AN ECONOMIC MODEL OF LOCAL EDUCATION EXPENDITURES WITHIN AN INDIVIDUAL UTILITY MAXIMIZATION FRAMEWORK: A THEORETICAL AND EMPIRICAL EXAMINATION

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PREFACE

The purpose of this dissertation is to develop and empirically test an economic model of local education spending. The analysis of governmental spending has been a relatively neglected area of economic inquiry. Fiscal theorists have, traditionally, concentrated almost entirely upon examining the tax side of the tax-expenditure process. Given the current importance of government activity in the economic system this seems unfortunate. It is hoped that the present study represents a small step toward presenting a methodology which is useful in analyzing, by using the traditional tools of economic analysis, a portion of government activity.

This investigation could not have been completed without the assistance of many persons. I would like to take this opportunity to express my appreciation for the guidance given by my advisory committee. Special gratitude is due Dr. Robert L. Sandmeyer for his direction, assistance, and generous contribution of time. Drs. Gerald M. Lage, Rudolph W. Trenton, and Larkin B. Warner also provided helpful suggestions which contributed to the dissertation.

Data inputs for the study were readily provided by the following: The Honorable O. Frank Thornton, Secretary of State, State of South Carolina; Mr. David S. Matthews, Supervisor of Internal Operations, State Department of Education, State of South Carolina; the Virginia State Board of Education; and the Virginia State Board of Elections. It is doubtful that the dissertation could have been completed without

the splendid assistance given my by these individuals and organizations.

Mr. Robert Klein performed data handling and processing tasks in his usual meticulous fashion. His assistance on this and other projects over the past three years has been invaluable. Mr. Jimmie O'Steen, Director of the Southeastern State College Computer Center, provided valuable assistance. I am indebted to Miss Anne Berryhill and Mrs. Velma Dittmar, who typed early drafts of the dissertation and to Miss Eloise Dreessen, who typed the final copy. A special appreciation is due Miss Berryhill for her patience and maintenance of good humor while struggling through the many early versions of the work. I also wish to thank Mrs. Mary Frye of Southeastern State College for reading the final draft and making suggestions which improved the clarity of the dissertation.

A special indebtedness is acknowledged to Dr. Lee B. Zink, former Director of the Technology Use Studies Center. Dr. Zink has served as employer, counselor, and friend throughout our several years of close association. His early interest and support are deeply appreciated.

Finally, I should like to express unique appreciation to my wife Jo and my family for their patience, understanding, and encouragement throughout a most trying period. Without these, the dissertation could have never been completed.

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CHAPTER I

INTRODUCTION

It is widely recognized that government activity constitutes an important facet of the economic landscape. The quantitative significance of contemporary government is illustrated by the fact that in 1968 government purchases of goods and services amounted to over $197 billion or 23 percent of the United States gross national product.[1] Economic theorists have carefully analyzed the impact of governmental spending upon the economic system. However, in aggregate models of economic activity the level of government spending is an exogenous variable--predetermined by the political process.

What is the so-called "political process"? In a democratic society, such a process must imply actions derived in some manner from individual choice. Individuals must, in a democracy, ultimately allocate resources for public as well as for private satisfaction of wants. But there is no accepted theory explaining the governmental expenditure variable that corresponds to the usual neoclassical market theory of consumer choice. Fiscal theorists have concentrated their attention almost exclusively upon the tax side of the tax-expenditure process. Economists have allocated few resources to providing an explanation of how individual choices produce collective fiscal outcomes. As

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[1]Derived from U. S. Department of Commerce, Survey of Current Business, Vol. 49 (February 1969), p. 9.

Buchanan notes:

> Little is known about individual actions and attitudes in collective, and specifically fiscal, choice. Scholars have simply not been interested in the behavior of individuals as political decision-makers. Once a democratic model for the political order is accepted, however, the gaps in our knowledge become apparent, and the need for many man-years of research is evident. Once we acknowledge that individuals as voters, or potential voters, in a broadly democratic political order ultimately determine the size of the public economy along with its composition, we are obligated to try to find out as much as we can about their choices.
>
> Very little research has been done; what has been done is widely scattered; much of this remains incomplete, and the questions asked have been the wrong ones.[2]

Collective decision models, with individual choice as the basic assumption underlying the analysis, may be developed using the traditional tools of economic analysis. In this view, "government" activity represents the collective decisions of individuals who are assumed to maximize utility.

Nature of the Present Study

The premise underlying the present study is that individuals make fiscal choices. An individualistic approach is assumed wherein individuals view collective choice decisions within the usual utility maximization framework. Thus, individuals are presumed to make fiscal choices which maximize utility in terms of their own utility functions. This should not be interpreted to imply that individuals are hedonistic in evaluating fiscal programs. Utility functions are assumed to contain altruistic motivations as well as purely personal considerations.

In support of the contention that individuals make fiscal choices

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[2] James M. Buchanan, Public Finance in Democratic Process (Chapel Hill: The University of North Carolina Press, 1967), p. 181.

as utility maximizers, a model of local public education spending is developed and empirically tested. The approach is to identify those factors which should influence individual demand for local public education. Since these factors primarily involve individual preferences for public education, which represent the "givens" of economic analysis, economic theory does not provide a guide for their selection.

A general framework for analyzing local government spending must then be developed. Many studies in recent years have been concerned with the determinants of government expenditures. In each of these studies the primary objective has been to identify variables which statistically explain variation in the level of expenditures among jurisdictions and to measure the relative importance of the selected variables. The usual model employs some form of cross-section regression analysis. A weakness common to most of these studies is the absence of a model or general framework for analysis. It is part of the objective of this study to provide an analytical framework for the local sector of the public economy. Once the theoretical model has been developed, a form of cross-section regression analysis will be used to test it. An analysis will be made for the year 1962, the latest year for which census data are available. The study will focus on county areas in Virginia and South Carolina for an empirical test of the model.

It should perhaps be emphasized that this study is concerned with an economic theory of local government spending. In constructing this theory, abstraction from the purely political aspects of the problem is made. An alternative to the economic interpretation is construction of a political behavior model. Adoption of the economic theory construct does not imply that observed political influences are unimportant in

the expenditure process. However, political decision making is a complex process and once a democratic order is postulated,

> ..., analysis that cuts through the maze and examines the cost and benefit calculus of the individual as if he makes specific choices seems necessary as a starting point.[3]

The individualistic economic model used here represents one approach to explaining fiscal outcomes. The alternative and equally applicable political approach is reserved for those with both the inclination and ability to pursue this path.

Plan of Study

In Chapter II the individualistic approach to explaining fiscal outcomes is examined. The theoretical model of local education expenditures, which is based upon results derived in Chapter II, is developed in Chapter III. Chapter III also contains a brief examination of recent studies which relate to the present investigation. Chapter IV is devoted to an empirical evaluation of the theoretical construction presented in Chapter III. The conclusions and implications to be drawn from the inquiry are presented in Chapter V.

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[3] Ibid., p. 5.

CHAPTER II

THE INDIVIDUALISTIC FRAMEWORK FOR ANALYSIS OF COLLECTIVE FISCAL CHOICE

The purpose of this chapter is to present the framework for analysis of fiscal choice to be used in this study. Results derived in this chapter provide the basis for building a model of local public education spending which follows in Chapter III. In constructing the local public education spending model, a basic premise is that an individualistic approach is appropriate. Two separate views of government--the organic and individualistic concepts--are briefly discussed.

Since this study is concerned with education, a quasi-public good, the distinction between a pure-public good and a quasi-public good is drawn. The discussion is in terms of the different manner in which each enters into the individual's utility function.

In order for the individualistic approach to be relevant it must be shown that true preferences for public goods will be revealed. It has been emphasized in the public finance literature that individuals will not reveal true preferences for public goods under a voluntary arrangement. A political mechanism, rather than a market mechanism, must therefore be employed to allocate resources to public use. The contention that true preferences will not be revealed is examined in light of institutions which would tend to eliminate the motive for such individual behavior. A simple collective decision model is used to

illustrate that the motive for strategic behavior is not present in the framework adopted here.

The Concept of Government

In developing a framework within which fiscal outcomes are analyzed, the concept of "government" must be briefly explored. The view of government used dictates the questions asked regarding fiscal institutions and collective outcomes. A difference in analysis can result, for example, when the frame of reference is the individual participating in collective choice situations as opposed to a reference system revolving around a budgetary authority presumed to make fiscal decisions. Therefore, it is necessary as a point of departure to define clearly the concept of government and the resulting reference system underlying the analysis in this study. It is particularly necessary here because the framework adopted is different from that found in most currently-accepted views on fiscal theory.

It has been suggested that there are essentially two separate and opposing conceptions of government upon which a theory of public finance may rest.[1] In the first, government is considered a unitary being. This organic concept of the state depicts government as a single decision-making unit for society. Viewed in this manner, the decision processes are supposed to be similar to those of a private individual making market choices. Individuals, in making private market choices, are assumed to behave as if they attempt to maximize their utility

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[1] James M. Buchanan, "The Pure Theory of Government Finance: a Suggested Approach," Journal of Political Economy, Vol. LVII (December 1949), pp. 496-505.

subject to budgetary constraints. Thus, the fiscal authority is, in the organic view of government, thought of as a "person" seeking to maximize the "public interest." For consistent decisions to be made, "government" must possess some integrated preference system which is based upon some criteria. This becomes the heart of the problem when it is assumed that government operates with the objective of fostering the public interest. There is no ultimately correct or agreed-upon criterion as to exactly what constitutes the public interest. Any concept of the public interest must of necessity be quite arbitrary. The public interest is, in the final analysis, what each individual views it to be.

> Many persons have in their minds quite misleading images of government in action. To some, government suggests only smoke-filled rooms, corruption, inefficiency and impending oppression. To others, government apparently means an impersonal device that will automatically act in the public interest. Moreover, since there is no agreed-upon conception of the public interest, each of these persons means his idea of the public interest. Thus many persons, especially when they say "The government should control this or that," apparently visualize government as an impersonal force that will automatically implement their policy ideas.[2]

The other view of government, accepted as the framework for analysis in this study, is purely an individualistic one. The focus of analysis is upon the individual as he participates in making collective choice fiscal decisions. In this view, government activity represents the collective decisions of individuals composing society.[3] In a

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[2]Roland N. McKean, Public Spending (New York: McGraw-Hill Book Company, 1968), p. 11.

[3]The proposition that the valuation of public goods originates with individual members of society is not new. An individualistic approach to examining governmental activity is an integral part of the works of Maffeo Pantaleoni, Emil Sax, Knut Wicksell, Erik Lindahl, and others. See Richard A. Musgrave and Alan T. Peacock, eds., Classics in the Theory of Public Finance (New York: St. Martin's Press, 1964).

broadly democratic setting this concept of government appears to be the appropriate one since the essential philosophical entity is the individual, rather than society.

In the economic analysis of market exchange, the underlying individual motivation is utility maximization. This same basic value motive is assumed to be predominant in the generation of collective outcomes via individual choice. Individual utility functions differ among individuals making up the collective body. Rationality is assumed as a behavior characteristic of individuals as they pursue collective fiscal outcomes. Thus, the representative individual can rank alternative combinations of goods and services in a consistent manner. This applies to public as well as private goods and services.

In order to predict behavior within the utility maximization model, some further propositions are required. The items making up individual utility functions are to some extent substitutes for each other. In the theory of consumer choice, a basic proposition is that the lower the price of a good or service the greater is the quantity demanded. The consumer sets out to maximize his utility subject to constraints imposed upon him. These constraints are the consumer's income and the prices of goods and services which enter his utility function. Basic to utility analysis is the proposition that some amount of a particular good will compensate the individual for giving up a unit of some other good. As the price of one good decreases, other goods become relatively more expensive; and more of the first good is demanded. The assumption here is that individuals derive benefits from public as well as private goods. The basic propositions regarding utility maximization and consumer demand are applicable to an examination of public goods.

Individuals, when confronted with making collective fiscal decisions, evaluate the marginal costs and benefits derived from specific public goods in terms of their own utility functions. It is further assumed here that fiscal outcomes are made directly by individual citizens through the voting process. Thus, the contention is that a model of direct democracy may be useful in describing observed governmental-expenditure levels. Under a decision rule of simple majority, the median preference member of the community is decisive.[4] The collective results will thus be in the direction most preferred by the individual whose preferences represent the community median.

It should perhaps be emphasized that the utility maximization hypothesis does not imply that individuals are solely motivated by selfish interests. Surely, individuals are motivated by altruistic as well as selfish considerations. The individual's utility function is derived from a complex of motivations which probably covers the whole spectrum between the two extremes of purely selfish to purely altruistic. In this respect, McKean notes that

> Each individual adjusts or makes decisions so as to maximize his utility as he sees it. In other words his behavior is generally purposeful, not random.[5] (footnote omitted) He takes those actions that he believes to be best. This does not imply that he is highly hedonistic, selfish, callous, materialistic, immoral, or anything of the sort. The thousands of items that contribute to an individual's "utility" in this sense include helping others, performing tasks well, playing and relaxing, exploring ideas, enjoying beautiful scenery and works of art, enjoying peace of mind, and adhering to moral codes and ethical rules--as well as having personal comfort, material goods, prestige and so on. Selfishness means attaching a higher value to helping oneself than helping others.[6] (footnote omitted) Utility maximization

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[4] Assuming single-peaked preference schedules in order that simple-majority voting yields some determinate outcome.

> simply means choosing purposefully in view of whatever utility a person ascribes to the things he wants (or doesn't want) and deems attainable.[5]

The utility maximization assumption permits the building of an economic model of government spending which is in some sense analogous to private market choice. No attempt is made here to develop such a comprehensive theory of governmental spending and taxing. Rather, the purpose is to derive a simple economic model of local educational expenditures within a given tax-institution framework. A given tax institution means that the method of allocating tax shares among individuals has been predetermined by an existing constitution. Thus, a governmental constitution might specify that a particular public good is to be financed from income tax revenue. Another level of analysis, which is not investigated here, has the objective of examining individual choice among tax institutions.[6] In this study, the predetermined tax institution represents a "given" to the indivdual as he participates in determining the use and allocation of public resources.

Pure-Public and Quasi-Public Goods

A pure-public good is usually defined as being available to be consumed in equal amounts by all.[7] The essential characteristic of a pure-public good is that benefits among individuals are indivisible. The

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[5] McKean, p. 13.

[6] This problem is examined in Part II of Buchanan, Public Finance in Democratic Process.

[7] Paul A. Samuelson, "The Pure Theory of Public Expenditure," Review of Economics and Statistics, Vol. XXXVI (November 1954), pp. 387-389 and "Diagrammatic Exposition of a Theory of Public Expenditure," Review of Economics and Statistics, Vol. XXXVII (November 1955), pp. 350-356.

equal-consumption definition presumably stems directly from the indivisibility property along with the recognition that to exclude individuals from enjoying benefits would be costly.

The orthodox equal-consumption definition is unduly restrictive and has been severely criticized.[8] The equal-consumption definition need not be implied in the case of a pure-public good. Thus, a pure-public good satisfies more than one demand and is produced for joint consumption by individuals.[9] The unit of a public good involved is a production unit which is made available for joint consumption. In terms of usual quantity and quality standards, individual consumption units may be widely divergent.[10]

In the case of a pure-public good, one individual's consumption in no way affects the benefits derived by another individual. Assuming one private good Z, one pure-public good X, and two individuals, this condition may be expressed in terms of utility functions as

$$(1)\quad U^i = U^i(Z^i, X^i + X^j)$$

$$(2)\quad U^j = U^j(Z^j, X^i + X^j)$$

where

Z^i = quantity of private good Z purchased by individual i

Z^j = quantity of private good Z purchased by individual j

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[8] See Julius Margolis, "A Comment on the Pure Theory of Public Expenditure," Review of Economics and Statistics, Vol. XXXVII (November 1955), pp. 347-349.

[9] On the development of public goods in terms of joint supply, see James M. Buchanan, The Demand and Supply of Public Goods (Chicago: Rand McNally and Company, 1968). A public good in Buchanan's analysis refers to any good that individuals have collectively decided to have provided by government. This definition of a public good is used in this study. The question of what goods should be provided by government is not an issue here.

[10] Ibid., p. 54.

X^i = quantity of pure-public good X "purchased" by individual i

X^j = quantity of pure-public good X "purchased" by individual j

Individual i derives benefits from individual j's consumption of X and vice-versa. In this case of a pure-public good, externalities are reciprocal.[11] Thus, the benefits derived by individual i from individual j's consumption of X are of the same nature as those derived by j from i's consumption of X.[12] The same unit of production is available for joint consumption by both individual i and individual j.

It may be argued that the polar case of a pure-public good has little relevance because in fact there are few, if any, such goods in existence. Most public goods have both specific (private) and public benefits associated with them. Public goods that yield some degree of divisibility among individuals are usually termed quasi-public goods. Public education provides an example. Governmentally provided education is not a pure-public good because benefits are divisible. Benefits are directly associated with those individuals being educated. It is also widely recognized that at the same time, as a result of the educational process, benefits do accrue to other individuals in the community. Thus, although benefits are primarily differential and private, reciprocal externalities in consumption are also generated. These latter benefits which flow from a literate community are equally available for all individuals to consume. In terms of utility

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[11] Only externalities in consumption are considered here. More frequently, externalities are identified with production rather than with consumption.

[12] Richard A. Musgrave, "Provision for Social Goods" (unpub. paper read for the International Economic Association in Biarritz, September 1966), p. 10.

functions, again assuming one private good, one public good, and two individuals (family units), this situation may be represented as

$$(3)\ U^i = U^i(Z^i, X^i, X'^i + X'^j)$$

$$(4)\ U^j = U^j(Z^j, X^j, X'^i + X'^j)$$

where

Z^i = quantity of private good Z purchased by individual i

Z^j = quantity of private good Z purchased by individual j

X^i = quantity of public good X "purchased" by individual i for private consumption

X^j = quantity of public good X "purchased" by individual j for private consumption

X'^i = quantity of public good X "purchased" by individual i for public consumption

X'^j = quantity of public good X "purchased" by individual j for public consumption

In this case, the public good (education) generates two distinct types of benefits; one is purely private and applies to own-consumption only, while the other is purely public and is equally available for joint consumption.[13]

Family units with an own-consumption component (families with children) derive differentially higher benefits than family units without an own-consumption component. At the same time family units or

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[13] Ibid., p. 14. Musgrave notes that recognition of the fact that governmentally-provided goods involve varying degrees of publicness hardly renders analysis in terms of the polar case useless (p. 10). He then demonstrates that a quasi-public good can readily be incorporated into the conventional-type analysis. That is, for purposes of analysis, public goods may be conceptualized in terms of the polar case of a pure-public good.

individuals without own-consumption components receive spillover benefits from direct beneficiaries. Thus, in the evaluation of benefits derived from public education, family units consider both own-consumption and consumption by other families in the community. In effect, each family or individual act of consuming education is thought of as being a separate public good.[14]

Public Goods and Revealed Preferences

In the private sector of the economy a price system operates to allocate resources among competing uses in accordance with consumer preferences. In the case of public goods, no such market mechanism exists to serve as a guide for resource allocation to the public sector. Various attempts have, however, been made to analyze government expenditures within a framework analogous to the private market concept. The benefit theory of taxation has developed along these lines.[15] According to the benefit approach, the demand for public goods depends upon preference patterns of individuals within society. In the individualistic framework, social wants are generated in the same manner as private wants. Individuals are assumed to derive benefits from publicly-provided goods and services and are capable of evaluating these benefits. Taxes are viewed as voluntary payments made by individuals in exchange

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[14]This procedure permits public goods (pure and impure) as well as private goods to be analyzed as public goods in the orthodox manner. For development of this, see Buchanan, The Demand and Supply of Public Goods.

[15]No attempt is made here to trace the development of this approach. For a review of specific contributions see Donald Ray Escarraz, "A Study of the Voluntary Exchange or Price Theory of Public Finance" (unpub. Ph.D. dissertation, Oklahoma State University, 1964), Chapters II and III.

for public goods provided on the basis of individual preferences.

A central problem in attempting to develop a positive theory of government within the individualistic framework has been the indivisibility of benefits from public goods and services among individuals. The individual knows that his contribution to providing public goods represents a small amount in relation to total costs involved. Under a voluntary situation, the individual might then view his benefit as independent of his personal contribution. Thus, the inducement is to conceal true preferences, since the individual cannot be excluded from the benefits of public goods.[16]

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[16]That individuals will not reveal true preferences for public goods has led to two observations in the literature. First, there exists multiple Pareto-optimum solutions to the problem of allocating resources to the satisfaction of public wants. Second, since the market mechanism fails, a political process which forces individuals to reveal true preferences must be substituted for the market process. The first implication has been emphasized by Paul A. Samuelson in "The Pure Theory of Public Expenditure," Review of Economics and Statistics, Vol. XXXVI (November 1954), pp. 387-389 and "Diagrammatic Exposition of a Theory of Public Expenditure," Review of Economics and Statistics, Vol. XXXVII (November 1955) , pp. 350-356. The second implication has been emphasized by R. A. Musgrave, The Theory of Public Finance (New York: McGraw-Hill Book Company, Inc., 1959), Chapters 4 and 6. For a critique and suggested modification of the Musgrave-Samuelson expositions, see Donald R. Escarraz, The Price Theory of Value in Public Finance (Gainesville, Florida: University of Florida Press, 1966).

For a critical examination of the contentions that consumers will not reveal true preferences and a single Pareto optimum will not be reached, see Ansel M. Sharp and Donald R. Escarraz, "A Reconsideration of the Price or Exchange Theory of Public Finance," Southern Economic Journal, Vol. XXXI (October 1964), pp. 132-139.

Knut Wicksell recognized the non-revelation of true preferences by individuals as a problem and concentrated upon the political aspects of public resource allocation. See "A New Principle of Just Taxation," in Richard A. Musgrave and Alan T. Peacock, eds., Classics in the Theory of Public Finance (New York: St. Martin's Press, 1964), pp. 72-118. Buchanan has emphasized Wicksell's contribution in Public Finance in Democratic Process and The Demand and Supply of Public Goods.

Buchanan argues that within a given institutional setting the existence of indivisibility of public-goods supply need not cause the individual to conceal his true preferences.[17] Most real-world political structures eliminate any incentive that the individual might have to conceal his true preferences for public goods because

> A "tax structure" or "tax system" is chosen quite independently of the particular allocation of benefits in specific instances, and expenditures are voted in the knowledge that taxes will, in fact, be distributed among individuals in accordance with the tax institutions in being.[18]

The individual motivation for strategic behavior along the lines which Musgrave has stressed depends upon the assumption that such behavior will modify the individual's tax-price. This possibility does not exist for the individual when fiscal choice is examined in a setting where the tax institution is predetermined. The distribution of tax-prices among individuals is exogenously determined by the tax institution at this level of fiscal choice. Since tax institutions are selected constitutionally, individual evaluations of public goods do not directly affect the per unit tax-price.[19]

These distinctions may be illustrated graphically. First, consider the voluntary-exchange model presented in Figure 1. Assume a three-person community in which the only difference among individuals is their demand for public good X.[20] The demand curves d_A, d_B, and d_C depict

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[17] Buchanan, Public Finance in Democratic Process, Chpater 9.

[18] Ibid., p. 119.

[19] Ibid.

[20] For simplicity assume that the public good represents a pure-public good. The analysis is not affected if the public good is quasi-public. For an explanation of how a quasi-public good can be analyzed in terms of the pure-public good case see Musgrave, "Provision for Social Goods."

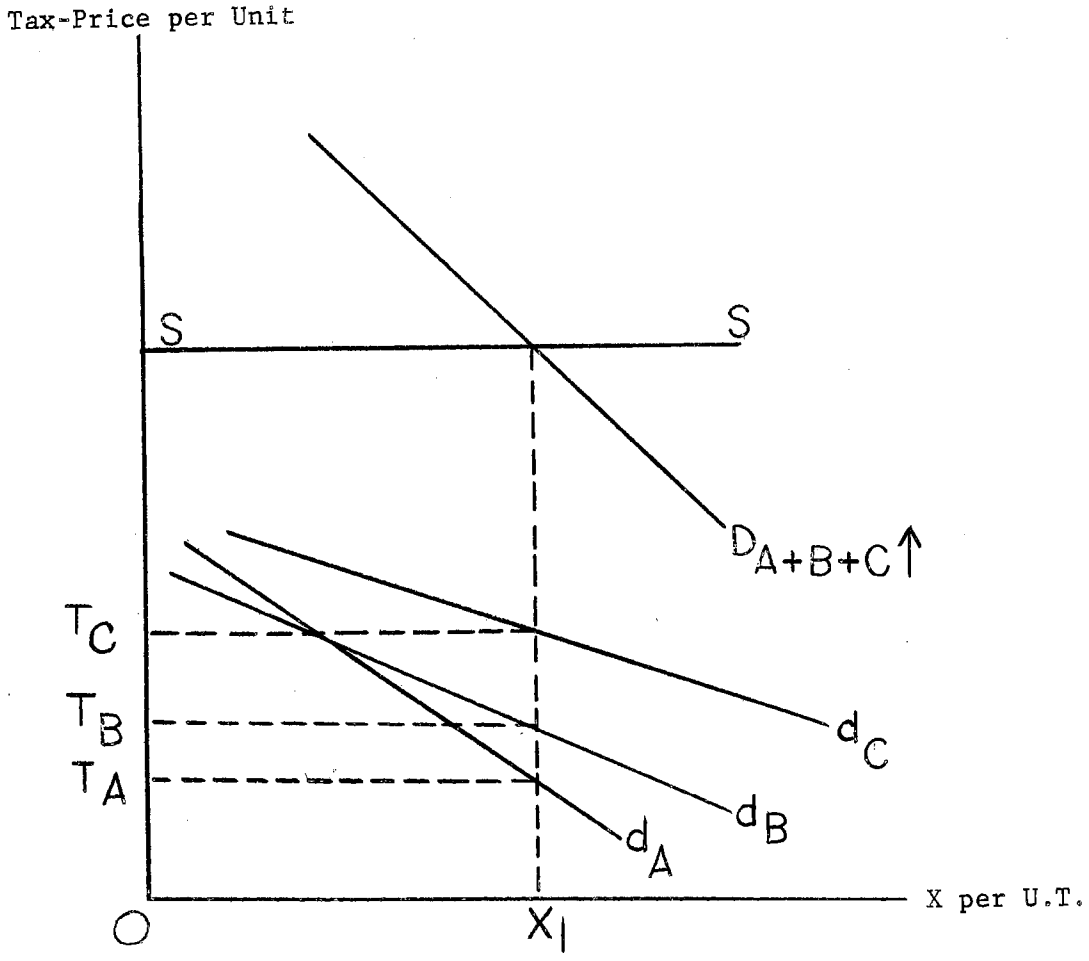

Figure 1. A Voluntary-Exchange Model

the respective individual demands for public good X. A vertical summation of individual demands, $D_{A+B+C\uparrow}$, represents the aggregate demand for the public good.[21] A vertical summation is indicated because the same unit of production is available for joint consumption. The supply curve, SS, assumes that public good X is produced under constant-cost conditions. Aggregate output, X_1, is determined by the intersection of SS and $D_{A+B+C\uparrow}$. Unit prices for the three individuals are than T_A, T_B, and T_C. Thus, the tax-price each individual faces depends directly upon his evaluation of the public good. Discrimination in tax-prices among individuals is then a result of different individual evaluations of the public good.

Now consider the situation where the amount of a public good provided is the result of a voting process. It is assumed here that direct democracy prevails wherein all citizens participate in the collective decision. Recall that the tax institution which allocates the tax bill among individuals is predetermined by the constitution. Table I may be used to illustrate the relationship between the assumed tax institution and tax-prices. Suppose that the community is composed of three individuals who each own taxable property assessed at $10,000. It is further assumed that the public good is produced at a constant marginal cost of $100 per unit. The predetermined constitution specifies that provision of the public good is to be financed through the levy of a tax on property within the jurisdiction. The total assessed property in the three-person community is $30,000, which represents the

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[21] The vertical summation of individual demand curves to determine aggregate demand in the case of a public good is associated with Howard R. Bowen, Toward Social Economy (New York: Rinehart and Company, Inc., 1948), pp. 177-180.

TABLE I

RELATIONSHIP BETWEEN PUBLIC GOOD SUPPLY AND TAX-PRICE WHEN THE TAX INSTITUTION IS PREDETERMINED

Units of Public Good	Total Cost of Public Good	Assessed Property Value of Individual	Tax-Price per Unit of Public Good
1	$100	$10,000	$33.33
2	200	10,000	33.33
3	300	10,000	33.33
4	400	10,000	33.33
5	500	10,000	33.33
6	600	10,000	33.33
7	700	10,000	33.33
8	800	10,000	33.33
9	900	10,000	33.33
10	1,000	10,000	33.33

Note: The example assumes three individuals each with assessed property of $10,000.

sum of the individual $10,000 assessments. Suppose that, through a political process, the individuals decide to supply one unit of the public good. Thus, $100 is the sum that must be collected from the property tax for this purpose. The tax rate applied to assessed property is $100/$30,000 or 0.3333 percent. The tax-price per unit of the public good then becomes $33.33 (0.003333 X $10,000). Under the assumption of constant marginal costs in the supply of the public good, the tax-price confronted by the individual remains invariant over quantity.

Assume that the good under consideration is local public education.[22] Benefits as viewed by the family unit in terms of its own utility function include both specific (private) and indirect (public) benefits. Costs to the individual or family are estimated on the basis of how the given tax institution allocates tax shares.[23] The given tax institution specifies the manner in which tax shares are allocated to specific individuals. Suppose that the prior-determined constitution specifies that a property tax is to be used to publicly provide educational services. Then in terms of the individual decision calculus, the individual makes a cost-benefit evaluation of the public good in order to determine his preferred quantity. The individual will prefer

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[22] Indivisibility of benefits is not the central issue in this case. In the example that follows, the same principles apply to any public good. Since education is publicly provided the individual may still view the situation as similar to that of a pure-public good. That is, the motivation for concealing true preferences may still be present in the belief that full exclusion is not possible. Thus the individual may still think that he can derive the benefits from consumption of the public good without contributing his portion of the costs.

[23] Throughout the remainder of the discussion of this example, the term individual is used to refer to either individuals or individual family units.

that quantity where an incremental unit of output equates marginal costs and benefits.

Individual demand curves for the public good can be derived in the usual manner. It is assumed that, for each individual, the per unit tax-price remains invariant over quantity. Thus as quantities change the marginal tax per unit of output remains equal to the average tax per unit. This assumption permits an individual demand curve for the public good to be derived in the orthodox fashion.[24] To derive an individual demand curve for the public good, the individual is conceptually confronted with a series of alternative tax-prices and indicates the respective quantities demanded.

Again assume a three-person community in which the only difference among individuals is in their demand for public good X.[25] In all other respects, including those relevant for determining tax liabilities as specified in the predetermined tax-sharing arrangement, the three individuals are assumed to be identical. Determination of the quantity of public good X produced via a political process is illustrated in Figure 2. Based upon the predetermined tax-sharing arrangement, each individual estimates that provision of public good X results in a per unit tax-price of t_1. Preferred individual quantities are then x_1, x_2, and x_3. Assume that the decision rule for the combining individual votes to arrive at collective decisions is that of simple majority-voting. Individuals are assumed to have single-peaked preference schedules in order that a determinate outcome is produced under

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[24] Buchanan, The Demand and Supply of Public Goods, p. 44.

[25] The following discussion is based upon Buchanan, Public Finance in Democratic Process, Chapter 11.

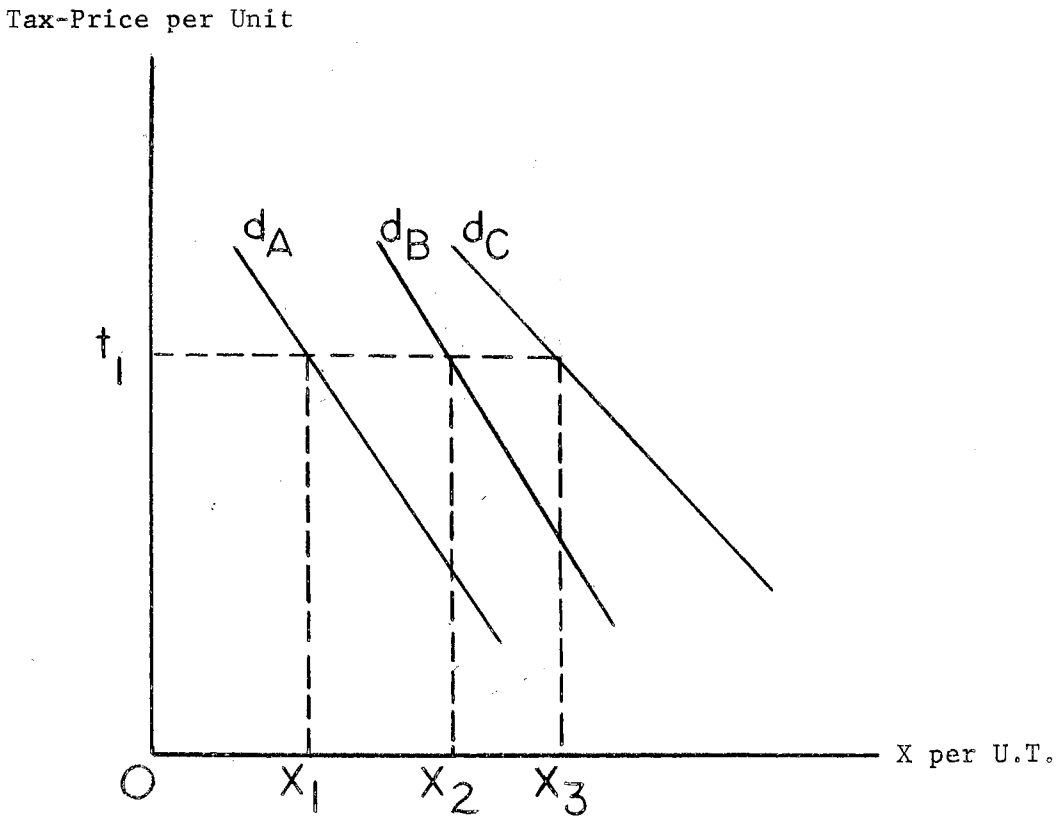

Figure 2. Collective Results Under Simple Majority Voting

the decision rule.[26]

Under simple majority-voting, the median-preference quantity is dominant. Thus individual B is decisive in the majority decision. Individual A will prefer output x_2 to any larger quantity whereas individual C will prefer the quantity x_2 to any smaller quantity. The implication of the median-man construction for the analysis is that fiscal collective outcomes can be predicted to be in the direction of those expected on the basis of median group preferences. Thus, x_2 is the quantity of educational services that will be produced and made available for each resident. The same physical output is then available for individuals to consume for both private and collective consumption use.

Figure 2 thus indicates that the individual's tax-price per unit does not depend upon his individual evaluation of the public good. That is, individual evaluations do not determine tax-prices. Individual tax-prices depend, in the example, upon the distribution of taxable property values.[27] There is therefore no incentive for the individual to conceal true preferences.

> This aspect of behavior is absent because we have postulated that a specific tax scheme is pre-selected, externally to the chooser, and that his own action cannot modify the

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[26] See Duncan Black, The Theory of Committees and Elections (Cambridge: Cambridge University Press, 1958).

[27] Assuming different values of property owned in the example, with equal preferences, the result would be different tax-prices for each individual. The differential tax-prices are still not dependent upon individual evaluations of the public good. Since the predetermined constitution specifies that the public good is to be financed by imposition of the property tax, resulting differences in tax-prices among individuals depends upon the distribution of taxable property values.

> tax-price per unit at which the public good is made available to him.[28]

Thus, when tax institutions are preselected, there is no reason to expect that individuals will behave strategically when making collective fiscal decisions.

Summary

The individualistic, rather than the organic, concept of government is accepted as the basis of analysis in this study. According to the individualistic view, there is no "public interest" above and beyond the interests of individuals composing the collective organization. Individuals ultimately determine resource allocation to the public sector. As individuals accomplish this task through political institutions, it is assumed that the basic value motive is utility maximization. This does not imply a selfish value pattern on the part of individuals. On the contrary, both hedonistic and altruistic motivations are assumed to be represented in individual utility functions. Individuals evaluate marginal costs and benefits associated with various governmental expenditures in terms of their own utility functions.

A pure-public good implies production units for joint consumption by individuals. In the case of a pure-public good, consumption externalities are reciprocal because benefits are indirect. A quasi-public good involves both specific (private) and collective benefits. Individual consumption elements thus combine private own-consumption

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[28] Buchanan, Public Finance in Democratic Process, p. 14. The individual does have some control over his tax-price per unit. This control is present, in the example, because the individual may choose to not own taxable property.

and spillover pure-public aspects. In the evaluation of benefits derived from quasi-public goods, the individual estimates these benefits in terms of his own utility function.

Economists, primarily Musgrave and Samuelson, have emphasized the indivisibility of benefits from public goods and services among individuals as being a crucial problem. Since the exclusion principle does not apply, under any voluntary-exchange concept, individuals are motivated to conceal their true preferences for public goods. Such motivation is present due to the belief that an individual can affect his own tax-price without any noticeable effect upon the public-good supply. Some political process, which in some fashion reveals true preferences, must serve as an alternative to a market mechanism in collective fiscal choice situations.

Buchanan argues that institutions can be so organized as to eliminate the motivation for individuals to conceal true preferences for public goods. Expenditure proposals are normally decided upon within a given tax institution. That is, expenditures are voted upon by individuals with the awareness that taxes will be allocated to them on the basis of a predetermined constitution. In this setting, the individual has no direct method of altering his per unit tax-price. A simple collective decision model, assuming direct democracy and majority rule, is used to illustrate that individual evaluations of public goods do not directly affect the per unit tax-price when the tax institution is predetermined.

CHAPTER III

AN ECONOMIC MODEL OF LOCAL EDUCATION EXPENDITURES WITHIN THE UTILITY MAXIMIZATION FRAMEWORK

An economic model of local education spending, based upon the individualistic framework presented in Chapter II, is developed in this chapter. This represents an attempt to remedy some of the shortcomings found in previous studies. To indicate what has been done, an overview of recent studies purporting to explain governmental activity is presented. The studies use statistical techniques to analyze variation in expenditure patterns among governmental units such as municipalities, states, and counties. Although great differences exist in terms of the unit of analysis and variables used to explain expenditure variations, some general uniformities emerge. Without going into detail regarding each major study, the generalizations gleaned from examination of this literature are presented here.

The procedure used to develop a model of local education spending is to isolate what appear to be the most relevant variables affecting the individual demand for this service. First, the level of local education spending is examined in an "other things equal" framework. Then an attempt is made to identify other key variables and specify the manner in which they relate to individual demand for local public education.

Studies of Governmental Expenditures

Since the publication in 1952 of Solomon Fabricant's The Trend of Government Activity in the United States Since 1900,[1] there has been a proliferation of studies dealing with the determinants of governmental expenditures.[2] No attempt is made here to review this extensive volume of literature. Some general comments, however, are in order regarding most of these empirical investigations.

Although different levels of government have been studied, two questions receive the focus of attention in the majority of studies examining the determinants of public expenditures. A host of socio-economic variables, such as income, population density, and urbanization, are used in different combinations to explain observed variation in expenditures. The questions asked have been how important is each

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[1] Solomon Fabricant, The Trend of Government Activity in the United States Since 1900 (New York: National Bureau of Economic Research, 1952).

[2] Some examples are: Robert F. Adams, "On the Variation in the Consumption of Public Services," Review of Economics and Statistics, Vol. XLVII (November 1965), pp. 400-405; John C. Bollens, ed., Exploring the Metropolitan Community (Berkeley: University of California Press, 1961); Harvey E. Brazer, City Expenditures in the United States (New York: National Bureau of Economic Research, Inc., 1959); Glenn W. Fisher, "Determinants of State and Local Government Expenditure: A Preliminary Analysis," National Tax Journal, Vol. XIV (December 1961), pp. 349-355 and "Interstate Variation in State and Local Government Expenditure," National Tax Journal, Vol. XVIII (March 1964), pp. 57-74; Werner Z. Hirsch, "Expenditure Implications of Metropolitan Growth and Consolidation," Review of Economics and Statistics, Vol. XLI (August 1959), pp. 232-241; Ernest Kurnow, "Determinants of State and Local Expenditures Reexamined," National Tax Journal, Vol. XVI (September 1963), pp. 252-255; Seymour Sacks and Robert Harris, "The Determinants of State and Local Government Expenditures and Intergovernmental Flows of Funds," National Tax Journal, Vol. XVII (March 1964), pp. 78-85; Seymour Sacks and William F. Hellmuth, Jr., Financing Government in a Metropolitan Area: The Cleveland Experience (New York: Free Press of Glencoe, 1961); S. Scott and E. L. Feder, Factors Associated with Variations in Municipal Expenditure (Berkeley: University of California Press, 1957).

variable in explaining expenditure variations and how much of the variation is explained by all the variables in combination.

The statistical method used to answer these questions is usually some form of multiple linear regression analysis. Predominantly cross-section studies are made. Various functional expenditure categories are designated as dependent variables and the several socio-economic characteristics are viewed as the set of independent, or explanatory, variables. The regression model then becomes

$$(1)\quad Y_{ij}=f(X_{1i}, X_{2i},\ldots, X_{ki}) + U_i$$

where

Y_{ij}=the actual per capita expenditure of the ith unit on the jth function

$(X_{1i}, X_{2i},\ldots,X_{ki})$ = the k independent or explanatory variables

U_i = a random term.

A measure of the over-all explanatory power of the model is given by the coefficient of determination (R^2). This coefficient indicates the percent of variation in the dependent variable explained by the chosen set of independent variables. The most common methods used to assess relative importance of independent variables are partial correlation coefficients, elasticity coefficients, and beta coefficients.[3]

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[3]A partial correlation coefficient indicates the degree of association between the dependent variable and a single independent variable, holding all other independent variables constant.

Elasticity coefficients indicate the percentage change in a dependent variable associated with a one percent change in a single independent variable, holding all other independent variables constant. Since elasticity coefficients are relative measures, they are directly comparable.

Beta coefficients also permit relative comparisons among independent variables since these coefficients involve standard units of measure. A beta coefficient measures the association that a change of

Statistical analyses have been carried out both within and among states. The unit of analysis is quite diverse. Some studies examine combined state-local expenditures; some use only state expenditures; some consider only local expenditures; others study only municipal expenditures; others limit the analysis to jurisdictions within a metropolitan area; while still other studies aggregate local expenditures within a county area to obtain an analytical unit. Partly because of this diversity, a summary of each major study would not appear to contribute to the analysis here.

It is also difficult to compare studies in this area because different investigators use differing arrays of independent variables. Thus the various coefficients generated by the regression analyses are not generally comparable among studies. Some generalizations are possible, however. An examination of these studies reveals that near unaminity exists concerning the importance of income. Along with income, urbanization and population density have been used as the "basic" variables explaining expenditure variation. Intergovernmental revenue--Federal and state aid--is considered a crucial variable. It is also generally concluded that each expenditure function should be investigated separately.

Several of the studies mentioned above include educational spending as one of the functional categories analyzed. In addition, a few

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one standard deviation in a specific independent variable has with the standard deviation of the dependent variable. The beta coefficient indicates the relative importance of each net regression coefficient in the estimating equation. A net regression coefficient gives the change in the dependent variable associated with a one unit change in an independent variable, the effect of other independent variables being taken into account. Regression coefficients are not directly comparable because their magnitude depends upon the unit of measure for the independent variable.

studies concentrating only on educational outlays have been conducted.[4] Besides the basic income, density, and urbanization variables, several other independent variables thought to be specifically related to education are usually included in the analysis. These are Federal and state aid, the number of school age children in relation to population, the proportion of children enrolled in private schools, property valuation, the percentage of the population which is non-white, and the percent of students in secondary grades.[5]

A major criticism of most of these empirical studies is that it is not always clear what purpose the analysis is supposed to serve. Thus, Morss observes that

> While there has been a large outpouring of statistical analyses purporting to explain state and local expenditures or some aspect thereof, there has been little written consideration given to the purpose these analyses are to serve.[5] (footnote omitted) This is unfortunate, for these purposes should be of primary importance in deciding on the research approach to be taken.[6]

Sometimes the objective appears to involve discovering new independent

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[4]Examples are: George A. Bishop, "Stimulative Verses Substitutive Effects of State Aid in New England," National Tax Journal, Vol. XVII (June 1964), pp. 133-143; Otto A. Davis, "Empirical Evidence of Political Influences Upon the Expenditure Policies of Public Schools," The Public Economy of Urban Communities (Baltimore: The Johns Hopkins Press, 1965), pp. 92-111; Werner Z. Hirsch, "Determinants of Public Education Expenditures," National Tax Journal, Vol. XIII (March 1960), pp. 29-40; Jerry Miner, Social and Economic Factors in Spending for Public Education (Syracuse: Syracuse University Press, 1963); Edward F. Renshaw, "Note on the Expenditure Effect of State Aid to Education," Journal of Political Economy, Vol. LXVIII (April 1960), pp. 170-74; and Sherman Shapiro, "Some Socioeconomic Determinants of Expenditures for Education: Southern and Other States Compared," Comparative Education Review, Vol. 6 (October 1962), pp. 160-166.

[5]Miner, pp. 55-56.

[6]Elliott R. Morss, "Some Thoughts on the Determinants of State and Local Expenditures," National Tax Journal, Vol. XIX (March 1966), pp. 96-97.

variables that step up the explanatory power of the model. An increase in R^2 over that obtained by a previous study is certainly viewed with great satisfaction. The explanatory power of the model is important; it should not be the primary objective, however. To provide a theoretical framework within which the analysis proceeds should be an initial objective. The questions asked then flow from the theoretical construction. Most of the previous studies present no theoretical framework. Also, the problem of intercorrelation among independent variables is usually not adequately dealt with. For example, the Miner study uses some 20 independent variables in the regression analysis. Some of the variables are rather highly intercorrelated. When this is the case, the precision of measures indicating separate effects is in doubt. Some technique for dealing with the problem of multicollinearity should be considered. A major objective of the present inquiry is to avoid these shortcomings.

Objective of Study

A premise of this study is that individuals make fiscal choices. It is further assumed that individuals are utility maximizers. Therefore individuals make fiscal choices to maximize utility as they view it in terms of their own utility functions. This then implies that it becomes necessary to examine individual demand for public goods.

The objective of the present study is to develop and empirically test an economic model of local public education spending. The quantity of public education demanded is a function of the tax-price, other things equal. Other things which are expected to influence the demand for local public education are the type of institutions providing the

service (dependent or independent school district), preference variables (income, education, the extent of private education which reflects the availability of substitutes, and the racial composition of the community), and state and Federal aid to local education.

A Model of Local Governmental Spending

A simple model of local governmental spending can be derived from the familiar propositions of demand theory.[7] In the theory of consumer choice, it is assumed that the individual attempts to maximize utility subject to a budgetary constraint. Assume that the decision-making unit is the family and that the individual family unit knows its utility function, money income, and prices of all goods and services. The theory of consumer choice indicates that the family unit seeks some combination of purchases which maximize

$$(1)\quad U^i = U^i(Z_1^i,\ldots,Z_n^i,g_1,\ldots,g_m)$$

where

U^i = utility function of the ith family

Z_k^i = quantity of the kth private good purchased by the ith family

g_t = expenditure of the local government on tth public good

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[7]The formulation here follows James L. Barr and Otto A. Davis, "An Elementary Political and Economic Theory of the Expenditures of Local Governments," The Southern Economic Journal, Vol. XXXIII (October 1966), pp. 149- 165.

The family budget provides a constraint upon consumer behavior. In order to derive the family budgetary constraint, assume that the only source of revenue for the local government is the property tax and the constitution specifies an annually-balanced budget. Thus, for the local governmental unit, by definition

$$(2) \quad \sum_{t=1}^{m} g_t = \sum_{j=1}^{s} rP_j$$

where

r = tax rate on assessed property value

P_j = assessed value of the jth unit of taxable property within the jurisdiction

The family budget constraint then becomes

$$(3) \quad \sum_{k=1}^{n} p_k Z_k^i + rP^i = y^i$$

where

p_k = price of the kth private good

P^i = assessed value of taxable property owned by the ith family

y^i = annual money income of the ith family

An alternative form of the budget constraint is derived by substitution of r from equation (2) into equation (3). This substitution yields

$$(3') \quad \sum p_k Z_k^i + \frac{\sum g_t}{\sum P_j} P^i = y^i$$

The family unit then seeks some combination of purchases which maximizes (1) subject to (3'). Maximization of (1) subject to (3') by use of a Lagrange multiplier produces the necessary conditions for consumer

maximization in the private goods market as

$$(4)\quad u_k^i - \lambda^i p_k = 0, k = 1,2,\ldots,n$$

where

$$u_k^i = \frac{\partial U^i}{\partial Z_k^i}$$

In equilibrium, the Lagrange multiplier λ^i is equal to the common value of the ratios u_k^i to p_k. Thus,

$$(5)\quad \lambda^i = \frac{u_1^i}{p_1} = \frac{u_2^i}{p_2} = \ldots = \frac{u_n^i}{p_n}$$

The parameter λ^i may then be thought of as the ith consumer's marginal utility of income. The result obtained from the traditional theory of consumer choice is derived from (4). Thus,

$$(6)\quad p_k = \frac{-1}{\lambda i} u_k^i$$

indicates that the consumer equates price and the weighted marginal utility of the kth good in order to maximize satisfaction.

Using Lagrangian procedures again, the necessary condition for maximizing local government expenditures is derived:

$$(7)\quad u_t - \lambda^i \frac{P^i}{\Sigma P_j} = 0, t = 1,2,\ldots,m$$

where

$$u_t = \frac{\partial U^i}{\partial g_t}$$

Equation (7) may be rewritten as

$$(8)\quad \frac{P^i}{\Sigma P_j} = \frac{-1}{\lambda^i} u_t, t = 1,2,\ldots,m$$

Equation (8) implies that if the ith family is not a property owner ($P^i = 0$), it will prefer a level of spending on the tth local public good that equates the family's marginal utility of expenditure to zero. If the ith family owns property ($P^i > 0$), the preferred level of spending on the tth local public good is one that equates the family's marginal utility of expenditure weighted by the reciprocal of λ^i to the ratio of the family's assessed property value over the assessed value of all taxable property in the jurisdiction. The ratio indicates the percentage of assessed local property owned by the ith individual residing in the jurisdication. Individuals will, other things equal, prefer a smaller local expenditure on g_t the larger this percentage becomes. Thus, $P^i/\Sigma P_j$ appears to be a crucial determinant of local expenditure decisions. The ratio, in fact, performs the function assigned to prices in the traditional theory of consumer choice.[8]

Other Factors Affecting Individual Choice

There are probably many factors that enter into the individual decision process regarding public expenditures. The utility maximization assumption regarding individual motivation allows for many diverse utility functions among individuals. As such, the assumption in and of itself offers little guidance in determining factors related to individual demand for public goods. Almost any fiscal outcome observed could probably be accounted for by some version of the utility maximization model. Used in this manner, however, the model would become useless as an explanatory device. Thus, some restrictions must be

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[8] Ibid., p. 152.

placed upon variations among individuals in order to derive meaningful propositions about the expenditure variable. The task at this point is to identify key variables and specify the manner in which they affect individual choice behavior.

Type of School District

Individuals are assumed to determine local education outlays on the basis of a cost-benefit decision calculus. The institutions through which costs and benefits are presented to the individual are assumed to influence individual choice. Institutions become relevant to the extent that the same public good is provided through different institutions. The Bureau of the Census distinguishes between two types of governmental institutions which provide public education:

> (1) Those which are administratively and fiscally independent of any other government and are classified for Census Bureau reporting of governmental data as independent school district governments; and (2) those which lack sufficient autonomy to be classified as independent governmental units. Each of the latter, for Census statistics, is treated as a dependent agency of some other government--...[9]

The independent school districts represent the largest group of special-purpose governments in the country. As a government, the independent school district performs only the education function. In performing the educational responsibilities, the independent school district essentially has administrative and fiscal autonomy. Education services provided by dependent school districts are a product of multipurpose governments such as counties and municipalities. Education in this

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[9] U. S. Bureau of the Census, Census of Governments: 1962, Vol. I, Governmental Organization (Washington, D. C.: U. S. Government Printing Office, 1963), pp. 5-6.

arrangement represents a part of the "bundle" of services provided by some governmental unit.

Implicit in the analysis of fiscal choice thus far is the assumption that the individual chooses preferred quantities of a public good, one at a time, within a given tax institution. This framework depicts a system variously described as earmarking, revenue dedication, or revenue segregation. The independent school district corresponds to this kind of system. General-fund financing, which corresponds to the dependent school district arrangement, is the alternative to an earmarking system. Earmarking is a preferred fiscal institution from the standpoint of the individual as he makes fiscal choices.[10] Under an earmarking institution, the individual can, conceptually, make a separate cost-benefit analysis concerning each public outlay. In this manner a more efficient allocation via the individual voter's choice calculus is achieved. It should be emphasized that the term earmarking does not refer to a situation where a specific tax is constitutionally dedicated to a specific expenditure function without annual review. Most earmarking arrangements are probably of the nature where the proceeds from a given tax are automatically allocated to a specific function each budgetary period.

In making collective fiscal decisions under the general-fund

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[10]An earmarking institution is emphasized in the work of Knut Wicksell. See "A New Principle of Just Taxation" in Richard A. Musgrave and Alan T. Peacock, eds., Classics in the Theory of Public Finance (New York: St. Martin's Press, 1964), pp. 72-118. Erik Lindahl's theory of the public sector, derived within the individualistic concept of government, also implies a system of earmarking. On this point, see Leif Johansen, "Some Notes on the Lindahl Theory of Determination of Public Expenditures," International Economic Review, Vol. 4 (September 1963), pp. 346-358.

institution, individuals determine the total amount to be spent on a group of public goods. Allocation among specific functions composing the bundle is made by the budgetary authority. A bundle arrangement must create a considerable amount of uncertainty for the individual as a participant in collective fiscal choice.

> If this mix is not announced in advance to the voter-taxpayer, he must try to predict the outcome of another decision process, in which he may or may not participate, a process that need not exist at all in the more straight-forward earmarking model where all revenue sources are specifically dedicated.[11]

Economists have almost universally condemned the practice of earmarking, or dedicating, tax revenues. A standard type of statement on earmarking is that

> Probably the worst danger to good budget practice in state governments is the dedication of particular funds, from which particular activities are financed. By this system, income is channeled into any number of separate accounts, large and small, with little opportunity for transfer between accounts.[12]

> The segregation and earmarking of special receipts for special purposes has the effect of removing from budget practice its real reason for being--the intelligent control of expenditures.[13]

It is thus argued that the earmarking fiscal institution imposes constraints upon budgetary choice with a consequent inferior allocation of funds. Buchanan suggests that the censure of earmarking derives from the view of the budgetary authority as a "person" confronted with a situation analogous to that of an individual seeking to maximize his

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[11] Buchanan, Public Finance in Democratic Process, p. 73.

[12] Philip E. Taylor, The Economics of Public Finance (3d ed., New York: The Macmillan Co., 1961), p. 30.

[13] Ibid., p. 32.

utility in the private market.[14] Constraints on choice in the market situation would limit the individual to an inferior position on his utility surface.

Buchanan argues that this private market analogy is not appropriate to the analysis of collective choice. The reference system should not be that of a budgetary authority, but that of the individual as he confronts budgetary alternatives. Viewed within the individualistic framework, earmarking is closely analogous to the situation confronting an individual in market choice. In the private sector, an individual usually purchases each good or service separately, within the limits allowed by complementarity, and bases the purchase decision upon a cost-benefit evaluation. Only under a fiscal institution involving revenue segregation is the individual as a collective decision-maker in a position approximately comparable to the private market analog.[15]

Another aspect of the disapproval of earmarking as an institution relates to the usual concept of earmarking without annual budgetary review. Criticism of automatic allocation of revenues from a specific tax source to a specific public good is valid. In this situation, expenditures are automatically determined by the amount of revenue generated by the tax institution. Thus, no type of budgetary control exists under an earmarking institution of this nature. Certainly, an earmarking system without an annual reevaluation of costs and benefits does not contribute to a rational allocation of resources to the public

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[14] Buchanan, Public Finance in Democratic Process, p. 73.

[15] Ibid.

sector.[16]

General-fund financing of public goods, contends Buchanan, has its counterpart in the private sector tie-in sales arrangement. In the private market tie-in sale, the individual is forced to take a bundle of goods within which the component mix is independent of the individual's preferences.[17] Tying arrangements in private markets can be viewed as a device to extract a portion of the buyer's consumer surplus by forcing him into making an all or nothing choice.[18] In the public expenditure case of general-fund financing, the individual is also forced into purchasing a bundle of goods where the mix is determined independently by the budgetary authority. Margolis has suggested that specific projects within a general-fund budget generate consumers' surpluses to the extent that individuals are willing to vote for the entire package rather than lose the specific project.[19]

For purposes of illustration assume that only two services, police protection and education, are provided collectively in the community under consideration.[20] Further suppose, to eliminate the uncertainty

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[16]For implications of this concept of earmarking see Elizabeth Deran, "Earmarking and Expenditures: A Survey and a New Test," National Tax Journal, Vol. XVIII (December 1965), pp. 354-361.

[17]On tie-in sales see M. L. Burstein, "The Economics of Tie-In Sales," Review of Economics and Statistics, Vol. 42 (February 1960), pp. 68-73 and Ward S. Bowman, Jr., "Tying Arrangements and the Leverage Problem," Yale Law Journal, Vol. 67 (March 1957), pp. 19-36.

[18]Burstein, p. 68.

[19]Julius Margolis, "Metropolitan Finance Problems: Territories, Functions, and Growth," Public Finances: Needs, Sources, and Utilization (Princeton: Princeton University Press, 1961), p. 242.

[20]The following analysis is based upon Buchanan, Public Finance in Democratic Process, pp. 74-82.

inherent under the general-fund arrangement, that the budgetary mix is made known to all individuals prior to collective decision making on expenditures. Also assume that the tie-in is defined in terms of the specific proportion of the total budget which is allocated to each of the two public services. There exists some budgetary mix which produces the same results irrespective of the institutional form.

> That is to say, there will always be one budgetary ratio that will cause the individual to "vote for" the same relative quantities of the two services and the same total public outlay under general-fund financing that he would "vote for" under complete earmarking. This unique solution may be called "full equilibrium" for the individual, and this solution may be used as a starting point for the more extended analysis.[21]

As a point of departure, assume that the full equilibrium ratio prevails. Then, by assumption, the given budgetary mix produces no differential impact upon individual choice as between institutions. The individual will desire the same quantity of services and spending level under either institution.

Differing results under the two institutions are derived when other than the full equilibrium ratio is presented to the individual in the general-fund arrangement. To illustrate, assume that earmarking has prevailed but a change to the general-fund institution is made. Further assume that the budgetary ratio is changed to favor education relative to police protection. Since the new budgetary ratio now favors educational services, this suggests more education and less police protection is demanded by the individual in the tie-in institution than is the case when full equilibrium prevails. Thus, a budgetary ratio other than the full equilibrium one will produce distortion

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[21] Ibid., p. 76.

in individual choice under general-fund financing.[22] In being forced to purchase a bundle of services the individual moves to some less preferred position on his utility surface.[23] The assumption here is that education is favored by the budgetary ratio in the general-fund institutional arrangement. This is likely to be the case, for

> Public services, like education, that provide differentially higher benefits to particular subgroups in the community (in this case families with children) will tend to be relatively more demand elastic than services that are more "general" in benefit incidence (say, police protection). By requiring taxpayers who do not secure direct benefits from publicly provided educational services to purchase general community services such as police only through a tie-in arrangement with education, some "tax-payers' surplus" is captured, as Margolis has suggested. The bachelor who might vote against additional school district taxes (and expenditures) may vote for additional taxes to finance a bundle of services that includes education.[24]

The institution for provision of local education must thus be considered as a factor which affects behavior as the individual participates in fiscal choice decisions.

Preference Variables

There is no well-defined body of economic theory which can serve as a guide to selection of preference variables. Preferences represent the "givens" of economic analysis and in relation to public goods the preference area is not well understood. Furthermore, empirical research

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[22] Ibid.

[23] Ibid.

[24] James M. Buchanan, "The Economics of Earmarked Taxes," Journal of Political Economy, Vol. LXXI (October 1963), p. 466.

seldom deals with individual preferences for public goods.[25]

There is almost unanimous agreement among economists that income is positively associated with public expenditures. Such an income-related preference is an essential ingredient of models depicting individual behavior in private market choice situations. The assumption here is that individuals have positive income-related preferences for public as well as private goods.

It may be argued that this assumption is inconsistent with a narrowly conceived view of self-interest. A narrow concept of self-interest produces the following individual calculus reasoning. In evaluating an expenditure increase proposal, the individual calculates both the additional benefits and costs which will affect him should the proposal be approved by community residents. If the estimated additional benefit exceeds the additional cost, the utility-maximizing individual will vote in favor of the proposal. Since local systems are financed primarily by property taxation, low-income residents in the community are likely to be more in favor of increased spending than would be high-income groups. This is because the relative cost is greater for the upper-income individuals, to the extent that these individuals also own property of greater value, since the ratio of

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[25] See, however, the following: William C. Birdsall, "A Study of the Demand for Public Goods," in Richard A. Musgrave, ed., Essays in Fiscal Federalism (Washington, D. C.: The Brookings Institution, 1965), pp. 235-294; Elizabeth Likert David, "Public Preferences and State-Local Taxes," in Harvey E. Brazer, ed., Essays in State and Local Finance (Ann Arbor: Institute of Public Administration, The University of Michigan, 1967), pp. 74-106; Eva Mueller, "Public Attitudes Toward Fiscal Programs," Quarterly Journal of Economics, Vol. LXXVII (May 1963), pp. 210-235; James Q. Wilson and Edward C. Banfield, "Public Regardingness as a Value Premise in Voting Behavior," American Political Science Review, Vol. 58 (December 1964), pp. 876-887.

benefits to cost declines for them as income increases. Thus, assuming a narrow version of the self-interest motivation, higher-income individuals could be predicted to indicate less support for public programs than lower-income individuals.

This result is not, however, expected if a broader concept of self-interest is used, as is done here. The higher-income individual, to a greater extent than lower-income individuals, may recognize and value more highly the "spillover" benefits accruing to other individuals generated by public expenditures. Individuals, in regard to education spending, may value highly living in a community where education receives a generous share of public resources. A certain sense of security may derive from living in a community where well-informed citizens emerge from the local educational system.

It is likely that income per se does not produce this result. The level of education attained by the individual is interwoven with income as an explanatory factor. The educational process should sufficiently broaden individual horizons to the extent that their utility functions take into consideration the benefits from public spending that accrue to other individuals. Presumably, the greater the level of educational attainment, the more likely the individual is to take this view. Thus, it is assumed that the more education an individual has, the more accurately he is able to evaluate benefits from educational spending. This further implies, in the present context, a greater preference for educational spending. However, since education and income are generally closely associated, their individual influence on

educational spending may be difficult to ascertain.[26]

An important concept in the demand for a good or service in the theory of private consumer choice is the availability of good substitutues. Private education offers a substitute for public provision of the educational function. To the extent that families prefer a private education for their children, the demand for public educational services is reduced accordingly. It is therefore assumed that a greater percentage of pupils attending private schools is associated with a lower level of public education outlays.

The racial composition of the community is also expected to exert an influence upon local expenditure decisions. A greater presence of non-whites in the community is expected to result in a lower level of local public educational outlays. The negative association between non-whites and local educational spending is expected for two reasons. First, non-white preferences for educational services may not be effectively registered because of their exclusion from the voting process.[27] Second, to the extent that non-white preferences for education are registered they may be lower than white preferences for educational services. The non-white may attach a smaller benefit to education because of expected job-discrimination after the educational process is completed. Again, it may be difficult to evaluate the relative

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[26]The problem of intercorrelation among independent variables is treated in Chapter IV where the statistical model is developed.

[27]This is particularly relevant here because of the region chosen for an empirical test of the educational spending model. As discussed in the next chapter, Virginia and South Carolina are chosen for an empirical evaluation. For discussion and analysis of southern politics wherein disenfranchisement of non-whites is dealt with, see V. O. Key, Jr., Southern Politics (New York: Alfred A. Knopf, Inc., 1949).

importance of this variable because it is probably closely associated negatively with both income and educational attainment.

In summary, two characteristics of individuals are assumed to be positively associated with higher public spending on local education. These characteristics, which are termed preference variables, are income and educational attainment. Two other preference variables, the percentage of pupils attending private schools and the percent of nonwhites, are assumed to be negatively associated with local public educational spending.

Federal and State Aid

Education expenditures usually involve significant amounts of Federal and state aid. These funds are primarily state subsidies to local school districts. Such subsidies should not alter the benefit aspect of the individual calculus. They do, however, affect the cost side of the individual cost-benefit decision framework. In essence, the aid is analogous to a price decrease where the locality is able to purchase additional units at a discount. Thus, it is postulated that state and Federal aid to education is positively associated with local spending on the education function. Several recent studies suggest the prevalence of such an association.[28] These studies have, however,

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[28] See Roy W. Bahl and Robert J. Saunders, "Determinants of Changes in State and Local Government Expenditures," National Tax Journal, Vol. XVIII (March 1965), pp. 50-57; "Factors Associated with Variations in State and Local Government Spending," Journal of Finance, Vol. XXI (September 1966), pp. 523-534; George A. Bishop, "Stimulative verses Substitutive Effects of State Aid in New England," National Tax Journal, Vol. XVII (June 1964), pp. 133-143; Ernest Kurnow, "Determinants of State and Local Expenditures Reexamined," National Tax Journal, Vol. XVI (September 1963), pp. 252-255; Jack W. Osman, "The Dual Impact of Federal Aid on State and Local Government Expenditures," National Tax

been criticized for the manner in which the aid variable is used in the analysis.[29] The amount of per capita Federal aid to the function being considered is usually designated as one of the independent variables in the regression analysis. The dependent variable, per capita expenditures, includes the aid component as well as outlays financed from own sources. Thus, as indicated above, the usual regression model becomes

$$(1)\quad Y_{ij} = a + b_1X_{1i} + b_2X_{2i} + \ldots + b_kX_{ki} + U_i$$

where

Y_{ij} = the actual per capita expenditure of the ith unit on the jth function (includes aid to jth function)

$(X_{1i},X_{2i},\ldots,X_{ki})$ = the k independent or explanatory variables

U_i = a random term

Let X_k represent the amount of per capita aid for the jth function. The estimated regression coefficient $\hat{b}_k$ of the aid variable then indicates the change in Y associated with a unit change in per capita aid (X_k). If $0<b_k<1$ then aid is defined as substitutive. Although per capita spending on the jth function increases as per capita aid increases, per capita spending from local sources on the jth function is reduced.

Journal, Vol. XIX (December 1966), pp. 362-373; and Seymour Sacks and Robert Harris, "The Determinants of State and Local Government Expenditures and Intergovernmental Flows of Funds," National Tax Journal, Vol. XVII (March 1964), pp. 75-85.

[29] See Elliott R. Morss, "Some Thoughts on the Determinants of State and Local Expenditures," National Tax Journal, Vol. XIX (March 1966), pp. 95-103; Wallace E. Oates, "The Dual Impact of Federal Aid on State and Local Government Expenditures: A Comment," National Tax Journal, Vol. XXI (June 1968), pp. 220-223; Thomas F. Pogue and L. G. Sgontz, "The Effect of Grants-in-Aid on State-Local Spending," National Tax Journal, Vol. XXI (June 1968), pp. 190-199.

Thus, aid has in effect been substituted for local revenue sources. In the usual formulation, if $\hat{b}_k > 1$ then aid is defined as stimulative.[30] That is, for each dollar increase in per capita aid on the jth function, per capita spending on that function increases by more than one dollar. In this case aid has then had the effect of stimulating per capita outlays from local revenue sources on the jth function. The estimated aid regression coefficient $\hat{b}_k$ is usually thus interpreted as a measure of the cause-effect relationship between aid and local spending. The causality is assumed to be a one-way relationship running from aid to local spending.

Fisher argues that this interpretation may not be valid.[31] Aid may in part be determined by expenditures. For certain types of aid, such as those with matching-grant provisions, more aid is the result of more spending from own sources. Thus, aid in this case cannot be said to determine expenditures since aid and expenditures are functions of each other and are simultaneously determined.

Pogue and Sgontz argue that a non-zero value of $\hat{b}_k$ in equation (1) is expected under any of the following conditions:[32]

1) Expenditures are determined, in part, by aid payments with expenditures having no effect on aid payments.
2) Aid payments are determined, in part, by expenditures with aid payments having no effect on expenditures.
3) Aid payments and expenditures are jointly determined, i.e., a function of each other. This is essentially Fisher's case.

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[30] This is not always clearly stated. For example, Sacks and Harris have been criticized by Morss for their failure to note that expenditures from own funds are not increased by aid unless $\hat{b}_k > 1$.

[31] Fisher, "Interstate Variation in State and Local Government Expenditure."

[32] Pogue and Sgontz, p. 192.

> 4) At least some of the factors determining expenditures also influence aid; and, the set of variables $X_1,\ldots,X_{k-1}$ does not include all of these common determinants. Instead, some of the factors which influence both aid and expenditures are included in the error term (U).

Only if statements 2, 3, and 4 are invalid can it be concluded that the estimated aid regression coefficient is an unbiased estimate of the casual influence of aid on expenditures.[33] In evaluating the impact of aid upon spending, an implicit assumption has been that statements 2, 3, and 4 are in fact invalid.[34] However, given the nature of some aid programs, as noted above, this becomes a questionable assumption. Statements 2 and/or 3 are valid when matching provisions are associated with aid so that when spending from own sources increases aid payments increase. The extent to which state or Federal matching funds are involved appears to be the most critical point regarding using aid as an independent variable.

> The only grants that result in an increase in aid proportionate to increases in local expenditures, are those that call for state or federal matching of local expenditures in some fixed ratio. Federal grants for slum clearance, public housing, and waste treatment works are of this type.[35]

Under most state grants, if the local governmental unit increases expenditures from own sources then more state aid does not result.[36] Regarding education, if state grants are on the basis of average daily attendance then two localities with different per student expenditures

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[33] Ibid.

[34] Ibid.

[35] Selma J. Mushkin, "Intergovernmental Aspects of Local Expenditure Decisions," in Howard G. Schaller, ed., Public Expenditure Decisions in the Urban Community (Washington, D. C.: Resources for the Future, Inc., 1963), p. 59.

[36] Ibid., p. 58.

could receive the same amount of state aid.[37]

Statement 4 above is more difficult to assess. It is reasonable to suspect that statement 4 is valid because aid may be serving as a proxy for variables which affect both spending and aid and these variables may not have been included in the regression equation.[38]

> Examples of factors which might be expected to influence both aid and expenditures are the power and attitudes of the political leaders of the state, the population's attitude toward government activity, the way in which the tax-expenditure process is institutionalized, and factors which affect the demand for and/or cost of public goods.[12] (footnote omitted)[39]

The regression equation is then mis-specified if factors which affect local spending have not been included in the set of explanatory variables. The result of these omissions is that the estimated regression coefficients are biased if there is intercorrelation among the included and excluded variables.

A factor, also illustrating statement 4, to be considered is that both aid and spending are possibly determined by the same factors. If this is the case, then a correlation between aid and local spending does not necessarily indicate a cause-effect relationship.[40] A correlation between aid and expenditures is expected even though no cause-effect relationship exists if aid is determined in part by the same factors which determine expenditures.[41] This possibility can be

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[37] Ibid., p. 59. The institutional arrangements regarding state payments to local governments for education in the study region considered here are discussed in the next chapter.

[38] Pogue and Sgontz, p. 193.

[39] Ibid.

[40] Ibid., p. 198.

[41] Ibid.

empirically tested from the data used to generate the regression equation. Further discussion on this point is deferred to the following chapter.

In summary, the use of Federal and state aid in a regression analysis of local spending is subject to criticism. These criticisms will be taken into account in this study so as to minimize the possibility of obtaining a biased estimate of the aid coefficient.

Local educational spending here does not include Federal and state aid. This is clearly the proper approach if the focus of the investigation is upon how the institution of aid affects local expenditure decisions. More meaningful relationships can thus be examined by using the procedure adopted here.

Summary

Many studies have been made in recent years on the determinants of government spending. These studies use various combinations of socio-economic variables to account for variation in public outlays among similar governmental units. The governmental units analyzed have been quite diverse. Cross-section multiple regression analysis is used to indicate how much variation can be explained and to determine the relative importance of each explanatory variable. Some studies examine several functional expanditure categories while others deal only with a specific function. A major criticism of most of these investigations is the absence of a theoretical framework for analysis. Also, the problem of intercorrelation among independent variables has not received adequate attention. This has resulted in questionable measures of relative importance for the various explanatory variables. Federal and

state aid is recognized as an extremely important variable. However, an examination of the literature reveals that this variable is usually introduced into the various models in an unsatisfactory manner.

The premise underlying this study is that individuals make fiscal choices. Individuals are assumed to be utility maximizers and thus make fiscal choices so as to maximize utility as they see it. This then leads to an analysis of individual demand for local education. Using the individualistic framework for analysis, a model of local governmental spending is developed. Determining the level of local educational spending is viewed as a constrained maximization problem. The family unit seeks some combination of purchases, including public goods, which maximizes its utility function subject to the family budget constraint. Within this framework, the analysis implies, other things equal, that the amount of property owned by an individual in relation to the total assessed property in the jurisdiction is a crucial determinant. In the formal model, this is expressed as the ratio of the family's assessed property value over the assessed value of all taxable property in the jurisdiction. An inverse relationship between this ratio and preferred levels of local spending is expected.

Utility functions are assumed to vary among individual family units. Several factors, which are assumed to be the most relevant, are introduced to account for this diversity. These factors are the type of school district, preference variables, and Federal and state aid.

There are two types of institutions at the local level through which educational services are provided. An independent school district represents a single-function governmental unit. An independent school district operates essentially with administrative and fiscal autonomy.

Educational services, in a dependent school system, represent part of the bundle of services provided by a multipurpose governmental unit.

Economists have, for the most part, censured the practice of earmarking tax revenues. Buchanan suggests that the nonacceptance of earmarking stems from viewing the budgetary authority as the reference individual. The reference system should, however, be that of the individual voter as he confronts budgetary alternatives. Viewed in this manner, earmarking is analogous to the situation confronting an individual in private market choices. Thus, under the institution of independent school district, the individual as a collective decision maker is in a position approximately comparable to the private market analog.

Another aspect of the criticism of earmarking relates to the concept that it implies a situation where revenues determine expenditures. Where there is no annual review of expenditure programs under an earmarking institution, this is an appropriate criticism. Earmarking as used here, however, implies a situation where the individual chooses in a collective decision process the revenue and expenditure levels each budgetary period.

The system of general-fund financing, such as where dependent school districts prevail, is similar to the private market tie-in-sales arrangement. In this case the individual is forced to take a bundle of goods within which the component mix is independent of the individual's preferences.

The essence of Buchanan's argument is that earmarking is a preferred fiscal institution because, conceptually, the individual can make a separate cost-benefit analysis concerning each public outlay.

An extension of the analysis implies that, under certain assumptions, spending on some functions may be higher under the general-fund institution as opposed to the earmarking institution. It is postulated here that local education is a functional category that would tend to receive greater support in a general-fund arrangement.

In addition to institutions, other variables must be considered which are assumed to affect the individual decision calculus in the process of collective choice. Individual family units are assumed to have positively-related income preferences in the public sector as well as in the private sector. The level of education in the community is also assumed to be positively related to local education outlays. A higher level of education is likely to mean that the individual values more highly the spillover benefits associated with education. A third preference variable, the extent to which pupils attend private schools, is assumed to reduce the demand for publicly-provided education services. Also expected to be negatively associated with local education outlays is the percentage of non-whites in the community.

Local educational spending is assumed to be positively associated with Federal and state aid. Local spending here refers to spending from own sources which excludes such aid. Aid should alter the cost aspect of the individual cost-benefit evaluation because a subsidy is analogous to a price decrease. Thus, the greater the amount of aid, the greater the amount of local spending on the education function.

Studies using aid as an independent variable in a regression analysis have been criticized for this procedure. These criticisms are taken into account in the present study in an effort to reduce the problems associated with using aid as an expenditure determinant.

Expenditures here exclude aid to the function under examination. The major portion of aid is granted on a non-matching basis. Thus the procedure used here enables a more accurate answer to be given to the question of how the institution of aid affects a specific local expenditure decision.

CHAPTER IV

AN EMPIRICAL TEST

This chapter is concerned with an empirical test of the economic model of local education spending developed in Chapter III. It is assumed that the collective decision process can be represented by a model of direct democracy. The decision rule for determining the collective result is assumed to be that of simple majority-voting. The median-man construction thus provides a bridge between the individual calculus and collective decisions.

> The relevance of the whole analysis depends on the appropriateness of the simple majority-voting models as reflections on real-world political process in democratic governments. Obviously decisions on taxes and public spending are not made in glorified town meetings, even at the local government level. The critical question is whether or not the simplified town meeting can serve as a model with which we can analyze the much more complex process through which fiscal decisions get made. There is no way in which this question can be answered other than through the testing of hypotheses that emerge from the model against observed experience. The fact that, in some superficially descriptive sense, decisions do not seem to be made in this manner, tells us relatively little about the predictive power of the models.[1]

The task at this stage is to therefore develop an empirical model for testing the theoretical model of local education spending developed in Chapter III.

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[1] Buchanan, Public Finance in Democratic Process, p. 159.

An Empirical Model

A form of regression analysis, regression on dummy variables, is used to assess the explanatory potential of the individualistic model of local public education spending that has been developed in previous chapters.[2] The economic model constructed in Chapter III provides the basis for selection and classification of variables to be used in the multiple regression analysis.

The Dependent Variable

The dependent variable is expressed here as local elementary and secondary public education expenditures per student in average daily attendance. Capital outlays are excluded from the education spending variable on the premise that they do not reflect the current level of educational services provided. Also excluded from expenditures are state and Federal grants-in-aid to local governmental units. The dependent variable thus represents per student expenditures from local sources. Data are for 1962, which is the latest year for the U. S. Census of Governments.

Independent Variables

Fiscal Institution

A dummy variable X_1 is used to represent the type of fiscal institution. Values are given to X_1 as follows:

$X_1 = 1$ if dependent school system.

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[2] See J. Johnston, Econometric Methods (New York: McGraw-Hill Book Company, Inc., 1963), pp. 221-228 on dummy variables.

X_1 = 0 if independent school system.

This technique permits a determination of the importance of the type of fiscal institution variable and provides a quantitative estimate of its effect.

Property and Voting Data Proxies

The analysis in Chapter III indicates that $P^i/\Sigma P_j$, the ratio of the family's assessed property value over the assessed value of all taxable property in the jurisdiction, is a primary determinant of local expenditure decisions. Assume that the level of local education expenditures is determined by a jurisdictional referendum. Further suppose that the balloting is such that each voter indicates the level of education spending he desires.[3] If the decision rule is simple majority, then the median preference expressed in the voting process is dominant.

Let g_1 represent the local educational service. The assumed voting process yields some median preferred expenditure level, $\bar{g}_1$, given each voter's preferred outlay g_1^i. Assuming tastes and income to be equal among voters, then a one-to-one correspondence exists between the individual preferred expenditures g_1^i and the ratio $P^i/\Sigma P_j$ for any given jurisdiction.[4] This correspondence defines an inverse relationship

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[3]As indicated above, in the general-fund arrangement individuals are presumed to determine only the level of total spending with the budgetary mix being determined independently of individual choice. The assumption here is that in a conceptual sense the voting process can still be described in terms of a model of direct democracy. The implication for the empirical analysis is that the distortion in consumer choice caused by the predetermined budgetary ratio is indicated, in two dimensional space, as a parallel upward shift in the regression equation. Regression coefficients are thus assumed to not be affected by the institutional arrangement.

[4]Barr and Davis, p. 156.

between the property ratio and the individual preferred expenditure.[5] The larger $P^i/\Sigma P_j$ the smaller g_1^i. Also, each median preferred expenditure $\bar{g}_1$ is associated with a corresponding median ratio $\bar{P}/\Sigma P_j$.[6] Thus, an inverse relationship should exist between actual expenditures and corresponding median property ratios.[7] However, it is not possible to test this relationship due to lack of data on individual property ownership. Thus, following Barr and Davis, two proxies are used as an alternative:

X_2 = Assessed value of property per student in the jurisdiction.

X_3 = The number of owner-occupied residences in the jurisdiction divided by the number of registered voters in the jurisdiction.

The relationship between X_2 and per student educational spending is expected to be positive. Per student educational spending and X_3 are expected to yield an inverse relationship. These expected results are based upon the following two propositions:[8]

1. An inverse relationship exists between X_2 and $\bar{P}/\Sigma P_j$.
2. A positive relationship exists between X_3 and $\bar{P}/\Sigma P_j$.

Regarding proposition 1, it is reasonable to assume that among jurisdictions higher values of X_2 are likely to occur in more urbanized areas.[9] Further, in those jurisdictions, a larger percentage of the

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[5] Ibid.

[6] Ibid.

[7] Ibid.

[8] Ibid., p. 157.

[9] Ibid.

population is likely to be renters so that the left tail of the density of the $P^i/\Sigma P_j$ may be larger.[10] Also, larger values of X_2 probably occur where commercial and industrial properties are relatively important components of the tax base.[11] Since a portion of these properties is likely to represent absentee ownership, the owners are not included in the density of $P^i/\Sigma P_j$ whereas the value of the property is included in ΣP_j.[12] Thus, it is expected that larger values of X_2 are associated with smaller values of $\bar{P}/\Sigma P_j$. Regarding proposition 2, it appears that the larger the percentage of home-owning voters, the more likely it is that the home-owner is the median voter.[13] This implies that the left tail of the density of the $P^i/\Sigma P_j$ is smaller.[14] Thus, larger values of X_3 are expected to be associated with larger values of $\bar{P}/\Sigma P_j$. Given that these propositions are valid, then the above relationships between per student expenditures and variables X_2 and X_3 are implied.

Median Family Income, Education, Percentage of Pupils Attending Private Schools, and Percent of Population Non-White

The following four variables are used to indicate family preferences for local public elementary and secondary education:

X_4 = Median family income.

X_5 = Median years of school completed by persons 25 years old and over.

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[10] Ibid.

[11] Ibid.

[12] Ibid.

[13] Ibid.

[14] Ibid.

X_6 = Percent of pupils attending private schools.

X_7 = Percent of population non-white.

The variables X_4 and X_5 are expected to be positively related to per student educational outlays. A negative relationship between per student educational spending and variables X_6 and X_7 is expected.

State and Federal Aid

To reflect the impact of criteria substantially outside the local decision process, a state and Federal aid to education variable is used:

X_8 = Per student state and Federal aid to education.

Variable X_8 and local education expenditures per student are expected to be positively associated.

Unit of Analysis

For an empirical test of the model, this study focuses on predominately non-urban county areas in Virginia and South Carolina. Initially only those counties with a population density of up to 150 per square mile were selected. Then counties designated in 1960 as Standard Metropolitan Statistical Areas were also dropped, if they had not been initially, from the sample.[15] There are only four states, Hawaii, Maryland, North Carolina, and Virginia, where local education is financed entirely by the dependent school arrangement.[16] Political jurisdictions in Virginia and South Carolina appear appropriate for essentially two reasons.

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[15]Other counties were deleted at a later stage in the analysis. A discussion of reasons for deletion of specific counties and a list of those counties is included in Appendix B.

[16]U. S. Bureau of the Census, Census of Governments: 1962, Vol. I, Governmental Organization (Washington, D. C.: U. S. Government Printing Office, 1963), p. 6.

1. Broad Regional Differences are Eliminated - A relatively-homogeneous area normalizes for broad regional differences associated with climate, topography, sociological, and other characteristics which might influence local expenditure decisions. For purposes of this study, Virginia and South Carolina appear reasonably homogeneous. It might be argued that since all dependent school districts are in Virginia and all independent school districts are in South Carolina, the dummy variable is a regional variable reflecting differing attitudes between the states. The posture here is that both states, being a part of the Southern region, share a common distinctive character.[17] This is not to suggest that the South does not contain diversity. There are in fact many Souths, with a great deal of geographic, social, and economic diversity. Yet the South continues to be treated by many as a distinct regional entity.[18] This distinctiveness appears to be due to a state-of-mind which keeps the South at odds with national norms.

> Though many Southerners are loath to admit it, the very existence of their section, because of its annoying habit of being out of step with the rest of the nation, is a standing invitation to reform and change. The region has sought to remain nearly static while belonging to the most dynamic society in the world; it has tolerated hierarchy in the most democratic of nations; it has accepted race and class distinction in egalitarian America; it has remained casual or indifferent towards formal education in a nation which has long and lovingly held the belief

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[17] No attempt is made here to delineate the South. However the Southern region under discussion here may roughly be identified as Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, and Virginia.

[18] The literature dealing with the South is of enormous proportions. In 1964 a selected bibliography of Southern history indicates that there were 407 scholarly journal articles published that year. No attempt was made by the compiler at full coverage of Civil War history. Derived from The Journal of Southern History, Vol. XXXI (May 1965), pp. 178-197.

> that education is the panacea for the ills of man and society; it has reflected an ingrained pessimism while existing among the most optimistic folk in history; it has embraced Romanticism in the midst of the most practical of people, and it has persistently demonstrated a predilection for violence in a nation which prides itself on being a government of laws.[19]

Thus, the assumption here is that the states in the study region, being a part of the South, essentially share attitudes distinctive to the Southern region.[20] Attitudes toward education in the South will be discussed at a later stage in the analysis. However, since no variable is used to reflect attitudes in the empirical body of this research effort, it must be recognized that this may in fact be a methodological weakness of the study.

2. Similar State Aid Institutions - State aid to local schools consists of equalizing, flat, general, and specific grants. Usually

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[19]Otis A. Singletary, "The Contemporary South," The Texas Quarterly, Vol. I (Spring 1958), p. 43.

[20]For the thesis that Southern traditions persist and inhibit Southern economic development see William H. Nicholls, Southern Traditions and Regional Progress (Chapel Hill: The University of North Carolina Press, 1960). The components of the Southern tradition are described by Nicholls as: "(1) the persistence of agrarian values, (2) the rigidity of the social structure, (3) the undemocratic nature of the political structure, (4) the weakness of social responsibility, and (5) conformity of thought and behavior" (p. 15).

No pretense is made here of having systematically surveyed the seemingly endless literature dealing with Southern values. In addition to the book by Nicholls, the following have helped to formulate the assumption of a persistent "mind of the South": Harry S. Ashmore, An Epitaph for Dixie (New York: W. W. Norton & Company, Inc., 1957, 1958); W. J. Cash, The Mind of the South (New York: Alfred A. Knopf, Inc., 1941); Thomas D. Clark, The Emerging South (New York: Oxford University Press, 1961); Wilma Dykeman and James Stokley, Neither Black nor White (New York and Toronto: Rinehart & Company, Inc., 1957); Louis D. Rubin and James Jackson Kilpatrick, eds., The Lasting South: Fourteen Southerners Look at Their Home (Chicago: Henry Regnery Company, 1957); Otis a Singletary, "The Contemporary South," The Texas Quarterly, Vol. I (Spring 1958), pp. 41-50; C. Vann Woodward, Origins of the New South 1877-1913 (Baton Rouge: Louisiana State University Press, 1951), and The Burden of Southern History (Baton Rouge: Louisiana State University Press, 1960).

one type of aid arrangement predominates within a given state. To the extent that the institution differs in this respect, it might be hypothesized that type of aid has a differential impact upon local decisions. To eliminate this possibility, a similar type of aid program as between financing institutions is called for. State aid in both Virginia and South Carolina is predominantely on a non-equalizing basis and employs essentially similar criteria in dispensing the major portion of education aid to local governments.[21] A large portion of state aid to local education in Maryland is on an equalizing basis. Local governmental units in North Carolina are not primarily responsible for the education function. In this state, local education is essentially a state administered and financed program.

In South Carolina, 72.9 percent of the amount of state payments to local governments for non-capital education expenditures in 1962 was based upon the amount required to pay teachers according to a state-prescribed salary schedule.[22] The number of teachers any given school may qualify depends upon average daily attendance. Thus, average daily attendance is the essential criteria for dispensing this portion of state aid. An additional 8.6 percent of state payments for non-capital education spending in 1962 was based directly upon the number of pupils enrolled. Therefore, some 82 percent of state payments in 1962 was determined on the basis of pupils either enrolled or number in average daily attendance in the district. For this major portion of aid, districts having differing expenditures per student could receive the

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[21] This observation is based upon U. S. Bureau of the Census, Census of Governments: 1962, Vol. VI, State Payments to Local Governments.

[22] Ibid.

same amount of per student aid. Thus, the bulk of state aid in South Carolina in 1962 was not determined by expenditures. That is, greater spending per student from local sources does not imply greater state aid per student. A small amount of state payments (involving both state and Federal funds) was distributed on the basis of some fixed ratio to local expenditures.[23] These state payments amounted to 6.6 percent of total state payments to localities for non-capital education outlays.

A similar picture regarding aid emerges for Virginia. In 1962, 67.5 percent of state payments to local governments for non-capital education spending was determined by average daily attendance or per pupil enrolled.[24] Only 11.9 percent of state payments involved distribution on the basis of some ratio to local spending.

The implication for the analysis here is that aid to localities, for the most part, is not determined by expenditures. Thus, by subtracting aid from the dependent variable, a reasonably accurate measure of spending from local sources is obtained. To the extent that some aid involves matching, local expenditures are overstated and the resulting regression coefficients are to some extent biased. For the study region involved, however, this is very minimal since matching aid is relatively unimportant.

Preliminary Analysis

A preliminary examination of the raw data indicated that private

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[23] Ibid.

[24] Ibid.

school enrollment is relatively insignificant for the study region. Many of the counties involved have less than one percent of the children enrolled in private elementary school. Also, several counties in each state indicate no private elementary school enrollment according to census data. Thus, it was decided to delete the private school enrollment variable from further consideration.

It was indicated in Chapter III that studies similar to the present one seldom attempt to deal with the problem of multicollinearity. Multicollinearity is present when a high degree of correlation exists among some or all of the independent variables. Some intercorrelation among the independent variables may be severe enough to leave the reliability of measures indicating separate effects in doubt. Consider the following:

$$Y_i = f_1(X_1, X_2, \ldots, X_k),$$

$$X_1 = f_2(X_2, X_3, \ldots, X_k).$$

Obtaining the separate effect of X_1 on Y_i requires holding $(X_2, X_3, \ldots, X_k)$ constant. But is is unrealistic to do this since changes in X_1 are associated with changes in the remaining k-1 independent variables. The computed correlation coefficients, regression coefficients, and beta coefficients would thus not be precise estimates of the true relationships.

Examination of simple correlation coefficients among the quantitative independent variables serves to identify the existence of multicollinearity. Table II presents the matrix of simple correlation coefficients for the selected quantitative independent variables. Table II indicates that median family income and median years of school completed have a relatively high positive correlation coefficient of

TABLE II

MATRIX OF SIMPLE CORRELATION COEFFICIENTS, SELECTED INDEPENDENT VARIABLES

Variable	Variable Number 2	3	4	5	7	8
X_2; Assessed Value of Property per Student	1.00000	.47225	.40176	.20553	-.26280	-.21545
X_3; Number of Owner-Occupied Residences / Number of Registered Voters		1.00000	.30330	.21644	-.22514	-.05234
X_4; Median Family Income			1.00000	.63073	-.58841	-.17259
X_5; Median Years of School Completed				1.00000	-.35518	-.10570
X_7; Percent Non-White					1.00000	.07469
X_8; Per Student State and Federal Aid to Education						1.00000

0.63073. Median family income also exhibits a relatively high negative correlation of -0.58841 with the percent non-white variable. On the basis of these and remaining intercorrelations, median family income is deleted while both median years of school completed and percent non-white are retained. Simple correlation coefficients among the remaining variables do not appear high enough to warrant further deletion.

Results of the Statistical Analysis

Table III presents the results of the statistical analysis.[25] An encouraging result from the overall analysis is that the model explains over 66 percent of the variation in per student local elementary and secondary spending in the study area. Strong support thus emerges for the individualistic model of local education spending developed in Chapter III. All variables are statistically significant at the 0.05 level except X_3, the number of owner-occupied residences divided by the number of registered voters, and X_5, median years of school completed.

Since the number of owner-occupied residences divided by the number of registered voters is serving as a proxy, it may be that it does not sufficiently approximate the theoretically-constructed variable. The preliminary analysis described in Appendix B supports this observation. Thus, the variable may be associated with per student local elementary and secondary spending but the empirical measure of the variable is not capable of indicating such an association.

The non-significance of the education variable is apparently due to its relationship with the percent non-white variable. This is

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[25] A step-wise program is used to obtain the multiple regression results.

TABLE III

REGRESSION COEFFICIENTS, STANDARD ERRORS, AND t VALUES OF SELECTED VARIABLES ON PER STUDENT LOCAL ELEMENTARY AND SECONDARY EDUCATION EXPENDITURES, SELECTED COUNTIES IN VIRGINIA AND SOUTH CAROLINA, 1962

Variable	Regression Coefficient	Standard Error	t Value
X_1; Dependent School District	24.1280	9.7719	2.4691**
X_2; Assessed Property Value per Student	0.0084	0.0015	5.5043**
X_3; $\frac{\text{Number of Owner-Occupied Residences}}{\text{Number of Registered Voters}}$	-0.1609	0.2016	0.7979
X_5; Median Years of School Completed	6.8389	5.2748	1.2965
X_7; Percent Non-White	-0.3386	0.1539	2.1992*
X_8; Per Student State and Federal Aid to Education	-0.5626	0.2492	2.2571*

Multiple $R^2 = 0.6626$; $F = 33.1894$**

*Significant at the .05 level.
**Significant at the .01 level.

indicated because if percent non-white is deleted from the regression then median years of school completed becomes significant at the 0.01 level. Also, deletion of median years of school completed while retaining percent non-white results in the latter variable showing increased significance (from the 0.05 level to the 0.01 level).[26]

All signs of the regression coefficients except one are consistent with the theoretical formulation. A most interesting result is that the sign of the aid variable coefficient is negative rather than the expected positive. This means that an increase in per student state and Federal aid to education is associated with a decline in per student local elementary and secondary outlays. This implies that individuals at the local level choose to allocate fewer local funds to the education function as Federal and state education aid to the locality is increased.

The negative association between educational aid and local educational outlays may be explained by regional competition for residents and industry. A fear of losing industry may induce local residents to limit spending out of local revenue since higher service levels would require increased local property, or other taxes. If it is felt that low taxes are necessary to attract industry, any local tax increase would be met with considerable resistance. State and Federal aid to education may then serve as an alternative to local tax increases. On the surface, this explanation certainly appears plausable. A deeper examination, however, suggests other possibilities.

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[26] See Appendix C for these comparative results. Appendix C also indicates that median family income can be used in the regression when both median years of school completed and percent non-white are deleted and the overall result is essentially the same.

It may be argued that the Southern quest for industrialization is more apparent than real in some areas.

> Considering the desperation with which most county seat towns in the South appear to be competing for industrial plants, one might at first doubt that any antagonism to industrialization remains even in the most rural areas. Nonetheless, in every such community there are important socio-political leaders who see in both industrialization and outmigration a threat to their traditionally high social status and their economic self-interest. Particularly where the plantation organization of agriculture still prevails, the relatively few but politically powerful large planters see in either outmigration or local industrialization the destruction of the plentiful and cheap farm labor supply which for a century has been the very foundation of their economic existence. Where a rural community has already attracted one or more low-wage plants, its Chamber of Commerce is typically dominated by local industrialists who look upon further industrialization merely as competition which would drive up local industrial wages, and so they drag their feet against efforts to lure other industry into the community.[27]

Thus, the assertion that localities compete fiercely for industry may not be valid for the essentially rural study region.

The unexpected regression result may be symptomatic of a tradition in Southern attitudes toward public education. A prejudice against free public schools is a part of the Southern heritage.[28] It can be argued that even today there exists in the South an attitude which reflects a generally low preference for public education. Thus,

> The blunt fact is that far too much of the South's conservative socio-political leadership, particularly that important segment rooted in the rural Black Belt,* (footnote omitted) has remained indifferent or even antagonistic to

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[27] Nicholls, p. 125.

[28] For a general history of public education in the South, see John Samuel Ezell, The South Since 1865 (New York: The Macmillan Company, 1963), pp. 241-276.

> the whole idea of universal public-school education right up to the present day.[29]

The historic prejudice in the South against universal public education is due to several things. Among them are the following:[30] an aristocratic view by Southerners of public education as being for paupers; the idea (from the Reconstruction period following the Civil War) that public education represented a Northern attack upon Southern institutions; the consideration by many Southerners of education as being a family matter under parental authority; and the fear that the Negro might become equal in status to whites as a result of the educational process. As a result of these traditional attitudes, many Southerners are then quick to resort to the idea of private schools when major educational problems face them.[31] After nearly a century of making substantial inroads to breaking down these prejudices, the historic 1954 Supreme Court decision in the Brown v. Board of Education of Topeka case provided the South with a major problem. Many Southerners were indeed shocked by the overturning of the separate but equal doctrine which had prevailed since 1896 as a result of the Plessy v. Ferguson decision. That integrated schools were to be the law of the land put the South in a terrible quandry. Integrated schools ran counter to one of the most cherished of Southern traditions. As a result of the 1954 decision, throughout the South many turned to the idea of providing private schools with state funds. These plans did not, however, for

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[29] Nicholls, pp. 110-111.

[30] See Ezell, pp. 241-276.

[31] Clark, p. 150.

the most part materialize.[32] With Virginia's failure to succeed with its program of massive resistance, as the South looked to Virginia for leadership along these lines, the future course of Southern education became clear. The Supreme Court decision was not to be avoided. Thus, it may be that in the study region the view is that if public education is to mean integrated schools, then less local support is preferred as state and Federal funds to localities are increased. The negative association between state and Federal aid and local per student spending may then be explained in terms of a traditional antagonism against public schools compounded by the realism that public education means integrated schools. If these attitudes prevail, individuals in the study region may then view an increase in state and Federal aid as an opportunity to reduce support from local sources.

It was indicated in Chapter III that both aid and spending may be determined by the same factors. To obtain an indication of the relationship between aid and the other variables associated with expenditures, state and Federal aid per student was regressed on the variables which were significantly associated with per student local education spending. A multiple R^2 of 0.1274 was obtained from the regression. This result suggests that the aid variable is determined only to a slight extent by the same set of factors associated with expenditures per student. This further adds credence to the implication that the cause-effect relationship runs from aid to expenditures. The possibility exists, however, that variables which are important have been

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[32]For an essentially political account of Virginia's abortive massive resistance attempt see Benjamin Muse, Virginia's Massive Resistance (Bloomington, Indiana: Indiana University Press, 1961).

omitted from the analysis and these variables and aid are significantly associated.

Summary

Use of a regression model was made to test the model of local education spending developed in Chapter III. Regression on dummy variables is the technique used in the empirical analysis. Per student local elementary and secondary public education spending represents the dependent variable in the regression model. The dependent variable is a measure of per student expenditures from local sources since both capital outlays and state and Federal grants are excluded.

Several independent variables, deriving from the utility maximization framework of Chapter III, are used in the regression model. A dummy variable is used to represent the type of fiscal institution. A value of one is assigned to this variable if the school system is dependent, otherwise a zero is given to the dummy variable.

The analysis of Chapter III indicated that a primary determinant of local governmental expenditures is the ratio of the family's assessed property value over the assessed value of all taxable property in the jurisdiction. An extension of that analysis implies that an inverse relationship should exist between actual outlays and corresponding median property ratios. Since the lack of data on individual property ownership precludes testing this relationship, two proxies are used as an alternative. These are the assessed value of property per student in the jurisdiction and the number of owner-occupied residences in the jurisdiction divided by the number of registered voters in the jurisdiction. It is hypothesized that the former proxy is positively

associated with local per student education spending while the latter is inversely related to local education spending per student. It is argued that these results are likely to be empirically, rather than a priori, true.

Median family income, median years of school completed, the percentage of pupils attending private schools, and percent non-white were selected to indicate family preferences for local education. A negative association with per student education spending was expected for both the percentage of pupils attending private schools and percent non-white. A positive relationship was expected between the dependent variable and the remaining two family preference variables.

Per student state and Federal aid to education is a variable which should reflect the impact of such programs on local expenditure decisions. A positive association between local education expenditures per student and the aid variable was expected to emerge.

County areas in Virginia and South Carolina were chosen for an empirical test of the model. These states appear appropriate because their selection eliminates broad regional differences affecting local expenditure decisions and state aid arrangements are similar. Both regional differences and differing types of aid institutions might be expected to have a differential impact upon local decisions. With regard to regional attitudes, it is assumed here that both states in the study region share a distinctive Southern tradition. This appears particularly appropriate since the county areas included in the analysis are essentially rural areas where it may be presumed that an agarian tradition prevails. An essential homogeneity in attitudes is necessary since all dependent school districts are in Virginia and all

independent districts are in South Carolina. Without homogeneity in attitudes the dummy variable may then be interpreted as reflecting regional differences in attitudes rather than indicating the effect of the institutional arrangement for providing public educational services.

In both South Carolina and Virginia, state payments for non-capital education spending to localities depend primarily upon per student in average daily attendance or per student enrollment. The important implication for the analysis is that this indicates that local spending does not determine aid. Then the procedure of subtracting aid from total spending to arrive at spending from local sources is reasonably accurate and more confidence can be placed in the estimated regression coefficients.

Preliminary analysis indicated that private school enrollment is relatively unimportant in the study region. On the basis of an examination of the raw data, the private school enrollment variable was thus deleted from the set of independent variables. In order to minimize the effect of multicollinearity, one further variable was also dropped. Simple correlation coefficients indicated that a rather high degree of association existed between median family income and both median years of school completed and percent non-white. Median family income was thus dropped from the analysis.

Results of the multiple regression analysis lend support to the individualistic model of local public educational spending. The model explained over 66 percent of the variation in local per student education spending. All variables except two were statistically significant at the 0.05 level. The number of owner-occupied residences divided by the number of registered voters did not indicate a significant

association with per student local education outlays. This result is perhaps due to the fact that the variable is serving a proxy role and thus does not adequately represent the theoretically-constructed variable. Median years of school completed also did not indicate a significant association with local per student education spending. This result was apparently due to the association between percent non-white and median years of school completed.

Only one regression coefficient sign was inconsistent with the theoretical formulation. A negative, rather than the expected positive, association between the aid variable and local per student education spending emerged. A possible explanation for the negative relationship may be found in the concept of regional competition for industry. A fear of losing industry may induce local residents to limit public spending from local sources since increased service levels imply increased taxes. Educational aid might then serve to release local funds from the education function so that they can be allocated to remaining local functions. Additional educational aid thus serves to limit tax increases at the local level in support of non-aided functions. This result may also be due to a lack of general support for public education. Southern tradition points to lack of general support for a system of public schools. A reinforcement of this attitude emerged as a result of the 1954 Supreme Court decision requiring integration of public schools.

The results of this inquiry indicate that, for the most part, in the study region aid and spending are not determined by the same set of factors. A regression of state and Federal aid per student on the remaining variables indicating a significant association with per student

local spending yielded a multiple R^2 of only 0.1274. This lends support to the hypothesis that aid is a determinant of local expenditure decisions.

CHAPTER V

CONCLUSION

Economists have, for the most part, not attempted to construct a theory of governmental spending that is analogous to the usual neo-classical market theory of consumer choice. In most economic models depicting how the economy functions, governmental spending is considered an exogenous variable. Governmental outlays are assumed to be determined by a political process through complex political institutions. The concern of economists has traditionally been with examining the effects of taxing and spending upon economic units. Little attention has been devoted to individual participation in collective fiscal choice. This lack of attention may have been justified when government was such a relatively minor part of the economic landscape. However, given the current importance of the amount of resources devoted to collective use, some modification in emphasis seems in order.[1]

In a broadly democratic setting, individuals must ultimately allocate resources to public as well as private use. Common observation indicates that individuals do participate in collective choice decisions.

> Man behaves, man chooses, in many other capacities than that of simple buyer and seller in the market place. Man behaves politically. He votes when given the opportunity, or chooses

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[1]Buchanan, Public Finance in Democratic Process, p. 3.

> to abstain from voting. He joins pressure groups. He makes campaign contributions. He runs for office. He writes letters. Can this behavior be subjected to scientific analysis?[2]

One approach to explaining collective choice has been examined and evaluated in this study. The analysis of fiscal choice has been limited to the local education function. An economic model of local education spending was developed and empirically tested. A model of direct democracy was postulated wherein individuals were assumed to vote directly on local spending for public education. The individual family unit was assumed to vote on the basis of a cost-benefit analysis.

The contention here is that such a model, although descriptively unrealistic, might be a useful explanatory device. The cross-section regression analysis of Chapter IV lends support to this assessment. Variables thought to be important in the family decision process were generally found to be significantly associated with local expenditure variations within the study region. The selected set of independent variables explained over 66 percent of the variation in per student local education spending. In one case, state and Federal aid to education, the sign of the regression coefficient was the opposite from what was expected. Each dollar of state and Federal aid per student to local education is associated with a fifty-six cent reduction in per student spending on education from local sources. The regression result indicates that state and Federal aid to education is substituted for local revenue sources. This result has some interesting implications.

The results here will be satisfying to those who view the shift away from local school support to state and Federal sources as a healthy

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[2]Ibid., p. 170.

trend. The argument is that high non-local support is equivalent to higher standards for the local education service. High levels of local support are, likewise, viewed as implying low local education standards. However, if additional school aid is viewed as a means of stimulating a better quality education (assuming that per student expenditures are a rough indicator of quality), then the results here are not encouraging. One of the most persistent arguments in favor of aid to education is that it serves to increase expenditures per pupil. As indicated in Chapter III, several studies indicate such an association. These results, however, are probably due to improper model construction wherein a positive bias results from partly correlating aid with itself.

Questions involving equity in taxation are also prompted by the results of the aid coefficient. The regression results imply that financial responsibility for local education is transferred from local governments to state and Federal governments. This means essentially state government responsibility since aid to education primarily involves state funds. By comparison, the Federal aid component is relatively small. This then involves a movement away from local property taxation toward state-wide sales, income, and excise taxation in support of local government. The result may be an even more regressive tax structure in support of local spending.[3]

The negative association between aid and local education spending per student may indicate that the individual simply feels that taxes levied elsewhere and spent in the local jurisdication represent an

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[3]The fiscal impact may, however, be quite different. The redistributional aspect of the fiscal process may produce a favorable net balance for low income groups under either the local property tax or the state-wide tax sources.

attractive proposition. The institution of state and Federal aid then has the effect of widening the bridge between tax and expenditure in the fiscal decision process. It is desirable, from the standpoint of rational individual decision making, to consider tax-expenditure proposals concurrently. State and Federal aid to local governments may tend to split the fiscal process, whereby the spending choice is apparently removed from the taxation decision. This apparent removal creates greater uncertainty in fiscal choice than would otherwise be the case. These uncertainties are minimized only if the institutions of fiscal choice reflect that a spending decision, within a balanced-budget framework, implies a taxing decision. Simultaneous determination of taxing and spending in collective fiscal choice situations serves to close the apparent splitting of the fiscal process prevalent under alternative institutions. In general, results to be expected when institutions cause an apparent divergence of the fiscal process are that if the individual tends to view only the expenditure (benefit) aspect without taking costs into account then expenditures will tend to be higher than the level that would be produced when the individual is fully informed.[4] Conversely, if the individual decision calculus fails to incorporate the benefit aspect and only the tax side of the fiscal account is considered, then expenditures will be lower than would be desired were the individual fully informed.[5]

An important aspect of aid, although not dealt with in this study, is the possible association between type of aid (flat grant, equalizing,

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[4]Buchanan, Public Finance in Democratic Process, p. 92.

[5]Ibid.

etc.) and local spending decisions. If the aid variable had been primarily based on some equalization procedure in the present study, then the negative aid coefficient would have been interpreted differently. When aid is granted on an equalization basis, then a negative association is expected. A causal relationship is not implied under these circumstances and a negative coefficient would indicate that the equalization program is effective. Since differing aid institutions are expected to produce different results upon individual choice, studies assessing the differential impact of varying aid institutions upon local spending decisions should add to our understanding. Given that aid has certain objectives, such studies would indicate the extent to which the objectives are fulfilled.

The area of preferences for public goods is not well understood. Preferences represent the "givens" of economic analysis and there is no well-defined body of theory which can serve as a guide to selection of preference variables. Empirical research has seldom dealt with individual preferences for public goods. Since some 34 percent of the variation in the dependent variable in this study was unexplained, this implies that important preference variables may not have been taken into account. Research must be undertaken in the preference area if our understanding of public spending decisions is to be enhanced. Both survey techniques and the study of actual voting data appear relevant. Survey techniques would be particularly important in probing the area of how well citizens are informed. To what extent do citizens vote upon collective outcomes without considering either the cost or benefit side of the fiscal account? Do institutions cause this apparent splitting of the fiscal process? If so, which ones? Such studies

would be important in devising techniques to provide voters with information in order that rational individual decisions can be made on allocating resources to public use. It may well be that a considerable educational process is necessary before individuals can make informed judgments upon such decisions.

It is clear that in a democracy individuals must in the final analysis allocate resources to public use. Thus, an individualistic approach to explaining fiscal outcomes is appropriate. The present study lends support to the contention that individualistic collective decision models have explanatory potential. Fiscal institutions can introduce a great deal of uncertainty and possible distortion into the individual choice calculus. This need not exist if institutions are organized so that the individual can make rational decisions based on informed judgment. From the standpoint of the individual as a participant in fiscal choice, an earmarking institution is preferred. Informed individual choice can only be made when the individual is able to evaluate adequately both sides of the fiscal account.

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APPENDIX A

TABLE A-I

COUNTIES INCLUDED IN STUDY AREA AND VALUES OF DEPENDENT AND INDEPENDENT VARIABLES

Column 1: Local Education Expenditures per Student ($)
Column 2: Assessed Value of Property per Student ($)
Column 3: Number of Owner-Occupied Residences divided by the Number of Registered Voters (%)
Column 4: Median Family Income ($)
Column 5: Median Years of School Completed
Column 6: Percent Non-White (%)
Column 7: Per Student State and Federal Aid to Education ($)

County	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Independent Districts (South Carolina):							
Abbeville	101	1,474	55.0	3,641	8.3	32.0	149
Allendale	65	1,357	42.7	2,188	7.4	63.1	157
Anderson	112	1,994	57.1	4,191	8.6	19.5	155
Bamberg	28	1,189	50.1	2,380	7.9	55.8	157
Barnwell	45	1,994	32.3	3,266	8.5	43.4	168
Beaufort	33	1,271	56.2	3,597	9.9	38.8	196
Berkeley	51	563	69.6	3,367	7.7	49.7	166
Calhoun	34	1,273	68.1	1,766	7.7	67.2	158
Cherokee	98	1,559	38.0	3,686	7.6	21.1	149
Chester	82	1,725	48.6	3,700	7.8	40.1	155
Chesterfield	51	908	43.4	2,811	7.6	37.1	168
Claredon	25	593	57.9	1,945	7.1	68.3	143
Colleton	54	873	59.6	2,462	7.8	51.1	156

TABLE A-I (CONTINUED)

County	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Darlington	85	1,256	48.1	3,231	8.1	44.4	150
Dillon	25	927	38.6	2,356	7.3	46.5	149
Dorchester	41	1,184	54.7	3,031	8.3	49.0	161
Edgefield	113	1,322	49.6	2,595	8.4	58.2	129
Fairfield	70	1,863	50.4	2,730	7.3	59.5	148
Florence	38	1,083	45.1	3,232	8.5	43.2	148
Georgetown	72	1,579	51.4	3,160	7.6	52.1	146
Greenwood	94	1,838	44.6	4,175	8.7	29.6	151
Hampton	80	1,462	49.6	2,487	7.5	53.9	154
Horry	56	1,116	53.1	3,019	8.7	26.8	164
Jasper	73	1,432	60.7	2,401	6.7	62.4	161
Kershaw	76	1,926	49.2	3,538	8.3	39.8	158
Lancaster	98	1,676	34.3	4,482	8.3	27.0	156
Laurens	55	1,485	63.4	4,145	8.1	29.5	153
Lee	46	930	39.7	1,680	7.3	65.7	148
McCormick	19	1,157	45.6	2,639	7.6	61.8	165
Marion	49	945	49.9	2,307	7.9	55.0	146
Marlboro	87	1,398	35.2	2,465	7.4	48.9	159
Newberry	80	1,730	52.7	3,341	8.6	35.5	153
Oconee	62	1,362	55.3	3,721	8.1	10.7	169
Orangeburg	80	1,035	55.4	2,603	8.2	60.1	152
Pickens	66	1,488	55.9	4,503	8.4	10.1	150

TABLE A-I (CONTINUED)

County	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Saluda	54	1,691	42.1	2,965	9.0	36.8	158
Sumter	58	1,252	72.7	3,267	9.3	46.9	168
Union	71	1,430	40.2	4,115	7.8	29.6	145
Williamsburg	45	623	57.8	1,631	7.4	66.5	144
York	102	1,600	51.3	4,318	8.6	28.6	137
Dependent Districts (Virginia):							
Accomack	126	3,580	94.8	2,817	7.9	38.7	157
Albemarle	198	6,333	93.0	4,516	9.7	14.9	139
Amelia	111	4,700	49.1	2,715	7.5	51.4	163
Appomattox	159	6,202	57.1	3,495	8.0	25.6	169
Augusta	144	7,165	83.1	4,352	8.7	4.4	146
Bath	194	8,767	59.5	3,218	8.5	9.2	164
Bedford	121	4,329	78.0	3,886	7.9	19.4	145
Bland	103	2,216	56.8	2,594	7.8	3.4	166
Botetourt	158	5,157	69.9	4,035	8.5	9.1	152
Brunswick	88	3,933	58.3	2,506	7.4	58.7	163
Caroline	94	3,983	79.3	3,658	7.8	52.6	160
Charolette	125	3,332	44.9	2,864	7.4	40.0	161
Clarke	140	6,495	43.5	3,691	8.5	17.3	160
Culpepper	101	7,104	51.3	3,661	8.5	27.6	143
Cumberland	103	3,651	63.3	2,013	7.4	54.2	172

TABLE A-I (CONTINUED)

County	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dinwiddie	109	4,945	57.1	3,762	7.1	61.8	166
Essex	146	9,137	93.7	3,407	8.3	47.5	159
Fauquier	166	9,153	74.3	3,929	8.5	25.9	129
Floyd	129	3,275	52.1	2,994	7.5	5.2	171
Fluvanna	209	14,472	97.6	3,223	7.6	37.9	152
Frederick	118	5,149	71.8	4,125	8.3	1.9	151
Giles	183	8,030	66.3	4,209	8.8	2.7	150
Gloucester	45	6,168	70.6	3,769	8.3	28.2	161
Goochland	109	7,835	52.5	3,313	7.5	48.1	159
Grayson	71	1,701	56.9	2,978	7.5	3.9	175
Greene	86	3,856	63.0	2,925	7.3	12.2	167
Greensville	81	3,608	46.5	2,936	7.0	54.9	158
Halifax	85	3,313	73.0	2,724	7.5	44.5	167
Hanover	136	5,335	80.8	5,012	9.4	25.3	150
Isle of Wight	128	4,586	48.8	3,780	7.8	52.5	165
King and Queen	152	3,525	90.9	3,162	7.5	53.0	168
King George	129	4,374	75.1	4,803	9.1	27.0	189
King William	55	8,537	91.1	3,913	8.2	47.1	153
Loudoun	171	9,561	47.8	4,460	8.8	17.7	134
Lunenburg	86	3,645	73.2	2,871	7.9	42.2	165
Madison	135	4,560	61.8	2,908	7.9	22.3	154
Mecklenburg	90	3,484	70.3	2,779	7.9	46.9	169
Middlesex	155	6,562	78.8	2,808	8.2	41.5	154
Montgomery	118	4,008	88.0	4,180	8.8	4.6	154
Nansemond	54	2,830	72.0	3,496	7.5	63.1	162

TABLE A-I (CONTINUED)

County	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Nelson	133	4,165	53.1	3,088	7.4	27.9	159
New Kent	161	5,520	57.7	3,901	8.0	52.8	164
Northumberland	163	8,144	58.5	3,241	8.1	42.5	149
Nottoway	130	5,081	73.8	3,485	8.3	42.6	154
Orange	161	7,899	83.4	3,831	8.5	22.4	140
Page	127	3,284	50.6	3,705	8.1	3.1	148
Patrick	99	2,957	70.2	3,322	7.3	9.1	175
Pittsylvania	87	3,582	95.7	3,363	7.4	34.2	157
Pulaski	126	3,752	84.6	4,222	8.2	6.7	147
Rappanannock	131	3,820	60.5	2,903	7.0	17.5	147
Richmond	177	6,339	84.6	3,352	7.6	34.6	164
Rockbridge	186	7,097	74.4	4,175	8.1	8.2	136
Rockingham	135	6,824	95.7	3,971	8.8	1.8	146
Russell	89	5,938	56.9	2,933	7.3	1.9	166
Scott	62	1,361	54.1	2,637	7.5	1.2	165
Shenandoah	125	6,440	74.4	3,812	8.2	1.6	142
Smyth	84	2,212	65.0	3,940	7.9	1.7	168
Southampton	98	4,559	64.8	2,964	7.4	57.8	156
Spotsylvania	135	6,823	59.4	4,375	8.0	22.8	152
Stafford	123	4,855	87.6	4,821	9.1	11.7	147
Surry	103	5,967	63.1	2,694	7.5	64.8	141
Sussex	113	3,974	49.6	2,581	7.3	66.3	142
Tazewell	70	2,199	58.8	3,622	7.8	4.5	143
Warren	204	11,175	67.5	4,790	8.7	7.2	139
Washington	131	1,722	89.2	3,347	8.0	2.5	146

TABLE A-I (CONTINUED)

County	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Westmoreland	89	6,212	53.5	3,051	7.6	46.6	156
Wise	67	2,377	76.7	3,450	7.3	2.9	154
Wythe	187	3,378	32.7	3,235	7.8	4.4	152

Source: Column 1: U. S. Bureau of the Census, Census of Governments: 1962, Vol. IV, No. 4, Compendium of Government Finances (Washington, D. C.: U. S. Government Printing Office, 1964); Annual Report of the Superintendent of Public Instruction of the Commonwealth of Virginia, School Year 1961-1962 (Richmond: State Board of Education, 1962); Ninety-Fourth Annual Report of the State Superintendent of Education, State of South Carolina, 1961-1962 (Columbia: State Budget and Control Board, 1962).

Column 2: U. S. Bureau of the Census, Census of Governments: 1962, Vol. II, Taxable Property Values (Washington, D. C.: U. S. Government Printing Office, 1963); Annual Report of the Superintendent of Public Instruction of the Commonwealth of Virginia, School Year 1961-1962 (Richmond: State Board of Education, 1962); Ninety-Fourth Annual Report of the State Superintendent of Education, State of South Carolina, 1961-1962 (Columbia: State Budget and Control Board, 1962).

Column 3: U. S. Bureau of the Census, U. S. Census of Housing: 1960, Vol. I, States and Small Areas, South Carolina (Washington, D. C.: U. S. Government Printing Office, 1962); U. S. Bureau of the Census, U. S. Census of Housing: 1960, Vol. I, States and Small Areas, Virginia (Washington, D. C.: U. S. Government Printing Office, 1962); Voter registration data obtained from the State Board of Elections in Richmond, Virginia and the office of the Secretary of State, State of South Carolina in Columbia, S.C.

TABLE A-I (CONTINUED)

Column 4: U. S. Bureau of the Census, U. S. Census of Population: 1960, General Social and Economic Characteristics, South Carolina (Washington, D. C.: U. S. Government Printing Office, 1961); U. S. Bureau of the Census, U. S. Census of Population: 1960, General Social and Economic Characteristics, Virginia (Washington, D. C.: U. S. Government Printing Office, 1961).

Column 5: Same as Column 4.

Column 6: Same as Column 4.

Column 7: Ninety-Fourth Annual Report of the State Superintendent of Education, State of South Carolina, 1961-1962 (Columbia: State Budget and Control Board, 1962); Annual Report of the Superintendent of Public Instruction of the Commonwealth of Virginia, School Year 1961-1962 (Richmond: State Board of Education, 1962).

APPENDIX B

COUNTIES NOT INCLUDED IN STUDY

Although private school enrollment is relatively unimportant for most counties in the study region, a few counties indicate a substantial amount of private elementary school enrollment. In Prince Edward County, Virginia, for example, nearly 88 percent of elementary school enrollment is private. Thus, in order to have some homogeneity in the sample, the few counties exhibiting over 10 percent private elementary school enrollment were dropped from the sample.

Other difficulties in the data also necessitated deleting more counties. In Virginia, several counties indicate, by the proxy measure, that in excess of 100 percent of the registered voters are homeowners. Since this is an impossibility, these counties were deleted from the sample. This may indicate that the chosen empirical measure is not a good representation of the theoretical ideal. A few counties in both states also indicated extremes in the percent non-white variable. Thus, those counties having less than one percent and over 80 percent non-white populations were also dropped from the analysis.

The following counties were then deleted from the sample for one or more of the above reasons:

South Carolina:

Aiken
Charleston
Greenville
Lexington
Richland
Spartanburg

Virginia:

Alleghany
Amherst
Buchanan
James City
Lancaster
Lee

Buckingham
Campbell
Carroll
Charles City
Chesterfield
Craig
Dickenson
Fairfax
Franklin
Henrico
Henry
Highland
Louisa
Mathews
Norfolk
Northampton
Powhatan
Prince George
Princess Anne
Prince Williams
Roanoke
Shenandoah
York

APPENDIX C

TABLE C-I

REGRESSION COEFFICIENTS, STANDARD ERRORS, AND t VALUES OF SELECTED VARIABLES ON PER STUDENT LOCAL ELEMENTARY AND SECONDARY EDUCATIONAL EXPENDITURES, SELECTED COUNTIES IN VIRGINIA AND SOUTH CAROLINA, 1962

Variable	Regression Coefficient	Standard Error	t Value
X_1; Dependent School District	24.1280	9.7719	2.4691**
X_2; Assessed Property Value per Student	0.0084	0.0015	5.5043**
X_3; $\frac{\text{Number of Owner-Occupied Residences}}{\text{Number of Registered Voters}}$	-0.1609	0.2016	0.7979
X_5; Median Years of School Completed	6.8389	5.2748	1.2965
X_7; Percent Non-White	-0.3386	0.1539	2.1992*
X_8; Per Student State and Federal Aid to Education	-0.5626	0.2492	2.2571*

Multiple $R^2 = 0.6626$; $F = 33.1894$**

*Significant at the .05 level.
**Significant at the .01 level.

TABLE C-II

REGRESSION COEFFICIENTS, STANDARD ERRORS, AND t VALUES OF SELECTED VARIABLES ON PER STUDENT LOCAL ELEMENTARY AND SECONDARY EDUCATIONAL EXPENDITURES, SELECTED COUNTIES IN VIRGINIA AND SOUTH CAROLINA, 1962

Variable	Regression Coefficient	Standard Error	t Value
X_1; Dependent School District	34.0332	8.8337	3.8526**
X_2; Assessed Property Value per Student	0.0077	0.0015	5.0541**
X_3; $\frac{\text{Number of Owner-Occupied Residences}}{\text{Number of Registered Voters}}$	-0.2099	0.2041	1.0283
X_5; Median Years of School Completed	12.1705	4.7720	2.5503**
X_8; Per Student State and Federal Aid to Education	-0.6378	0.2515	2.5360**

Multiple $R^2 = 0.6464$; $F = 37.4511$**

**Significant at the .01 level.

TABLE C-III

REGRESSION COEFFICIENTS, STANDARD ERRORS, AND t VALUES OF SELECTED VARIABLES ON PER STUDENT LOCAL ELEMENTARY AND SECONDARY EDUCATIONAL EXPENDITURES, SELECTED COUNTIES IN VIRGINIA AND SOUTH CAROLINA, 1962

Variable	Regression Coefficient	Standard Error	t Value
X_1; Dependent School District	18.0612	8.6073	2.0983*
X_2; Assessed Property Value per Student	0.0092	0.0014	6.3763**
X_3; $\frac{\text{Number of Owner-Occupied Residences}}{\text{Number of Registered Voters}}$	-0.0896	0.1946	0.4603
X_7; Percent Non-White	-0.4303	0.1372	3.1367**
X_8; Per Student State and Federal Aid to Education	-0.5362	0.2492	2.1512*

Multiple $R^2 = 0.6577$; $F = 39.2292$**

*Significant at the .05 level.
**Significant at the .01 level.

TABLE C-IV

REGRESSION COEFFICIENTS, STANDARD ERRORS, AND t VALUES OF SELECTED VARIABLES ON PER STUDENT LOCAL ELEMENTARY AND SECONDARY EDUCATIONAL EXPENDITURES, SELECTED COUNTIES IN VIRGINIA AND SOUTH CAROLINA, 1962

Variable	Regression Coefficient	Standard Error	t Value
X_1; Dependent School District	27.1868	8.2704	3.2872**
X_2; Assessed Property Value per Student	0.0079	0.0015	5.2749**
X_3; $\frac{\text{Number of Owner-Occupied Residences}}{\text{Number of Registered Voters}}$	-0.1620	0.1988	0.8150
X_4; Median Family Income	0.0110	0.0039	2.7767**
X_8; Per Student State and Federal Aid to Education	-0.5596	0.2511	2.2280*

Multiple $R^2 = 0.6496$; $F = 38.0940$**

*Significant at the .05 level.
**Significant at the .01 level.

VITA

James Harold Warren

Candidate for the Degree of

Doctor of Philosophy

Thesis: AN ECONOMIC MODEL OF LOCAL EDUCATION EXPENDITURES WITHIN AN INDIVIDUAL UTILITY MAXIMIZATION FRAMEWORK: A THEORETICAL AND EMPIRICAL EXAMINATION

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