PREDICTORS OF LOCAL CURRENT EXPENDITURES FOR NORTH CAROLINA PUBLIC SCHOOLS AND COMMUNITY COLLEGES

by

Robert Cornelius Myers

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APPROVED:

Richard G. Salmon, Chairman

Samuel D. Morgan

Jimmie C. Fortune

Wayne M. Worner

H. Bruce Downey

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ABSTRACT

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The purposes of this study were twofold: 1) to determine the predictability of the amount of county current expenditures for the North Carolina Public School System by using nineteen county characteristics, and 2) to determine the predictability of the amount of county current expenditures for the North Carolina Community College System by using these same nineteen county characteristics. All data were collected from the year 1985 with the exception of general population data, which were secured from the Census of 1980.

Factor analysis was performed on the nineteen predictor variables in order to remove multicollinearity between the variables and to reduce the data to a manageable size for subsequent multiple regression analysis. Stepwise regression was then utilized to determine which factors best predicted the amount of local revenues spent for educational current expenditures.

Factors 2, 3, and 5 were significant predictors for per pupil local current expenditure for the public schools.

Factor 2 included median years of education completed by the general population, high employment, and high income varialbes. Factor 3 described the relationship with per capita property value and per capita property tax. It also included the migration rate in the general population. Factor 5 included per pupil state current expenditure for the public schools, percent of high school juniors passing the North Carolina Competency Test, and percent of labor force in new and expanded industry.

Factors 2 and 4 were significant predictors for per pupil local current expenditure for the community college. Factor 4 represented per pupil state expenditure for the community college and percent of white pupils in the community college.

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CHAPTER I

INTRODUCTION

The achievement of absolute fiscal equity of educational opportunity, as defined by equal expenditures per unit, continues to be unresolved (Wood, 1985). Absolute equity plans...

> begin with the assumption that the educational needs and costs are equal across jurisdictions, that by equalizing per-pupil spending power one does the best one can of providing equal educational opportunity without doing unreasonable violence to local autonomy (Paquette, 1987 p. 137).

Underlying this study is the notion that achievement of fiscal equalization of educational opportunity is a proper goal of state government. However, this study does not accept the standard that fiscal equalization of educational opportunities require all school districts expend precisely equal dollars per pupil. Instead, it is recognized that achievement of fiscal equalization will require unequal per pupil expenditures if the the specific needs of individual pupils are met.

Today education is the largest single item of expenditure in state and local government finance (Carroll and Park, 1983). The large percentage of state revenues allocated to public education, however, has not always existed. Throughout the 1800's, localities were usually

allowed by the states to levy school taxes, charge tuition and use rate bills to support public elementary education. Due to noticeable inequities in local money expended for public schools soon became apparent, the states began to increase their attention to this situation (Goertz and Hannigan, 1976).

By 1929 approximately 83 percent of funds for public elementary and secondary education came from local sources, nearly 17 percent from state sources and less than 1 percent from federal sources. By 1969 the local sources had decreased to 52 percent, the state's share had increased to nearly 40 percent and the federal portion had increased to approximately 8 percent (National Center for Education Statistics, 1978). In 1982 local sources comprised nearly 43 percent, the state comprised approximately 49 percent and the federal remained at nearly 8 percent (Salmon and Alexander, 1983). Thus, over a fifty-three year period the states' share increased from 17 percent to 49 percent of the total revenue received.

A study conducted by Bettye MacPhail-Wilcox reveals that state funding of North Carolina community colleges has declined in recent years. Between 1965-66 and 1981-82, state funding declined from 75 percent to 65.2 percent of total state and local funds, resulting in increased dependence on "unequalized local tax bases" (MacPhail-

Wilcox, 1985, p. 419).

The court case of Serrano in 1971 demonstrated that the inequality of school fund distribution still existed within state districts. The Advisory Commission On Intergovernmental Relations in 1971 made the following comment:

> Proposals to shift the burden of public school financing to the State level raise a broad spectrum of issues--ranging from the merits of property tax and how it should be used, to the advantages of local control in maintaining diversity and educational vitality, and the relatively new concept of measuring how effective the education dollar is being used. (p. 30)

The 1972 President's Commission on School Finance recognized the extreme complexity and difficulty of funding public elementary and secondary public education equitably, as the following statements indicate:

> If State governments are to assume their proper responsibilities for education, most of them urgently need to improve their present capabilities in educational planning, policy development, administration, and evaluation. These improvements should extend to both their legislative and executive branches.... (p. xiii)

> Encouraging more research into needs, methods, and possible solutions may seem like counseling patience to a person trapped in a burning building. That is certainly not our intention. But we do not agree with those who argue that money is the remedy for virtually all the ills of our educational system. (p. xi)

In 1983 the publication A Nation At Risk again

recognized the continuing complexity and difficulty of providing equity in education:

> All, regardless of race or class or economic status, are entitled to a fair chance and to the tools for developing their individual powers of mind and spirit to the utmost. (p. 4)

The North Carolina General Assembly has attempted to solve its absolute fiscal equity problems for its public schools and community colleges by simply increasing the state's share of revenue through a flat grant method. This flat grant method is discussed more thoroughly in Chapter II.

Unfortunately due consideration was not given either to the amount of local revenues generated or the amount of tax effort that local districts exerted to raise such revenues. Use of the flat grant method also ignored other variables that make each school district unique. For example the North Carolina school finance system does not allocate state revenue for either the capital outlay needs of the school districts nor their debt service requirements.

Problem

Similar to the fiscal structures of public education and the community colleges that currently exist in most states, absolute fiscal equity as measured by equal per unit expenditures has not been achieved in North Carolina. This problem is illustrated by the amounts of local

expenditures by the counties in 1985 for K-12 education. Local expenditure per pupil ranged from $2,486.00 in the five high fiscal capacity counties in North Carolina to $699.00 per pupil for the five low fiscal capacity counties. Fiscal capacity of school districts was defined as the total taxable property base or property evaluation (North Carolina Public Schools Statistical Profile--1986).

As indicated earlier, achievement of fiscal equalization of educational opportunity does not require precisely identical per pupil expenditures. However, fiscal equity as defined by equal per pupil expenditure could act as an achievable objective and would substantially increase fiscal equity among North Carolina school districts.

Purpose

Nineteen characteristics of the North Carolina counties were used to determine if a significant ($p>.01$) relationship could be found to predict county current expenditures. These nineteen characteristics (predictor variables) are listed in the beginning of Chapter III of this document. The purposes of this study were twofold: 1) to determine the predictability of the amount of county current expenditures per unit for the North Carolina Public School System by using nineteen county characteristics, and

2) to determine the predictability of the amount of county current expenditures per unit for the North Carolina Community College System by using these identical nineteen county characteristics.

The Research Question

Which of the nineteen county characteristics fit into a regression equation (that permits the prediction at the $p>.01$ level or with 99 percent confidence) in regard to: 1) the county current expenditure for the North Carolina Public School System and (2) the county current expenditure for the North Carolina Community College System? For example, will the county characteristic of median years of education completed for the general population significantly predict whether county current expenditure for the public schools in North Carolina will increase or decrease?

Significance of the Study

Because the public schools and community colleges in North Carolina both are funded principally through the flat grant method, the education commissions, during the terms of Governors Daniel K. Moore and James B. Hunt, recommended examining into the funding responsibilities for the public schools of North Carolina. If changes are made in public

schools funding, community college funding might also change since the North Carolina community college finance system is structured similarly.

The North Carolina General Assembly directed the State Board of Education in June, 1985, to adopt a basic education program and to recommend a definition of state and local funding responsibilities (The Basic Education Program For North Carolina's Public Schools, 1986).

As of 1985, educational opportunities for pupils in North Carolina still were positively related to the fiscal capacities of their respective counties. A simple and easily understandable example, used previously, was the amount of local expenditure by the counties for K-12 education. Local expenditure per pupil ranged from $2,486.00 in the five wealthiest North Carolina counties to $699.00 per pupil in the five poorest counties. This discrepancy occurred despite the allocation of nearly 40 percent of their total local revenue for education by the five low fiscal capacity counties, and the five high fiscal capacity counties allocated less than 25 percent.

The fiscal capacities of the counties were readily available to use in making comparisons with county current expenditures. Other characteristics, included in this study were more difficult to obtain, but provided considered in order to obtain a more complete description

of the fiscal condition of the public schools and community colleges in North Carolina. These nineteen county characteristics should also provide insight as to how greater fiscal equity can be achieved.

Limitations

All information was collected from the year 1985 with the following exceptions: The make up of the general county populations was taken from the most recent source, which was the 1980 Census of Population (U.S. Department of Commerce Bureau of Census). The fiscal year, calendar year, and academic year were considered the same for the purposes of this study.

Because the amount of local current expenditure was either non-existent or too small to be important, no data were included on special schools of the State Department of Public Instruction: The Governor's Schools of North Carolina, North Carolina School of Science and Mathematics, North Carolina School of the Arts, State Schools for the Handicapped, and Division of Youth Services.

CHAPTER II

REVIEW OF THE LITERATURE

This review of the literature is composed of five general areas relating to the fiscal equalization of educational opportunity: (a) court decisions, (b) the use and distribution of state funds for current expenditures, (c) the financing of education in North Carolina, (d) determinants of educational expenditures, and (e) determinants of local government.

Court Decisions

In the 1800's, Roe indicates, the courts generally held that it was legal to levy taxes for public education. The court ruled in 1874 that it was legal for a school district to expend tax revenue for the support of a high school in the famous Kalamazoo case in Michigan. The Robinson v. Schench case in Indiana in 1885 prompted a ruling that it was legal for the legislature to levy a statewide tax to aid all of the schools in the state. In a Kansas case, State vs. Board of Commissioners of Elk County in 1899, the court agreed that a state could compel a county to levy a tax rate for schools (1973). These court cases were concerned more with the legality of levying

taxes for schools than with the rights of children to equal opportunities for education. This trend continued into the twentieth century. In explaining recent developments within the legal system, Alexander and Jordan divided court cases into three twentieth century generations. In the first generation of cases, the taxpayer was the aggrieved party. He was usually opposing a tax, and his motive was primarily to avoid taxation. In the second generation of cases, the pupil was the aggrieved party. These cases determined that the educational opportunity of a pupil should depend not upon the wealth (or, more importantly, the lack of it) nor upon the fiscal ability of the district in which he lived. The third generation of court cases included the questions of the second generation (those concerning equalization of financial resources), and further, they raised the question of the degree to which a state has responsibility for providing equal educational opportunity (1973).

An example of cases classified as first generation is Dean v. Coddington, which was tried in South Dakota in 1964. The constitutionality of the State's foundation program law was challenged; the taxpayer felt that revenue of the state tax must be uniformly distributed as well as uniformly collected. The court held that "the constitutional provisions requiring equality and uniformity

relate to the levy of taxes and not to the distribution or application of the revenue derived therefrom" (cited in Johns, 1973, p.36).

Both the second and third generation cases were greatly influenced by the ruling of the Supreme Court of the United States in the Brown v. Board of Education of Topeka case. The Court stated:

> Today, education is perhaps the most important function of state and local government.... In these days, it is doubtful that any child may reasonably be expected to succeed in life if he is denied the opportunity of an education. Such an opportunity, where the state has undertaken to provide it, is a right which must be made available to all on equal terms (1954, cited in Alexander, 1980, p.465).

The most important second generation case was Serrano v. Priest, heard in the California Supreme Court in 1971. In a brief the Court determined that education is a fundamental interest protected by the Constitution, that wealth is a "suspect classification," and that the State has no compelling interest in making a child's education dependent upon the wealth of his local school district. The Court further ruled that the school finance system of California violated the equal protection clause of the Fourteenth Amendment because the system made a pupil's education substantially dependent upon the wealth of the district in which he lived. "School finance as a critical

government issue had come into its own" (Education Finance Center, Education Commission of the States in Denver, Colorado, 1975, p.iii).

The California Supreme Court, in Serrano v. Priest, emphasized what has become known as the "wealth neutrality" doctrine: each school-age resident has a fundamental right to an education of equal quality. This decision provided that a pupil in a poor district should be provided an educational opportunity equal to that of a pupil in a rich district. The court seemed to use the terms rich and poor in relation to property wealth in particular. In this case the court declared that the California public school financing system, with its "substantial dependence on local property taxes," was unconstitutional (cited in Harrison, 1976).

Third generation cases are most important as they may give insight to court decisions in the future. This generation of cases requires not only equalization of fiscal resources but also equalization of educational programs. In these cases it is alleged that some children require educational needs that differ, and per pupil costs of programs to meet these needs vary. Educational opportunities cannot be equalized without including these variations. Therefore, unequal expenditures per pupil in order to equalize educational opportunity are required

(Johns, 1973). In the first of these decisions, McInnis v. Shapiro, the United States District Court for the Northern District of Illinois held that the Equal Protection and Due Process clauses of the Fourteenth Amendment were violated by the Illinois State system of school finance. This decision was affirmed by the Supreme Court of the United States (Alexander and Jordan, 1973).

Burruss v. Wilkerson was a similar case coming soon after the decision of Illinois. The court held:

> The courts have neither the knowledge, nor the means, nor the power to tailor the public moneys to fit the varying needs of these students throughout the state. We can only see to it that the outlays on one group are not invidiously greater or less than that of another. No such arbitrariness is manifest here (cited in Johns, 1973, pp.39-40).

School districts involved in McInnis and Burruss were not classified as fiscally poor because wealth was measured in terms of property assessed valuation. In both cases claims were made that children were denied equal access to educational programs because of the large number of deprived children. "In both instances, the courts recognized the existence of varying educational needs and costs but refused to elevate the disparity to a plane of constitutional discrimination" (Alexander and Jordan, 1973, p.13).

The New Jersey Superior Court in Robinson v. Cahill in

1969 ruled that the Constitution of the State of New Jersey was violated in part by an over-reliance on the property tax. The Court agreed with a New Jersey report which stated:

> It is now recognized that children from lower socio-economic level homes require more educational attention if they are to progress normally through school. When the additional compensatory education is provided, it results in substantially higher costs. The weighting of the children from the lower income families compensates in part for the larger expenditure necessary to provide them with an adequate educational program so they may overcome their lack of educational background (The Bateman report, 1968 cited in Alexander and Jordan, 1973, p. 14).

If this argument had been accepted by the United States Supreme Court in the 1973 San Antonio v. Rodriguez decision, 49 of the 50 states would have been held in violation. Only Hawaii, which has a full state plan, would have been able to meet the test (Johns, 1973). "The problem is that they have provided no substantive guidelines other than the concept of fiscal neutrality--that the wealth base must be the wealth of the state as a whole rather than that of the local district" (Alexander and Jordan, 1973, p.15). The United States Supreme Court, however, rejected Serrano-type litigation as violative of the Fourteenth Amendment of the United States Constitution.

Following Rodriguez, those persons unhappy with public

school finance programs have had to seek redress through their state courts as violative of their respective state constitutions. A total of seven states have seen their state public elementary and secondary finance programs ruled unconstitutional by their highest state courts. These states include Arkansas, California, Connecticut, New Jersey, Washington, West Virginia and Wyoming. However, the majority of attempts to change state school finance programs through use of state courts have failed.

In 1982, the United States Supreme Court made it clear in Board of Education of Rogers v. McClusky that local school boards will not be scrutinized on every decision they make (O'Hara, 1986). O'Hara interpreted Rogers as follows:

> The courts will become involved only when school officials' actions are not reasonable. This decision as well as the lack of federal involvement, indicates that the major substance of education and education law will be determined by the states and the local school boards (1986, p. 28).

Federal involvement in the 1980's thus far could be termed inactive when compared to federal decisions of the 1960's and 1970's. The United States Congress has reduced the percentage of funding granted to the states under P.L. 94-142 by maintaining its dollar amount of funding (O'Hara, 1986). P.L. 95-561 (1978), a statute for education of the gifted, was repealed in 1980. The only active part

Congress has played in education recently has been the passage of the Equal Access Act. This federal statute prohibits any

> ...public secondary school which receives Federal financial assistance and which has a limited open forum to deny equal access or a fair opportunity to, or discriminate against, any students who wish to conduct a meeting within that limited open forum on the basis of the religious, political, philosophical, or other content of the speech at such meeting (P.L. 98-377, 1985 cited in O'Hara, 1986, p. 36).

It should be noted, however, that the statute does not subject school systems to loss of federal funds if its requirements are violated, nor does it specifically outline other methods of enforcement.

The Use and Distribution of State Funds for Current Expenditures

The original public schools in the United States were for the children of paupers who could not afford private schools or tutors. Local property tax revenues were exclusively used to pay for these schools. The inequities between communities soon became apparent (Garms, Guthrie, and Pierce, 1978). In 1835, Thaddeus Stevens stated the following to the Pennsylvania House of Representatives: "...it is the duty of government to see that the means of information be diffused to every citizens. This is

sufficient answer to those who deem education a private and not a public duty..." (cited in Alexander and Jordan, 1973, p. 159). Ellwood Cubberley made the following recommendations in 1905 (later known as "nonequalizing" or "flat grant"):

> 1. That due to the unequal distribution of wealth, the demands set by the states for maintaining minimum standards cause very unequal burdens. What one community can do with ease is often an excessive burden for another.
>
> 2. That the excessive burden of communities borne in large part for the common good should be equalized by the state.
>
> 3. That a state school tax best equalizes the burdens.
>
> 4. That any form of state taxation for schools fails to accomplish the ends for which it was created unless a wise system of distribution is provided. (p. 250)

Harlan Updegraff, in 1921, proposed that the wealth of the local school district be entirely eliminated as a factor affecting the quality of a child's education (later known as "district power equalizing"). Henry Morrison, in 1930, took Updegraff's proposal a step further and recommended full state funding (as cited in Harrison, 1976). This movement was hindered and suppressed by many of the school superintendents and politicians in wealthy school districts. They considered state and federal financial equalization of educational opportunity as the Robin Hood Philosophy (Alexander and Jordan, 1973). It was

of little immediate advantage to the residents of wealthy school districts overall and operated to their fiscal disadvantage in relation to state revenues.

However, court cases and public concern beginning in the mid 1960's have caused many state legislatures to re-examine and change their educational finance systems. In part, this increased interest to reform state school finance programs was the result of the publicity of Serrano-type litigation. However, the growing reluctance of taxpayers reflected by tax limitations of failed bond referendums also contributed to increase levels of funding by state governments. With increased state aid there were many state-mandated changes to existing finance systems. "Increased resistance to school and its results are evident at each level of government, but the taxpayers' revolt has been particularly acute at the local level..." (Berke, 1972, p. 9). In the 1970's, property taxes were the most unpopular of all taxes, and most policy makers viewed them as regressive, placing a high burden on low-income individuals (Augenblick, 1986). Johns, in 1972, stated: "The present tax structure supporting the nation's public schools falls far short of meeting the equity test." (p. 48) Berke summed up the situation when he asserted, "...states have created school districts, assigned them

taxing power through the inequitable real property tax, and have failed to compensate with state aid the dramatic disparities in local revenue raising abilities" (1974, p. 9).

There are fundamental problems in equalization when using local revenues. Local revenues are raised through an interaction of local tax effort and fiscal capacity of the district. Most commonly, tax effort often is defined as the school tax rate, and fiscal capacity is defined as the taxable property base or property valuation (Goertz, Moskowitz, and Sinkin, 1978). Therefore, fiscal capacity multiplied by tax effort equals the local revenues for schools.

A high fiscal capacity district, can raise more revenue per pupil for its schools than a low fiscal capacity district, even though both are using identical tax rates. A tax effort-equalizing system, in which tax effort is defined simply as the school tax rate on taxable property, does not eliminate the variance created by differing tax bases. Total fiscal capacity must be measured on the total aggregate ability to raise tax revenue.

> The ability to raise tax revenues may be very different for two districts having equal total value of property but different income levels and different distributions of total property among commercial, industrial, and residential usages.... While it is impossible to determine a perfectly 'correct' measure of fiscal capacity

> the use of property value alone can certainly be improved upon (Akin, 1972, p. 27-28).

Most school finance systems have two major goals: (1) to distribute state and local resources in a way that insures a measure of equality of opportunity--pupil equity, and (2) to raise educational revenues in an equitable manner--taxpayer equity (Goertz, Moskowitz and Sinkin, 1978). "Equity not only extends to consideration of fiscal ability of the individual, but further to natural justice and fairness of government's treatment of the individual" (Johns, Morphet, and Alexander, 1983. p. 88). These authors go on to state that it is expected that a desirable tax should not inappropriately classify individuals or introduce some irrefutable bias against the taxpayer.

State Support Patterns For Public Schools

From the study of several works (Mueller and McKeouen, 1986; Garms, Guthrie and Pierce, 1978; Goertz, Moskowitz, and Sinkin, 1978; Coons and Sugarman, 1978; Harrison, 1976; Guthrie, 1975; Berke, 1974; Levin, 1974; Johns, 1973; The President's Commission on School Finance, 1972; Akin, 1972; Wise, 1968; and Johns and Morphet, 1960), the basic types of state funds distribution have become apparent and were clearly described by Goertz, Moskowitz, and Sinkin, 1978. Interestingly, most types of state aid programs were developed and used prior to 1935. Although these several

types of state aid programs differ in their conception of the state and local role, they are all based on the same components--fiscal capacity, tax effort and need.

Prior to the Serrano case in 1971,the right of state legislatures to develop their own objectives and systems of financing public schools was generally accepted. However, as indicated earlier, since 1971, many state systems for financing public elementary and secondary schools have been questioned in the courts. The following equalization programs--Flat Grant, Minimum Foundation Programs, Guaranteed Tax Base, Percentage Equalization, and District Power Equalization--remain widely used, but are not protected from Serrano-type challenges. Full state funding, of course, would be protected from Serrano-type litigation.

1. Flat Grant

A Flat Grant is a payment made by the state to local school districts, based solely on the number of pupils enrolled and/or the number of personnel employed. Under a Flat Grant Program, all districts receive the same amount of state aid per pupil. In this system, the fiscal capacity and tax effort of a district are not considered in the allocation of the aid.

2. Minimum Foundation Program

In the 1920's the most widely used school aid formula, the Minimum Foundation Program, was developed by George Strayer and Robert Haig to relieve the inequities in fiscal capacity among school districts. Under the Foundation Program, each school district is guaranteed a basic amount of money per unit of need. This guaranteed sum is known as the foundation amount or minimum guarantee. Local school districts must contribute to this guaranteed amount. Usually, the local share is determined by levying a state mandated tax rate on a district's property valuation and/or local tax base. The amount raised by a district by application of a uniform tax effort is known as the local required contribution. State aid is the difference between the per unit guarantee and the local required contribution.

A Minimum Foundation Program allows a participating district to tax itself at a rate above the mandated local tax effort. Known as a "local leeway," this add-on or local option tax was an integral part of the Strayer-Haig program. The supporters of the plan felt that local option would encourage adaptability and change within the educational system. However, a tax rate higher than the required tax rate will not cause an increase in state aid. Therefore, the ability to raise revenues above the foundation level varies with the fiscal capacity of the

district.

The extent to which a Minimum Foundation formula is equalizing depends upon the level of the state guarantee and the amount of local leeway generated by the district. As the state increases the level of its guarantee, a larger proportion of districts' current expenditures becomes eligible for state aid and the disparities among districts lessen. As the local districts tax above the mandated tax rate, the disparities widen again, because the wealth of the district determines the amount of money which can be raised above the foundation level.

3. Guaranteed Tax Base

While the Minimum Foundation Program emphasizes the spending level guaranteed by the state, the Guaranteed Tax Base Plan emphasizes the state-determined tax base and the district's local tax effort. The Guaranteed Tax Base Plan is designed to assure that every district in the state can act as though it has a tax base identical to the state-set level. Under a guaranteed tax base program the district selects its tax rate for education. This tax rate is then applied to the guaranteed tax base and the actual tax base for the school district. State aid is the difference between what would be raised with the guaranteed tax base and what can be actually raised from the local tax base.

The greater the difference between actual and guaranteed fiscal capacity, the larger the amount of state aid. Unlike the Minimum Foundation Program, the Guaranteed Tax Base Program provides districts with an incentive to increase tax effort, since aid increases proportionately for every increase in the tax rate.

The degree of equalization under this plan is affected by the level of the guaranteed tax base and the size of local district tax rates. A high guaranteed tax base increases the difference between actual and guaranteed wealth and will reduce the disparity in district expenditures by increasing the amount of state aid. If all districts with a tax base less than the guaranteed tax base levy identical tax rates, they will have equal revenues to spend on education. However, the proportion of state aid will vary in accordance with the fiscal capacities of the districts. Spending in districts with tax bases above the state guaranteed tax base will be determined by the locally chosen tax rate and the size of the total property tax base. Because of intervening variables, some districts are not always able to or choose not to tax themselves as heavily for education as do other districts. If this is the case, disparities in per pupil expenditures will occur. In essence, the guaranteed tax base/yield programs are designed to increase taxpayer equity but do not guarantee

fiscal equalization of education opportunity.

4. Percentage Equalization and District Power Equalization

The Percentage Equalizing formula emphasizes the way that state and local governments divide the support of educational expenditures. This formula was designed to assure that the state would support a share or percentage of educational expenditures. The share is larger in poor districts than in rich districts. Under the Percentage Equalizing formula the state determined what percentage of educational expenditures it will support in the average district. If the state aid program is established at a specific funding per unity level, the percentage-equalization program assumes the characteristics of a Minimum Foundation Program. On the other hand if the districts have the power to set their own per unit level prior to application of the state ratio of support, the percentage-equalization program assumes the characteristics of a District Power Equalization Program.

The early equalization formulas--minimum foundation, guaranteed tax base and percentage equalizing--attempted in varying degrees to minimize the disparities in education expenditures which resulted from variations in the fiscal capacity of districts. The studies and court cases of the 1960's and 1970's showed, however, that the distribution of

state aid under these formulas falls short of the goal of wealth neutrality.

The District Power Equalizing (DPE) concept was introduced by Coons, Clune, and Sugarman in 1970. It was one of the first modifications of existing equalization plans. DPE is consistent with the concept of equalization, which distributes state aid in inverse proportion to local taxable resources. However, identical to Guaranteed Tax Yield/Guaranteed Tax Base (GTY/GTB) programs, DPE focuses upon tax effort and guarantees that for any given level of the effort, all districts will be guaranteed an equal level of spending through a combination of local and state revenues.

A feature which distinguishes DPE and GTY/GTB programs from the traditional formulas is the possibility of recapturing local revenues. Local districts which raise more than the state guaranteed amount for a specific tax rate must pay back the excess to the state for redistribution to poorer schools. Since inequities exist in the ability of districts to provide an equal effort, researchers have begun to question the extent to which DPE formulas are truly equalizing.

5. Full State Funding

Full State Funding has been offered as an alternative to shared cost formulas. Full State Funding is a situation

in which the state contributes all of the public elementary and secondary education revenue in the state and the local districts are prohibited from generation of local revenue. Variations in per pupil revenue among districts are based upon the needs of the individual pupils rather than the fiscal capacity of local districts. The basic difference between Full State Funding and shared cost formulas is that the state determines the total levels of funding for all districts.

In adopting a Full State Funding program, policy-makers must be willing to eliminate some features of shared cost programs. First, Full State Funding eliminates local choice in determining the size of the local school budget and school tax levy. Second, state centralization may limit local autonomy in determining how funds are expended. Finally, the state decision-makers are under greater pressure to insure that their intergovernmental revenue transfer systems match fiscal assistance educational needs of the districts.

To summarize, most school finance formulas are shared-cost formulas with contributions coming from a combination of state and local sources. State Aid in most of these formulas is allocated in inverse relationship to the fiscal capacities of the districts.

Although the equalization ability of shared-cost formulas based upon these general approaches varies with specific implementations, in their pure form the formulas can be made mathematically equivalent. For a detailed discussion of the possible equivalence of these school finance formulas, see Peter Jargowsky, Jay Moskowitz and Judy Sinkin, School Finance Reform: Decoding the Simulation Maze (Princeton, New Jersey: Education Policy Research Institute of the Education Testing Service, June, 1976). Therefore, the selection of a specific formula is secondary to defining the various components of the formula--fiscal capacity, tax effort, and educational need--and establishing the relationship among these components. For example, the way in which fiscal capacity is defined--as property wealth, income, or some other measure--determines the ability of the district to support education. In districts that are property rich and income poor, the use of property valuation rather than income makes them appear more fiscally able. The use of an income measure will have the opposite effect.

The choice of definition for each component is a value judgment and a political decision. Different districts within a state will benefit in different ways from these definitions. The final choice often becomes a political compromise. A district may be willing to accept a revised

definition of fiscal capacity which has little effect on the amount of state aid it receives for a more beneficial definition of pupil units which will positively effect its state aid payments. Districts in which an alternative pupil unit will make little difference in state aid payments might be more concerned with a revised definition of fiscal capacity .

State Support Patterns for Community Colleges.

Nationally, the state support patterns for community colleges differ somewhat from that of public elementary and secondary schools. However, the finance programs are more similar than dissimilar. The funding patterns for the North Carolina public schools and the community colleges which are very similar are discussed later in this chapter.

After reviewing the considerable research conducted in the area of community college finance (Wattenbarger and Mercer, 1985; Cohen and Brawer, 1982; Gillis, 1982; Breneman and Nelson, 1981; Augenblick, 1978; Garms, 1978; Garms, 1977; Wattenbarger and Starnes, 1976; Wattenbarger and Cage, 1974; and Lombardi, 1973), it appears that state community college finance programs can be classified broadly as follows:

1) Negotiated budget funding is arranged annually or biannually with the state legislature or a state board. It

is used especially in states where all or nearly all the community college funds come from the state. Negotiated budgets demand a high level of institutional accountability for funds expended.

2) Under the unit rate formula, the state allocates funds to colleges on the basis of a formula that specifies a certain number of dollars per unit of measure. The unit of measure may be a full-time equivalent pupil (FTE), the number of pupils in certain programs, the credit hours generated, or some combination of measures. Commonly the unit rates are based upon use of the flat grant method. As a flat grant, funding does not vary with respect to fiscal capacity of the district.

3) The minimum foundation funding is also referred to as equalization funding. It is a method with variations in the form of the Strayer-Haig formula. State allocations are made at a variable rate that depends on the amount of local tax capacity available to the individual institutions. The allocation may be expressed either as a set dollar amount minus the local funds available per pupil or as a proportion of the approved district budget minus the amount provided by the local contributions. In either case the intent is to provide more state funds to institutions where local support is less.

4) The cost-based funding model provides state allocations based upon actual expenditures. In this model state funds are allocated on the basis of program functions, specifically budgeted objectives, and detailed instructional categories. Local tax funds may or may not be factored into the formulas, and the appropriations vary greatly among institutions, depending on the costs of the programs they offer.

Financing Education In North Carolina

North Carolina is presently in the middle of the issue of "equity funding" in relation to education (King, 1987). Many states addressed this issue by adopting state funding adjustment mechanisms in the early 1970's because of court cases and citizen concerns but North Carolina did not. Borne and Steifel (1983) classified North Carolina (and some other states) as a "nonreform state." In 1977, however, the Governor commissioned a study of equal educational opportunity. The study identified conditions which were problems to equal educational opportunity. Difference in district expenditures, declining state support, the failure to recognize differential costs, variable tax bases, and unequal educational needs across districts were cited (Access to Equal Educational Opportunity in North Carolina, 1979).

In North Carolina, the state provides the bulk of current operating expenditures--primarily teachers' salaries--while districts are responsible for capital costs and plant maintenance. Districts can raise additional revenues to provide expanded programs and many districts, particularly urban districts, do so. The result is "widespread inequalities" among districts (Levin, Muller, and Scanlon, 1973). In 1981, the Legislative Research Commission On School Finance Studies reported to the North Carolina General Assembly the following finding:

> This issue of who pays for what will become increasingly important as public funds become scarcer and officials are increasingly held accountable for their expenditure. Traditional local expenditures for education will become an increasingly complex political issue to the extent that property taxes, under increasing political attack, are a principal means of raising local education revenues. (p. 6)

A study conducted by Bettye MacPhail-Wilcox revealed that state funding of education continues to decline in North Carolina. Between 1965-66 and 1981-82, state funding declined from 75 percent to 65.2 percent of total state and local funds. This resulted in increased dependence on unequalized local tax bases (MacPhail-Wilcox, 1985).

The following are basic points describing the educational funding process used in North Carolina:

1) State funds are distributed primarily on a per pupil basis and on the number of personnel positions,

without adjustments for cost variation among districts.

2) Salary supplements are discretionary at the local level.

3) Hiring personnel beyond those positions provided by the state constitutes a wide variation among districts.

4) Local funds per pupil unit vary substantially across the state.

5) Local funds are obtained primarily from property taxes, with an optional 1 percent local sales tax collected by the state and returned, less administration fees, to the counties (MacPhail-Wilcox, 1985).

6) Local funds are used for operation and maintenance of school plants.

In 1985, the North Carolina General Assembly passed the Basic Education Program (BEP). It describes the education which should be available to every child in North Carolina and the resources needed to provide that education. The BEP outlines the curriculum, programs, general standards, classroom materials, and staffing which should be provided in all schools in the state. An eight-year implementation schedule is planned, with state costs totaling over $700 million (The Basic Education Program For North Carolina's Public Schools, 1985). However, King pointed out that this program will not help districts with

a low fiscal capacity to catch up, because it also operates to the advantage of districts with a high fiscal capacity. He cites the following example:

> ...an affluent school system might use its BEP funds to further reduce its class size and expand its educational offerings to include a broad range of foreign languages and special science courses for college-bound students. Impoverished systems would be hard pressed to match these improvements (1987, p.8).

The concern of King is strengthened when considered along with the following statements made in the BEP documents: "Local administrative units are not limited to the program described in the BEP. Any local administrative unit may provide programming, facilities, staffing, or other resources beyond those described at local expense" (State fact sheet entitled "NC Basic Education Program," 1986). Howard Maniloff, special assistant to State Superintendent of Public Instruction Craig Phillips, indicated that the Basic Education Program won't close the gap between rich and poor systems ("Researchers Say," 1985).

As stated in Chapter I of this study, standards need to be established and action taken by the state in order to ensure both fiscal educational opportunity and taxpayer equity.

Determinants of Educational Expenditures

Hirsch used seven independent variables to predict total per pupil current expenditure, together with debt service and per pupil in Average Daily Attendance (ADA). The predictors included number of pupils in ADA, percentage of pupils in high school, pupils per square mile, percent increase in public school pupils over a five year period (1951-56), assessed valuation, and an index of the scope and quality of education. The index included pupil-teacher ratio, number of college hours per teacher, average teacher salary, percent of teachers with more than ten years experience, number of high school credit units, and percent of high school seniors entering college. After studying school systems in the St. Louis City-County area, Hirsch found that the predictors explained 85 percent of the variance in per pupil expenditures. The single largest predictor, by far, was the assessed valuation of property. The index of scope and quality of education and percentage of pupils in high school also contributed significantly (1960).

Garms conducted a study of large city school districts and categorized the variables used to predict per pupil expenditure into three areas: (1) fiscal ability to support education, (2) educational expectations of the community, and (3) governmental system. By running a multiple

regression using variables included in the first two areas, he found they explained 71 percent of the variance. When governmental variables were included, the variance explained increased only to 73 percent. He indicated that the most important variables were mean family income, rate of unemployment, percentage of occupied housing occupied by owner, median years of schooling of the general population, assessed valuation, and private school enrollment in that order (1967).

Hickrod and Sabulao studied the determinants of per pupil expenditures in five metropolitan areas: Chicago, Cleveland, Detroit, Boston, and St. Louis. Their predictors included assessed property valuation, education tax rate, percentage of population college educated, median family income, and a ratio of blue collar to white collar workers. In the first three areas, assessed property valuation was the best predictor, and it was the second for the last two. For Boston and St. Louis, the best predictor was the ratio of blue collar to white collar workers. They noted that industrialized districts spent more for education and had low property tax rates, while the suburban districts had less property wealth and had to set higher tax rates (1969).

Ranney limited his study to school districts in cities

with populations over 300,000 and to current operating expenditures excluding debt service. His independent variables included per pupil expenditures in surrounding areas, median family income, ratio of public to private school enrollment, state aid per pupil, and whether or not a school system was fiscally independent. These variables explained 75 percent of the variance with expenditures per pupil in surrounding areas and public to private school enrollment ratios proving the most significant (1969).

Boons and Hu studied the determinants of per pupil expenditures in selected urban areas. They proposed certain variables as functions of a demand for education. These included tax income, median family income, median school years completed by the population, pupil-teacher ratio, and population density. Median school years completed and state aid per pupil also contributed significantly (1973).

Ladd studied communities in the Boston Standard Metropolitan Statistical Area with the following predictors: median family income, market value of commercial property, residential fraction of the assessed property tax base, local tax share, state aid per pupil, categorical grants per pupil, public school enrollment as a percentage of the population, percentage of families with incomes below the poverty level, and professional and

technical workers as a percentage of population. These variables were able to explain 65 percent of the variance. The best predictors were the measures of local fiscal capacity. Commercial property value was more strongly correlated to expenditures than residential property value. The authors suggest this indicated a willingness on the part of taxpayers to support expenditures when commercial properties made up a higher percentage of the total property in the district (1975).

Miller noted that the local property tax had been the base for local funding for many years, and local fiscal capacity had consistently been associated with current operating expenditures for schools. He also said that expenditures were influenced by the income level and the educational level of the community, the proportion of school funds which were locally derived, the size of the tax base, the number of private schools in the district, and socioeconomic factors (1975).

Sparkman studied the use of socioeconomic variables to predict state effort in supporting education. He defined state effort as educational expenditures divided by fiscal capacity, and he developed two indices to measure state effort. He then used principal component analysis to produce uncorrelated components from 28 independent

variables. These components were used in a multiple regression equation to predict state effort on each of the two indices. He described the factors as representing these following seven dimensions of the states: Education/Income, High State Support/Low Educational Levels, Urbanization, Government, Youth/Growth, Unemployment/Consolidation, and Educational Need (1977). These seven components explained 38 percent of the total variance of one index and 32 percent of the variance in the second index. For the first index, Educational Need and Youth/Growth were the major predictors. The author concluded that the states with a high degree of educational need and a young, growing population generally support schools at a higher level. For the second index, Government, Education/Income and Youth/Growth were the most important predictors. Accordingly Sparkman asserts that this indicated that states which provided many governmental services had a young and growing population and that high levels of income tended to support education as measured by the second index.

Determinants of Local Government Expenditures

In one of the earliest studies dealing with determinants of local expenditures, Fabricant was concerned with interstate variations in expenditures. He proposed

three basic determinants: income, urbanization, and population density. Using total state per capita expenditures as the dependent variable, he found that the three independent variables explained 70 percent of the variance. He determined that the most important factor was income, with urbanization second most important, although far behind (1952).

In 1961, Fisher provided the first of two studies which were intended to continue Fabricant's work. With data from 1957, he used the same three independent variables and classified the expenditures into general areas. These included local schools, public welfare, police, and so on. Overall, he found 49 percent of the variance was explained; the most important variable was income, and while population density was negatively related to expenditures, urbanization was positively related. For local schools, 62 percent of the variance was explained, and the general findings concerning the importance of variables and their signs held true (1961).

In 1964, Fisher expanded his study to include seven independent variables: percent of families with incomes less than $2,000, percent of population in urban areas, tax yield, population density, percent increase in population 1950-60, an index of two-party competition, and percent of population over the age of twenty-five years with less than

five years of education. The dependent variable again was total state per capita expenditure by category. Overall, he found the seven variables explained 65 percent of the variance, with percent of families with income less than $2,000 (negatively correlated) the important predictor and tax yield (positively correlated) the second best predictor. For local schools, the variables explained 67 percent of the variance, but he did not state which served as the best predictor (1964).

Spangler was concerned only with the effect of population growth upon expenditure. He used the percentage growth in population between 1950 and 1960 to predict total state per capita expenditure. Expenditure was divided into nine areas: education, highways, public welfare, health and hospitals, police, fire, interest, general control, and capital outlay. For all independent variables except highways, public welfare, and fire, the independent variable served as a significant predictor. For education, it explained 69 percent of the variance (1963).

CHAPTER III

METHODOLOGY

The purposes of this study were to determine if a significant ($p>.01$) relationship could be found between the two criterion variables which were represented by the amount of local current expenditure for the North Carolina Public School System and the North Carolina Community College System, and 19 predictor variables which were represented by underlying characteristics of the counties. Therefore, the research question was as follows: which predictor variables fit into a regression equation at the ($p>.01$) level in regard to local current expenditures for the public schools and community college at the county level for North Carolina?

It should be noted that this study involves prediction and not explanation. Explanation is theory driven, whereas prediction is not theory driven. The difference is noted by Pedhazur:

> It is necessary to distinguish between research designed primarily for predictive purposes and that designed for the explanatory purposes. In predictive research the main emphasis is on practical applications, whereas in explanatory research the main emphasis is on the understanding of phenomena.... The distinction between predictive and explanatory research is particularly germane to the valid use and interpretation of results from regression analysis. In predictive research, the goal is

> to optimize prediction of criteria such as income, social adjustment, election results, academic achievement, or delinquency (1982, p. 136).

Variables

Nineteen predictor (independent) variables and two criterion (dependent) variables were chosen for use in this study to predict local current expenditures for education at the county level in North Carolina. There were a large number of predictor variables which could have been used in relation to the two criterion variables. The following nineteen predictor variables used were selected because of their demonstrated impact in similar studies or were suggested for inclusion by educational authorities. The following were the nineteen predictor variables included for each county in this study:

1. percent of white pupils in the public schools;
2. percent of white pupils in the community college;
3. percent of white persons in the general population;
4. per pupil state current expenditure for the public schools;
5. per pupil federal current expenditure for the public schools;
6. percent of high school juniors passing the North

Carolina Competency Test;

7. percent of pupils in private/special schools;
8. per pupil state current expenditure for the community college;
9. median years of education completed for general population;
10. percent of general population under 18 and over 65 years of age;
11. percent of unemployment;
12. percent of labor force in non-manufacturing;
13. percent of labor force in new and expanded industry;
14. migration rate in the general population;
15. percent of voters registered Democrat;
16. percent of voters voting for Helms in the senatorial race;
17. per capita income;
18. per capita property value;
19. per capita property tax.

The following were the two criterion variables included for each county in this study:

A. per pupil local current expenditure for the public school;
B. per pupil local current expenditure for the community college.

community college.

Sample

All information was collected from the year 1985 with the following exception: the composition of the general county populations was taken from the most recent source, which was the 1980 Census of Population (U.S. Department of Commerce Bureau of Census). Due to a lack of precisely comparable data, the fiscal, calendar, and academic year were considered identical for the purpose of this study.

There were 140 public K-12 school districts which were subdivided into 40 total city units, 28 partial county units and 72 total county units. The 140 school districts are collectively referred to as the North Carolina Public School System (Sun, Personal Communication, 1986). Data for the 140 school districts were collapsed into 100 county units by the Division of Planning and Research which operated under the Controller's Office of the North Carolina Board of Education.

There were 58 community colleges and technical institutes, referred to as the North Carolina Community College System (Annual Enrollment Report, 1984-85). Each community college was geographically located in a single county. Their revenues were classified by source and institution and published by the Office of the State Auditor via annual financial audits.

In 1985, North Carolina had 451 non-public schools. The 1985 Directory of North Carolina Non-Public Schools made it possible to summarize non-public school data by county (Office of the Governor, 1985).

Data Sources

Data for "percent of white pupils in the public schools" were extracted from a document provided by the Division of Planning and Research under the State Board of Education entitled Pupil In Membership by Race and Sex of School Systems, 1984-85. Percentages were derived by dividing the data under the column representing white membership by respective data the figures in the column representing total membership.

The variable--"percent of white pupils in the community college" came from the "Annual 1984-85 Enrollment Report On the North Carolina Community College System." From Tables 7A and 7B, the WHITE MALE and WHITE FEMALE columns were combined as were the GRAND TOTAL columns. The resulting white persons totals were divided by the resulting grand total to achieve percentages for the county.

Table 45 of the 1980 Census of Population Vol. 1, Ch. B--"General Population Characteristic," U.S. Department of Commerce, Bureau of the Census--provided data on the

"percent of whites in the general population." The columns entitled MALE and FEMALE were combined for both "White" and "Total." The new "White" data were then divided by the new "Total" figure to obtain percentage for the counties. This same table provided data on "percent of general population under 18 and over 65 years of age." Total MALE and FEMALE Columns were combined for rows marked "18 Years and Over," "65 Years and Over," and "Total Persons." Then "18 Years and Over" data were subtracted from "Total Persons" to arrive at the "18 Years and Under" data for the counties. These result were added to the "65 Years and Over" data and divided by the original "Total Persons" data to achieve the percentages for the counties.

The North Carolina Public Schools Statistical Profile 1986 by the Division of Planning and Research of the North Carolina Board of Education provided data for the variables "per pupil state current expenditures for the public schools," "per pupil federal current expenditure for the public schools," "per pupil local current expenditure for the public schools," and total ADM for the respective counties needed to calculate "percentages of pupils in private/special schools."

The 1985 Directory of North Carolina Non-Public Schools produced under the auspices of the Office of the

Governor provided figures on private/special schools by county. The enrollments of all private/ special schools' enrollments were summed by county, added to the Average Daily Membership for public schools, and then divided by the resultant total to produce a percentage.

The variable "percentages of Juniors passing the North Carolina Competency Test" were calculated for the counties by combining the percentage of first-time juniors passing reading and math and dividing by two. These data were provided by the Division of Research/North Carolina Department of Public Instruction in a publication entitled Report of Student Performance, Fall 1985.

The variables "per pupil state current expenditure for the community college" and "per pupil local expenditure for the community college" were obtained by using the Total Expenditure row and Actual columns of the Financial Audit Report for the Year Ended June 30, 1985, produced for each community college by the Office of the State Auditor. To achieve a per pupil cost for each community college, these data were divided by the total FTE for each college reported in the Annual 1984-85 Enrollment Report on the North Carolina College system.

Profile/North Carolina Counties Seventh Edition, 1987, was produced by the Office of State Budget and Management, Management and Information Services. It contains 1984 data

for the following: "median years of education completed for general population," "percent of unemployment," "percent of labor force in non-manufacturing," "percent of labor force in new and expanded industry," "migration rate in the general population," "per capita income," and "percent of Democratic registered voters."

"Per capita property value" and "per capita property tax" data were provided by the Neuse River Council of Governments and a untitled document obtained from the Craven County Tax Supervisor. Both documents contained data on all 100 North Carolina counties.

The adjusted total taxes levied on real property for the counties were calculated by dividing the county-wide real estate base by the median ratio for the respective counties for the taxable year 1985, which represent the assessed value of all real estate in each county. The adjusted real property tax bases were then combined with the taxable personal property and public service property (both of which are re-assessed annually and therefore require no adjustment). These results were each multiplied by 1000 to compensate for the expression of property values in thousands of dollars, and then divided by the total populations of the respective counties. Finally, total property values for the counties were multiplied by the respective tax rates, and each divided by 100 in order to

respective tax rates, and each divided by 100 in order to express the tax rates as "dollars per hundred."

The North Carolina State Board of Elections provided a copy of a Certification of Votes Cast for United States Senator in the General Election Conducted on November 6, 1984. In order to achieve "percent of voters voting for Helms in the senatorial race" the votes cast for Helms were divided by the total votes cast in each county.

STATISTICAL PROCEDURES

Rationale of Factor Analysis

Factor analysis is a generic name given to a class of multivariate statistical methods that has a primary purpose of data reduction and summarization. Factor analysis statistically compares the interrelationship among a large number of variables and then explains these variables in terms of their common underlying dimensions referred to as factors. "The purpose of a factor analysis is to account for the intercorrelations among n variables, by postulating a set of common factors, considerably fewer in number than the number n, of these variables" (Cureton and D'Agostino, 1983, p. 2).

Factor analysis (principal component analysis) was used in this study to reduce the large number of variables

into a smaller number of factors. It was also used to eliminate the possibility of multicollinearity between the independent variables. Factor analysis will create an entirely new set of a fewer number of variables to replace completely the original set of variables for inclusion in subsequent regression (Hair, Anderson, Tathan, and Grablowsky, 1979).

The use of factor analysis requires that estimates of the factors themselves (factor scores) be obtained. The factor scores are then used as independent variables in a regression. The derived set of variables can be used as constructs which represent the original variables. The factors which were developed in this study, therefore, can be seen as constructs which represent the underlying characteristics of the counties under study.

As the objective of this research is to identify significant predictors (county characteristics), the factor analysis was applied to a correlation matrix of the variables. Component analysis was performed and the orthogonal extraction method was incorporated. In an orthogonal solution, the factors are extracted in such a way that the factor axes are maintained at 90 degrees, meaning that each factor is independent from all other factors. This approach ensures that the correlation between factors is arbitrarily determined to be zero; the

correlation of zero becomes very important when regression analysis is to follow the factor analysis due to the the potential for multicollinearity (Berry I. Feldman, 1985). The 90 degree rotation of the factors in most cases improves the interpretation by reducing some of the ambiguities which often accompany initial unrotated factor solutions. Obtaining theoretically meaningful factors and the simplest factor structure is the ultimate goal of any rotation (Hair, Anderson, Tatham, and Grablowsky, 1987). In this study the VARIMAX orthogonal approach was utilized.

The number of factors to be used was determined by establishing that their latent root (eigenvalues) must be greater than one (1) to be considered significant. The rationale for the eigenvalue criteria is that any individual factor should account for at least the variance of a single variable if it is to be retained for interpretation (Jackson and Borgatta, 1981).

As pointed out previously, a factor loading represents the correlation between an original variable and its respective factor. Hair, Anderson Tatham, and Grablowsky considered factor loadings greater than $\pm.30$ significant. Loadings $\pm.50$ or greater are considered very significant, with loading $\pm.40$ between the two (1979). In this study, loadings $\pm.50$ or greater were accepted. Also, each

variable was assigned to only one factor by assigning each variable to the highest loading factor providing the variable correlation was greater than $\pm.50$.

Rationale Of Multiple Regression Analysis

Multiple regression analysis is a statistical technique which can be used to analyze the relationship between a single dependent (criterion) variable and several independent (predictor) variables. In this study, multiple regression was used to examine the strength of association between the criterion variables (used one at a time) and the predictor variables. Since multicollinearity was removed by factor analysis, it was possible to identify the extent to which each of the predictor variables was related to the criterion variables (Kerlinger and Pedhazur, 1973).

The function of multiple regression is the development of the multiple regression coefficient, which when squared (R^2) tells how much of the variance of the criterion variables is explained by the predictor variables. This value can also be used in a test of significance to indicate the probability of association between the criterion and predictor variables.

In discussing strengths of multiple regression, Kerlinger and Pedhazur stated that multiple regression analysis is capable of doing everything that analysis of

variance can do--and more (1973). They also noted that because a problem could arise when too many predictor variables are used, factor analysis is an appropriate way to reduce their number.

Stepwise regression was utilized in this study. This method stops the procedure when no further addition or deletion of predictor factors (variables) would improve the Mean Square Error by more than one percent (Hintze, 1987). (Mean Square is the sum of squares divided by the degrees of freedom.) Since most commercially available computer programs for stepwise multiple regression will automatically go through the sequence of steps, a detailed explanation of the steps is not included in this study.

In general, however, the stepwise regression approach begins by choosing the single best discriminating predictor factor containing a set of independent variables. The initial factor is then paired with each of the other independent factors one at a time, and a second factor is chosen. The second factor is the one which is best able to improve the discriminating power of the function in combination with the first factor. Subsequent factors are selected in a similar manner. As additional factors are included, some previously selected factors may be removed if the information they contain about group differences is available in some combination of the other included

factors. Eventually, either all independent factors will have been included in the function or the excluded factors will have been judged as not contributing significantly toward further discrimination (Nie, Hull, Bent, and Nieswonger, 1975).

CHAPTER IV

ANALYSIS OF THE DATA

In this study, Table 1 is a key of the variables having an assigned identifying number or letter. It should be noted that only these numbers or letters will be used in the upcoming tables due to space limitations.

In order to determine which of the nineteen variables significantly predict local current expenditures at the county level for the North Carolina Public Schools and the North Carolina Community College System, factor analysis and stepwise regression were used. Factor analysis reduced the number of predictor variables and essentially eliminated multicollinearity. Stepwise regression was used to determine which factors were of importance in predicting local current expenditures.

It should be noted that stepwise regression was performed twice. The first regression was on criterion variable A (per pupil local current expenditure for the public schools). The second regression was on criterion variable B (per pupil local expenditure for the community colleges).

Descriptive Statistics

Preliminary analysis was utilized by determining the mean, standard deviation and commonality of each predictor

TABLE 1.

Listing Of The Variables And Their Identifiers

VAR 1 Percent of white pupils in the public schools;
VAR 2 Percent of white pupils in the community college;
VAR 3 Percent of white persons in the general population;
VAR 4 Per pupil state current expenditure for the public schools;
VAR 5 Per pupil federal current expenditure for the public schools;
VAR 6 Percent of high school juniors passing the N.C. Competency Test;
VAR 7 Percent of pupils in private/special schools;
VAR 8 Per pupil state current expenditure for the community college;
VAR 9 Median years of education completed for general population;
VAR10 Percent of general population under 18 and over 65 years of age;
VAR11 Percent of unemployment;
VAR12 Percent of labor force in non-manufacturing;
VAR13 Percent of labor force in new and expanded industry;
VAR14 Migration rate in the general population;
VAR15 Percent of voters registered Democrat;
VAR16 Percent of voters voting for Helms in the senatorial race;
VAR17 Per capita income;
VAR18 Per capita property value;
VAR19 Per capita property tax.

The following were the two criterion variables included for each county in this study:

VAR-A Per pupil local current expenditure for the public school;
VAR-B Per pupil local current expenditure for the community college.

variable. The results obtained can be found in Table 2. In addition, correlations were performed on each predictor variable in relation to all other predictor variables, and are displayed in a correlation matrix shown in Table 3. This preliminary analysis revealed high commonality and high correlations among the predictor variables. This finding confirmed the necessity of doing factor analysis before stepwise regression to remove the presence of multicollinearity.

Factor Analysis

The beginning of factor analysis was also completed with the development of the correlation matrix already mentioned and found in Table 3. In the component analysis the factors having eigenvalues (latent roots) greater than one were considered significant ($p>.01$). All factors with eigenvalues less than one were disregarded. The squared multiple correlations were used as the estimates of commonality. As a result, five factors were retained and are listed in Table 4.

The result of the first stage in the computation of factors is shown in Table 5--the initial factor loadings (also referred to as the unrotated component analysis factor matrix.) Figures referred to in the table as "commonalities" (such as VAR 3 = .9292) indicate that a

TABLE 2

Descriptive Statistics

Variable	Mean	Standard Deviation	Communality
VAR1	67.99	21.92	0.92
VAR2	44.25	39.24	0.91
VAR3	75.24	17.14	0.93
VAR4	1736.74	117.04	0.73
VAR5	273.75	90.54	0.83
VAR6	91.56	4.60	0.42
VAR7	3.45	3.23	0.64
VAR8	259.50	238.29	0.93
VAR9	11.68	0.60	0.79
VAR10	40.10	2.98	0.66
VAR11	8.07	2.71	0.61
VAR12	43.57	16.77	0.67
VAR13	2.53	2.21	0.47
VAR14	0.94	1.25	0.55
VAR15	74.30	19.45	0.67
VAR16	34.80	7.32	0.74
VAR17	9612.27	1622.46	0.67
VAR18	32957.27	12331.30	0.85
VAR19	210.51	82.36	0.79
VAR-A	541.00	161.03	0.85
VAR-B	34.63	34.07	0.88

LEGEND

VAR 1	Percent of white pupils in the public schools;
VAR 2	Percent of white pupils in the community college;
VAR 3	Percent of white persons in the general population;
VAR 4	Per pupil state current expenditure for the public schools;
VAR 5	Per pupil federal current expenditure for the public schools;
VAR 6	Percent of high school juniors passing the N.C. Competency Test;
VAR 7	Percent of pupils in private/special schools;
VAR 8	Per pupil state current expenditure for the community college;
VAR 9	Median years of education completed for general population;
VAR10	Percent of general population under 18 and over 65 years of age;
VAR11	Percent of unemployment;
VAR12	Percent of labor force in non-manufacturing;
VAR13	Percent of labor force in new and expanded industry;
VAR14	Migration rate in the general population;
VAR15	Percent of voters registered Democrat;
VAR16	Percent of voters voting for Helms in the senatorial race;
VAR17	Per capita income;
VAR18	Per capita property value;
VAR19	Per capita property tax.
VAR-A	Per pupil local current expenditure for the public school;
VAR-B	Per pupil local current expenditure for the community college.

TABLE 3

Correlations

	VAR1	VAR2	VAR3	VAR4	VAR5	VAR6
VAR1	1.0000	0.1277	0.9895	-.0796	-.6639	0.2829
VAR2	0.1277	1.0000	0.1685	-.4082	-.3240	0.0694
VAR3	0.9895	0.1685	1.0000	-.1142	-.6816	0.2874
VAR4	-.0796	-.4082	-.1142	1.0000	0.5777	0.1918
VAR5	-.6639	-.3240	-.6816	0.5777	1.0000	-.1834
VAR6	0.2829	0.0694	0.2874	0.1918	-.1834	1.0000
VAR7	-.3175	0.3212	-.2563	-.3133	-.0759	-.0535
VAR8	-.0572	0.8821	-.0222	-.3099	-.0907	-.0462
VAR9	0.1459	0.2844	0.1762	-.4521	-.5636	0.1066
VAR10	-.3110	-.2142	-.3305	0.4599	0.5940	-.1606
VAR11	-.1699	-.1110	-.1862	0.3379	0.5043	-.1382
VAR12	-.0260	0.3762	-.0021	-.2823	-.2912	-.0118
VAR13	0.0229	0.1633	0.0176	0.0648	-.0387	-.0469
VAR14	0.2864	0.0110	0.2659	-.1866	-.2518	0.1863
VAR15	-.7376	-.2052	-.7613	0.1278	0.5308	-.1677
VAR16	0.6972	0.2828	0.7210	-.2690	-.6149	0.1883
VAR17	0.1921	0.3332	0.2449	-.4207	-.6023	0.2012
VAR18	0.2989	-.1321	0.3012	0.0598	-.1631	0.2914
VAR19	-.0469	-.2264	-.0526	0.1400	0.0575	0.2115
VAR-A	0.0524	0.0685	0.0809	-.0630	-.3325	0.3083
VAR-B	-.0735	0.8246	-.0398	-.3113	-.1452	-.0233

LEGEND

VAR 1	Percent of white pupils in the public schools;
VAR 2	Percent of white pupils in the community college;
VAR 3	Percent of white persons in the general population;
VAR 4	Per pupil state current expenditure for the public schools;
VAR 5	Per pupil federal current expenditure for the public schools;
VAR 6	Percent of high school juniors passing the N.C. Competency Test;
VAR 7	Percent of pupils in private/special schools;
VAR 8	Per pupil state current expenditure for the community college;
VAR 9	Median years of education completed for general population;
VAR10	Percent of general population under 18 and over 65 years of age;
VAR11	Percent of unemployment;
VAR12	Percent of labor force in non-manufacturing;
VAR13	Percent of labor force in new and expanded industry;
VAR14	Migration rate in the general population;
VAR15	Percent of voters registered Democrat;
VAR16	Percent of voters voting for Helms in the senatorial race;
VAR17	Per capita income;
VAR18	Per capita property value;
VAR19	Per capita property tax.
VAR-A	Per pupil local current expenditure for the public school;
VAR-B	Per pupil local current expenditure for the community college.

TABLE 3
(continued)

Correlations

	VAR7	VAR8	VAR9	VAR10	VAR11	VAR12
VAR1	-.3175	-.0572	0.1459	-.3110	-.1699	-.0260
VAR2	0.3212	0.8821	0.2844	-.2142	-.1110	0.3762
VAR3	-.2563	-.0222	0.1762	-.3305	-.1862	-.0021
VAR4	-.3133	-.3099	-.4521	0.4599	0.3379	-.2823
VAR5	-.0759	-.0907	-.5636	0.5940	0.5043	-.2912
VAR6	-.0535	-.0462	0.1066	-.1606	-.1382	-.0118
VAR7	1.0000	0.2576	0.4183	-.2956	-.2226	0.6119
VAR8	0.2576	1.0000	0.1787	-.0751	0.0469	0.2947
VAR9	0.4183	0.1787	1.0000	-.6684	-.5690	0.6563
VAR10	-.2956	-.0751	-.6684	1.0000	0.5545	-.5395
VAR11	-.2226	0.0469	-.5690	0.5545	1.0000	-.2235
VAR12	0.6119	0.2947	0.6563	-.5395	-.2235	1.0000
VAR13	0.0538	0.1378	-.1278	0.0939	0.1784	0.0742
VAR14	-.0476	-.0399	0.2236	-.1236	-.1985	0.0945
VAR15	0.0515	-.0345	-.2123	0.2632	0.1921	-.1228
VAR16	-.1210	0.0827	0.1288	-.2080	-.2822	-.0810
VAR17	0.4803	0.1471	0.6257	-.4568	-.5853	0.4357
VAR18	0.0164	-.1802	0.2853	-.0909	-.0196	0.1497
VAR19	-.0193	-.2161	0.1732	0.015	-.0206	0.0407
VAR-A	0.4593	-.0322	0.6386	-.4595	-.3627	0.5664
VAR-B	0.3278	0.9006	0.2194	-.1025	-.0088	0.3346

LEGEND

VAR 1	Percent of white pupils in the public schools;
VAR 2	Percent of white pupils in the community college;
VAR 3	Percent of white persons in the general population;
VAR 4	Per pupil state current expenditure for the public schools;
VAR 5	Per pupil federal current expenditure for the public schools;
VAR 6	Percent of high school juniors passing the N.C. Competency Test;
VAR 7	Percent of pupils in private/special schools;
VAR 8	Per pupil state current expenditure for the community college;
VAR 9	Median years of education completed for general population;
VAR10	Percent of general population under 18 and over 65 years of age;
VAR11	Percent of unemployment;
VAR12	Percent of labor force in non-manufacturing;
VAR13	Percent of labor force in new and expanded industry;
VAR14	Migration rate in the general population;
VAR15	Percent of voters registered Democrat;
VAR16	Percent of voters voting for Helms in the senatorial race;
VAR17	Per capita income;
VAR18	Per capita property value;
VAR19	Per capita property tax.
VAR-A	Per pupil local current expenditure for the public school;
VAR-B	Per pupil local current expenditure for the community college.

TABLE 3
(continued)

Correlations

	VAR13	VAR14	VAR15	VAR16	VAR17	VAR18
VAR1	0.0229	0.2864	-.7376	0.6972	0.1921	0.2989
VAR2	0.1633	0.0110	-.2052	0.2828	0.3332	-.1321
VAR3	0.0176	0.2659	-.7613	0.7210	0.2449	0.3012
VAR4	0.0648	-.1866	0.1278	-.2690	-.4207	0.0598
VAR5	-.0387	-.2518	0.5308	-.6149	-.6023	-.1631
VAR6	-.0469	0.1863	-.1677	0.1883	0.2012	0.2914
VAR7	0.0538	-.0476	0.0515	-.1210	0.4803	0.0164
VAR8	0.1378	-.0399	-.0345	0.0827	0.1471	-.1802
VAR9	-.1278	0.2236	-.2123	0.1288	0.6257	0.2853
VAR10	0.0939	-.1236	0.2632	-.2080	-.4568	-.0909
VAR11	0.1784	-.1985	0.1921	-.2822	-.5853	-.0196
VAR12	0.0742	0.0945	-.1228	-.0810	0.4357	0.1497
VAR13	1.0000	-.0774	0.0589	-.0746	-.0270	-.2086
VAR14	-.0774	1.0000	-.1786	0.1541	0.1143	0.5486
VAR15	0.0589	-.1786	1.0000	-.6835	-.3359	-.2117
VAR16	-.0746	0.1541	-.6835	1.0000	0.3718	0.1875
VAR17	-.0270	0.1143	-.3359	0.3718	1.0000	0.1172
VAR18	-.2086	0.5486	-.2117	0.1875	0.1172	1.0000
VAR19	-.2411	0.3879	0.0441	-.1095	0.0642	0.7333
VAR-A	0.0368	0.1660	-.1283	-.0426	0.6095	0.4133
VAR-B	0.1043	-.0305	0.0006	0.0498	0.2721	-.1345

LEGEND

VAR 1	Percent of white pupils in the public schools;
VAR 2	Percent of white pupils in the community college;
VAR 3	Percent of white persons in the general population;
VAR 4	Per pupil state current expenditure for the public schools;
VAR 5	Per pupil federal current expenditure for the public schools;
VAR 6	Percent of high school juniors passing the N.C. Competency Test;
VAR 7	Percent of pupils in private/special schools;
VAR 8	Per pupil state current expenditure for the community college;
VAR 9	Median years of education completed for general population;
VAR10	Percent of general population under 18 and over 65 years of age;
VAR11	Percent of unemployment;
VAR12	Percent of labor force in non-manufacturing;
VAR13	Percent of labor force in new and expanded industry;
VAR14	Migration rate in the general population;
VAR15	Percent of voters registered Democrat;
VAR16	Percent of voters voting for Helms in the senatorial race;
VAR17	Per capita income;
VAR18	Per capita property value;
VAR19	Per capita property tax.
VAR-A	Per pupil local current expenditure for the public school;
VAR-B	Per pupil local current expenditure for the community college.

TABLE 3
(continued)

Correlations

	VAR19	VAR-A	VAR-B
VAR1	-.0469	0.0524	-.0735
VAR2	-.2264	0.0685	0.8246
VAR3	-.0526	0.0809	-.0398
VAR4	0.1400	-.0630	-.3113
VAR5	0.0575	-.3325	-.1452
VAR6	0.2115	0.3083	-.0233
VAR7	-.0193	0.4593	0.3278
VAR8	-.2161	-.0322	0.9006
VAR9	0.1732	0.6386	0.2194
VAR10	0.0152	-.4595	-.1025
VAR11	-.0206	-.3627	-.0088
VAR12	0.0407	0.5664	0.3346
VAR13	-.2411	0.0368	0.1043
VAR14	0.3879	0.1660	-.0305
VAR15	0.0441	-.1283	0.0006
VAR16	-.1095	-.0426	0.0498
VAR17	0.0642	0.6095	0.2721
VAR18	0.7333	0.4133	-.1345
VAR19	1.0000	0.3760	-.1549
VAR-A	0.3760	1.0000	0.0828
VAR-B	-.1549	0.0828	1.0000

LEGEND

VAR 1	Percent of white pupils in the public schools;
VAR 2	Percent of white pupils in the community college;
VAR 3	Percent of white persons in the general population;
VAR 4	Per pupil state current expenditure for the public schools;
VAR 5	Per pupil federal current expenditure for the public schools;
VAR 6	Percent of high school juniors passing the N.C. Competency Test;
VAR 7	Percent of pupils in private/special schools;
VAR 8	Per pupil state current expenditure for the community college;
VAR 9	Median years of education completed for general population;
VAR10	Percent of general population under 18 and over 65 years of age;
VAR11	Percent of unemployment;
VAR12	Percent of labor force in non-manufacturing;
VAR13	Percent of labor force in new and expanded industry;
VAR14	Migration rate in the general population;
VAR15	Percent of voters registered Democrat;
VAR16	Percent of voters voting for Helms in the senatorial race;
VAR17	Per capita income;
VAR18	Per capita property value;
VAR19	Per capita property tax.
VAR-A	Per pupil local current expenditure for the public school;
VAR-B	Per pupil local current expenditure for the community college.

TABLE 4

Eigenvalue Summary for Factors Retained

No.	Eigenvalue	Percent	Cumulative Percent
1	5.9431	28.30	28.30
2	3.6757	17.50	45.80
3	2.9050	13.83	59.64
4	1.7660	8.41	68.05
5	1.2595	6.00	74.04

TABLE 5

Initial Factor Loadings

Factors:	1	2	3	4	5	Communality
VAR1	0.5714	-.6663	0.3665	0.0642	0.1205	0.9233
VAR2	0.5064	0.5231	0.4897	0.3741	-.0237	0.9104
VAR3	0.6113	-.6312	0.3708	0.0644	0.1262	0.9297
VAR4	-.5509	-.3058	-.1513	0.2336	0.5071	0.7316
VAR5	-.8489	0.1972	-.1709	0.1966	0.0438	0.8292
VAR6	0.2753	-.2953	-.1590	0.3049	0.3767	0.4231
VAR7	0.3533	0.6325	-.2964	-.0611	0.1387	0.6357
VAR8	0.2886	0.6273	0.4776	0.4660	-.0948	0.9311
VAR9	0.7627	0.2398	-.3678	-.1177	-.0586	0.7918
VAR10	-.7179	-.0935	0.1679	0.3281	-.0086	0.6600
VAR11	-.5975	-.0161	0.2124	0.4301	0.1660	0.6149
VAR12	0.5591	0.4853	-.2898	0.0258	0.2074	0.6758
VAR13	-.0469	0.1716	0.2580	0.0492	0.6115	0.4746
VAR14	0.3378	-.3020	-.2650	0.3858	-.3574	0.5522
VAR15	-.5932	0.4570	-.3133	-.0282	-.1156	0.6730
VAR16	0.5756	-.4500	0.4450	-.0112	-.0934	0.7406
VAR17	0.7617	0.1826	-.1634	-.1642	0.0998	0.6772
VAR18	0.3157	-.4192	-.5244	0.5358	-.1138	0.8504
VAR19	0.0684	-.2498	-.6804	0.4807	-.1788	0.7931

LEGEND

VAR 1	Percent of white pupils in the public schools;
VAR 2	Percent of white pupils in the community college;
VAR 3	Percent of white persons in the general population;
VAR 4	Per pupil state current expenditure for the public schools;
VAR 5	Per pupil federal current expenditure for the public schools;
VAR 6	Percent of high school juniors passing the N.C. Competency Test;
VAR 7	Percent of pupils in private/special schools;
VAR 8	Per pupil state current expenditure for the community college;
VAR 9	Median years of education completed for general population;
VAR10	Percent of general population under 18 and over 65 years of age;
VAR11	Percent of unemployment;
VAR12	Percent of labor force in non-manufacturing;
VAR13	Percent of labor force in new and expanded industry;
VAR14	Migration rate in the general population;
VAR15	Percent of voters registered Democrat;
VAR16	Percent of voters voting for Helms in the senatorial race;
VAR17	Per capita income;
VAR18	Per capita property value;
VAR19	Per capita property tax.
VAR-A	Per pupil local current expenditure for the public school;
VAR-B	Per pupil local current expenditure for the community college.

large amount of the variance in a variable has been extracted by the factor solution. Small commonalities (such as VAR 13 = .4689) show that a substantial portion of such variance is unaccountable for by the factors.

The factor matrix was rotated to redistribute the variance in order to achieve a simpler and theoretically more meaningful factor pattern. The rotated factor loadings (also known as the VARIMAX rotated component analysis factor matrix) are identified in Table 6. In the rotated factor loadings, the factor loading pattern and the percentage of variance for each of the factors are different because the factors are no longer extracted in their order of importance based on the amount of variance extracted.

All variables did "load" ($\pm$.5 or greater) significantly on at least one of the five rotated factors. Therefore, none of the predictor variables were removed from the model. It should be noted that VAR 5 (per pupil federal current expenditure for the public schools) loaded significantly on both Factor 1 (-.6974) and Factor 5 (-.5590). The factor scores from this model were computer stored for further analysis using stepwise regression.

TABLE 6

Rotated Factor Loadings

Factors:	1	2	3	4	5	Communality
VAR1	0.9459	0.0317	-.1151	-.0373	0.1126	0.9230
VAR2	0.1898	0.2276	0.0958	0.8950	0.0140	0.8982
VAR3	0.9485	0.0717	-.1080	-.0026	0.1130	0.9292
VAR4	-.1676	-.4863	-.0560	-.3673	0.5921	0.7532
VAR5	-.6974	-.5590	0.0176	-.0971	0.1365	0.8272
VAR6	0.2777	0.1282	-.2986	-.1023	0.5432	0.4882
VAR7	-.3585	0.6426	0.0159	0.3189	0.1198	0.6578
VAR8	-.0085	0.0635	0.0886	0.9302	-.0325	0.8783
VAR9	0.0896	0.8424	-.2357	0.1197	-.0687	0.7922
VAR10	-.2609	-.7772	-.0049	0.0231	0.0516	0.6753
VAR11	-.2183	-.7064	-.0141	0.2073	0.2445	0.6497
VAR12	-.1425	0.7164	-.1097	0.3415	0.2223	0.7116
VAR13	0.0132	-.0567	0.3314	0.2515	0.5408	0.4689
VAR14	0.2292	0.0731	-.6949	0.0752	-.1548	0.5703
VAR15	-.7962	-.1478	0.0681	-.0680	-.0759	0.6708
VAR16	0.8390	0.0885	-.0144	0.1100	-.1348	0.7421
VAR17	0.2437	0.7646	-.0411	0.1151	0.0129	0.6591
VAR18	0.1766	0.0789	-.8951	-.0766	0.1217	0.8594
VAR19	-.1519	0.0359	-.8555	-.1712	0.0542	0.7885

LEGEND

VAR 1	Percent of white pupils in the public schools;
VAR 2	Percent of white pupils in the community college;
VAR 3	Percent of white persons in the general population;
VAR 4	Per pupil state current expenditure for the public schools;
VAR 5	Per pupil federal current expenditure for the public schools;
VAR 6	Percent of high school juniors passing the N.C. Competency Test;
VAR 7	Percent of pupils in private/special schools;
VAR 8	Per pupil state current expenditure for the community college;
VAR 9	Median years of education completed for general population;
VAR10	Percent of general population under 18 and over 65 years of age;
VAR11	Percent of unemployment;
VAR12	Percent of labor force in non-manufacturing;
VAR13	Percent of labor force in new and expanded industry;
VAR14	Migration rate in the general population;
VAR15	Percent of voters registered Democrat;
VAR16	Percent of voters voting for Helms in the senatorial race;
VAR17	Per capita income;
VAR18	Per capita property value;
VAR19	Per capita property tax.
VAR-A	Per pupil local current expenditure for the public school;
VAR-B	Per pupil local current expenditure for the community college.

Multiple Regression

Stepwise regression was applied after the use of factor analysis. At this point in the study, the nineteen predictor variables were reduced and grouped into five factors.

Stepwise regression requires that only one criterion (dependent) variable can be used. Therefore, since this study involved two criterion variables, the stepwise regression process was performed two separate times--once for criterion variable A (per pupil local current expenditure for the public schools) and once for criterion variable B (per pupil local current expenditure for the community college).

The nineteen predictor variables were separated according to their load on the factors. They were assigned using the cut-off of $\pm$.5 or greater. The results of the factor analysis for the predictor variables in order of importance were as follows:

FACTOR 1

+.9485	VAR 3	percent of white persons in the general population
+.9459	VAR 1	percent of white pupils in the public schools
+.8390	VAR 16	percent of voters voting for Helms in the senatorial race
-.7962	VAR 15	percent of voters registered Democrat

-.6974	VAR 5	per pupil federal current expenditures in the public schools
FACTOR 2		
+.8424	VAR 9	median years of education completed by the general population
-.7772	VAR 10	percent of general population under 18 and over 65 years of age
+.7646	VAR 17	per capita income
+.7164	VAR 12	percent of labor force in non-manufacturing
-.7064	VAR 11	percent of unemployment
+.6426	VAR 7	percent of pupils in private/ special schools
FACTOR 3		
-.8951	VAR 18	per capita property value
-.8555	VAR 19	per capita property tax
-.6949	VAR 14	migration rate in the general population
FACTOR 4		
+.9302	VAR 8	per pupil state current expenditure for the community college
+.8950	VAR 2	percent of white pupils in the community college
FACTOR 5		
+.5921	VAR 4	per pupil state current expenditure for public schools

+.5432	VAR 6	percent of high school juniors passing the North Carolina Competency Test
+.5408	VAR 13	percent of labor force in new and expanding industry

Criterion Variable A

Criterion variable A (per pupil local current expenditure for the public schools) was used to begin the actual stepwise regression process. A correlation matrix was performed using the five factors and criterion variable A as shown in Table 7. This Table demonstrated the negligible correlation which existed between the five factor scores. The stepwise regression portion of the computer software package Number Cruncher Statistical System/Version 5.0 (1987) by Dr. Jerry L. Hintze was used. The "Multiple Regression Report For The County Characteristics And Per Pupil Local Current Expenditures For The Public Schools" is provided in Table 8 and the "Analysis Of Variance Report For Regression Predicting Per Pupil Local Current Expenditure For The Public Schools" is found in Table 9.

The automatic variable (factor) selection procedure was performed. The procedure stops when the continuation of addition or deletion of the variables would improve the Mean Square Error by more than one percent (Hintze, 1987). The "Results Of Factor Significance After Automatic

TABLE 7

Correlations Between The County Characteristics Represented By Factors and Per Pupil Local Current Expenditure For The Public Schools

Factors:	1	2	3	4	5	VAR-A
1	1.0000	0.0000	0.0000	0.0000	-0.0000	-0.0462
2	0.0000	1.0000	-0.0000	0.0000	0.0000	0.6815
3	0.0000	-0.0000	1.0000	0.0000	-0.0000	-0.3347
4	0.0000	0.0000	0.0000	1.0000	0.0000	-0.0474
5	-0.0000	0.0000	-0.0000	0.0000	1.0000	0.3443
VAR-A	-0.0462	0.6815	-0.3347	-0.0474	0.3443	1.0000

LEGEND

FACTOR 1

VAR 3	percent of white persons in the general population
VAR 1	percent of white pupils in the public schools
VAR 16	percent of voters voting for Helms in the senatorial race
VAR 15	percent of voters registered Democrat
VAR 5	per pupil federal current expenditures in the public schools

FACTOR 2

VAR 9	median years of education completed by the general population
VAR 10	percent of general population under 18 and over 65 years of age
VAR 17	per capita income
VAR 12	percent of labor force in non-manufacturing
VAR 11	percent of unemployment
VAR 7	percent of pupils in private/special schools

FACTOR 3

VAR 18	per capita property value
VAR 19	per capita property tax
VAR 14	migration rate in the general population

FACTOR 4

VAR 8	per pupil state current expenditure for the community college
VAR 2	percent of white pupils in the community college

FACTOR 5

VAR 4	per pupil state current expenditure for public schools
VAR 6	percent of high school juniors passing the North Carolina Competency Test
VAR 13	percent of labor force in new and expanding industry

CRITERION VARIABLES

VAR-A	per pupil local current expenditure for the public school;
VAR-B	per pupil local current expenditure for the community college.

TABLE 8

Multiple Regression Report For the County Characteristics And Per Pupil Local Durrent Expenditures For The Public Schools

Dependant Variable: VAR-A

Independent Variable	Parameter Estimate	Stndized Estimate	Standard Error	t-value (b=0)	Prob. Level	Seq. R-Sqr	Simple R-Sqr
Intercept	541.0021	0.0000	9.061331	59.70	0.0000		
Factor 1	-7.445479	-0.0462	9.106978	-0.82	0.4157	0.0021	0.0021
Factor 2	109.7337	0.6815	9.106979	12.05	0.0000	0.4665	0.4644
Factor 3	-53.89368	-0.3347	9.106977	-5.92	0.0000	0.5785	0.1120
Factor 4	-7.639849	-0.0474	9.106978	-0.84	0.4037	0.5808	0.0023
Factor 5	55.44743	0.3443	9.106978	6.09	0.0000	0.6993	0.1186

LEGEND

FACTOR 1

VAR 3	percent of white persons in the general population
VAR 1	percent of white pupils in the public schools
VAR 16	percent of voters voting for Helms in the senatorial race
VAR 15	percent of voters registered Democrat
VAR 5	per pupil federal current expenditures in the public schools

FACTOR 2

VAR 9	median years of education completed by the general population
VAR 10	percent of general population under 18 and over 65 years of age
VAR 17	per capita income
VAR 12	percent of labor force in non-manufacturing
VAR 11	percent of unemployment
VAR 7	percent of pupils in private/special schools

FACTOR 3

VAR 18	per capita property value
VAR 19	per capita property tax
VAR 14	migration rate in the general population

FACTOR 4

VAR 8	per pupil state current expenditure for the community college
VAR 2	percent of white pupils in the community college

FACTOR 5

VAR 4	per pupil state current expenditure for public schools
VAR 6	percent of high school juniors passing the North Carolina Competency Test
VAR 13	percent of labor force in new and expanding industry

CRITERION VARIABLES

VAR-A	per pupil local current expenditure for the public school;
VAR-B	per pupil local current expenditure for the community college.

TABLE 9

Analysis of Variance Report For Regression Predicting Per Pupil Local Current Expenditure For The Public Schools By County Characteristics

Dependent Variable: VAR-A

Source	df	Sums of Squares	Mean Square	F-Ratio	Prob. Level
Constant	1	29268370	29268370		
Model	5	1795291	359058.1	43.73	0.000
Error	94	771812.6	8210.773		
Total	99	2567103	25930.34		

Root Mean Square Error	90.61331
Mean of Dependent Variable	541.0025
Coefficient of Variation	.1674915
R Squared	0.6993
Adjusted R Squared	0.6834

Stepwise Regression With Per Pupil Local Current Expenditure For The Public Schools" is shown in Table 10. The following definitions provided by Dr. Hintze in the NCSS/Version 5.0 software manual identify the terms used and the information contained in Table 10.

Results of Factor Significance After Automatic Stepwise Regression With Per Pupil Local Current Expenditure For The Public Schools

IN	Indicates Whether the variable is in the equation (Yes) or in the pool of variables waiting to be selected (No).
Variables	The name of the independent variable.
S-Est	The standardized regression coefficient. This value has been scaled so that the regression coefficients are comparable. These are the coefficients that would be obtained if all the variable were standardized by their means and standard deviation. Note that this value is only provided for those variables currently in the equation.
R2-Add	The amount that would be added to (or removed from) R-Squared if this variable were included in (or removed from) the model.
R2-Xs	The R-Squared value that would result if this variable were regressed on all other independent variables currently in the equation.
T-Value	The T-value for testing the hypothesis that this variable should be added to (or removed

TABLE 10

Results of Factor Significance
After Automatic Stepwise Regression
With Per Pupil Local Current Expenditure
For The Public Schools

Dependent Variable: VAR-A

IN	Variables	S-Est	R2-Add	R2-Xs	T-Value	Prob	%RMSE
Yes	Factor 2	0.68	0.464	0.000	12.1	0.0000	58.0
Yes	Factor 3	-0.33	0.112	0.000	-5.9	0.0000	16.3
Yes	Factor 5	0.34	0.119	0.000	6.1	0.0000	17.2
No	Factor 1		0.002	0.000	0.8	0.4149	0.2
No	Factor 4		0.002	0.000	0.8	0.4028	0.2

R-Squared: 0.6950 Root Mean Square (RMSE): 90.31652

LEGEND

FACTOR 1

VAR 3	percent of white persons in the general population
VAR 1	percent of white pupils in the public schools
VAR 16	percent of voters voting for Helms in the senatorial race
VAR 15	percent of voters registered Democrat
VAR 5	per pupil federal current expenditures in the public schools

FACTOR 2

VAR 9	median years of education completed by the general population
VAR 10	percent of general population under 18 and over 65 years of age
VAR 17	per capita income
VAR 12	percent of labor force in non-manufacturing
VAR 11	percent of unemployment
VAR 7	percent of pupils in private/special schools

FACTOR 3

VAR 18	per capita property value
VAR 19	per capita property tax
VAR 14	migration rate in the general population

FACTOR 4

VAR 8	per pupil state current expenditure for the community college
VAR 2	percent of white pupils in the community college

FACTOR 5

VAR 4	per pupil state current expenditure for public schools
VAR 6	percent of high school juniors passing the North Carolina Competency Test
VAR 13	percent of labor force in new and expanding industry

CRITERION VARIABLES

VAR-A	per pupil local current expenditure for the public school;
VAR-B	per pupil local current expenditure for the community college.

from) the regression equation.

Prob — The probability level for the above t-test. This value is the tail (or rejection) probability.

%RMSE — The percent change in the root mean square that would result if this variable were added to (or removed from) the regression equation.

The information contained in Table 10 shows that Factors 2, 3, and 5 were retained and Factors 1 and 4 were deleted from the stepwise regression model. Using the "Parameter Estimate" column in Table 8 the following equation can then be formulated:

$$Y = + 541.0021 + 109.7337x_2 - 53.8937x_3 + 55.4474x_5$$

or

$$\text{Criterion Variable A} = + 541.0021 + 109.7337(\text{Factor 2}) - 53.8937(\text{Factor 3}) + 55.4474(\text{Factor 5})$$

However, because of the difficulty in interpreting the relative contribution of each factor in this equation, it is advisable to use the "Standardized Estimate" (standardized regression coefficients or beta weights) which is also shown in Table 10 as "S-EST." This procedure will derive the following formula:

$$Y = + .6815z_2 - .3347z_3 + .3443z_5$$

or

$$\text{Criterion Variable A} = +.68(\text{Factor 2}) - .33(\text{Factor 3}) + .34(\text{Factor 5})$$

Note: $R^2 = 0.70$

The beta weights (+.68, -.33, and +.34) indicate the contribution of the factor. For example, as the beta weight increases, the contribution of the factor, after parceling out the other two factors, increases. It can be seen by this formula that Factor 2 provided the greatest amount of explanation of the variance in criterion variable A. Factors 5 and 3 are the next greatest, in that order. Factors 1 and 4 have been deleted because they did not improve the mean square error by more than one percent during the stepwise regression process.

The results of stepwise regression produced $R^2 = 0.70$. Thus the indices explained approximately 70 percent of the variance in criterion variable A.

Factor 2 had the greatest amount of prediction (with a beta weight of .68) for criterion variable A. The predictor variables making up Factor 2, including their amount of variance and sign ($\pm$), are as follows:

+.8424	VAR 9	median years of education completed by the general population
-.7772	VAR 10	percent of general population under 18 and over 65 years of age

+.7646	VAR 17	per capita income
+.7164	VAR 12	percent of labor force in non-manufacturing
-.7064	VAR 11	percent of unemployment
+.6426	VAR 7	percent of pupils in private/ special schools

Factor 2 appears to be a grouping of the characteristics in relation to education level obtained and employment exhibited by the population of the counties. Median years of education completed proved to be a better predictor than all of the others including per capita income. Education level and other variables relating to high employment and income are so strong in predicting local current expenditures in education that even the percent of pupils in private/ special schools has a positive relationship. It was previously assumed that it would be negative as were percent of general population under 18 and over 65 years of age and percent of unemployment.

Factor 5 had the next highest beta weight (.34) for criterion variable A although Factor 3 is almost the same (-33). The predictor variables, including their amount of variance and sign ($\pm$), are as follows:

+.5921	VAR 4	per pupil state current expenditure for the public schools
+.5432	VAR 6	percent of high school juniors passing the North Carolina Competency Test

+.5408 VAR 13 percent of labor force in new and expanded industry

Note that with low explanation of the variance of the variables and low beta weight of the factor, Factor 5 is much less of a predictor than is Factor 2 in relation to per pupil local current expenditure for the public schools.

Factor 3 had a beta weight of -.33. This weight is slightly lower than that of Factor 5. The predictor variables including their amount of variance and sign (±) are as follows:

-.8951 VAR 18 per capita property value

-.8555 VAR 19 per capita property tax

-.6949 VAR 14 migration rate in general population.

The variables in Factor 3, all negative in sign, appear to concentrate on tax effort. Higher property value, property tax, and migration rate result in a lower factor score.

Seven predictor variables were excluded from consideration of predicting criterion variable A when the stepwise regression procedure removed Factors 1 and 4. These predictor variables were:

VAR 1 percent of white pupils in the public schools

VAR 2 percent of white pupils in the community college

VAR 3 percent of white persons in the general population

VAR 5	per pupil federal current expenditure in the public schools
VAR 8	per pupil state expenditure for the Community College
VAR 15	percent of voters registered Democrat
VAR 16	percent of voters voting for Helms in the Senatorial Race

The seven predictor variables listed above were not of importance in developing factor scores for the prediction of per pupil local current expenditure for the public schools.

Criterion Variable B

The stepwise regression process was again performed, except that criterion variable B (per pupil local current expenditure for the community college) was used as the dependent variable instead of criterion variable A. A correlation matrix which was performed using the five factors and criterion variable B is shown in Table 11. The conduct of this process also demonstrated that negligible correlations existed among the five factor scores.

The "Multiple Regression Report For The County Characteristics And Per Pupil Local Current Expenditure For The Community College" is provided in Table 12 and the "Analysis of Variance Report For Regression Predicting Per Pupil Local Current Expenditure For The Community College By County Characteristic" is found in Table 13 for

TABLE 11

Correlations Between The County Characteristics, Represented By FActors, And Per Pupil Local Current Expenditure For The Community College

Factors:	1	2	3	4	5	VAR-B
1	1.0000	0.0000	0.0000	0.0000	-0.0000	-0.0418
2	0.0000	1.0000	-0.0000	0.0000	0.0000	0.1607
3	0.0000	-0.0000	1.0000	0.0000	-0.0000	0.0544
4	0.0000	0.0000	0.0000	1.0000	0.0000	0.8428
5	-0.0000	0.0000	-0.0000	0.0000	1.0000	-0.0171
VAR-B	-0.0418	0.1607	0.0544	0.8428	-0.0171	1.0000

LEGEND

FACTOR 1

VAR 3	percent of white persons in the general population
VAR 1	percent of white pupils in the public schools
VAR 16	percent of voters voting for Helms in the senatorial race
VAR 15	percent of voters registered Democrat
VAR 5	per pupil federal current expenditures in the public schools

FACTOR 2

VAR 9	median years of education completed by the general population
VAR 10	percent of general population under 18 and over 65 years of age
VAR 17	per capita income
VAR 12	percent of labor force in non-manufacturing
VAR 11	percent of unemployment
VAR 7	percent of pupils in private/special schools

FACTOR 3

VAR 18	per capita property value
VAR 19	per capita property tax
VAR 14	migration rate in the general population

FACTOR 4

VAR 8	per pupil state current expenditure for the community college
VAR 2	percent of white pupils in the community college

FACTOR 5

VAR 4	per pupil state current expenditure for public schools
VAR 6	percent of high school juniors passing the North Carolina Competency Test
VAR 13	percent of labor force in new and expanding industry

CRITERION VARIABLES

VAR-A	per pupil local current expenditure for the public school;
VAR-B	per pupil local current expenditure for the community college.

TABLE 12

Multiple Regression Report For The County Characteristics And Per Pupil Local Current Expenditure For The Community College

Dependent Variable: VAR-B

Independent Variable	Parameter Estimate	Stndized Estimate	Standard Error	t-value (b=0)	Prob. Level	Seq. R-Sqr	Simple R-Sqr
Intercept	34.63191	0.0000	1.779105	19.47	0.0000		
Factor 1	-1.42322	-0.0418	1.788067	-0.80	0.4281	0.0017	0.0017
Factor 2	5.474458	0.1607	1.788068	3.06	0.0029	0.0276	0.0258
Factor 3	1.854642	0.0544	1.788067	1.04	0.3023	0.0305	0.0030
Factor 4	28.71546	0.8428	1.788067	16.06	0.0000	0.7408	0.7103
Factor 5	-.581718	-0.0171	1.788068	-0.33	0.7457	0.7411	0.0003

LEGEND

FACTOR 1

VAR 3	percent of white persons in the general population
VAR 1	percent of white pupils in the public schools
VAR 16	percent of voters voting for Helms in the senatorial race
VAR 15	percent of voters registered Democrat
VAR 5	per pupil federal current expenditures in the public schools

FACTOR 2

VAR 9	median years of education completed by the general population
VAR 10	percent of general population under 18 and over 65 years of age
VAR 17	per capita income
VAR 12	percent of labor force in non-manufacturing
VAR 11	percent of unemployment
VAR 7	percent of pupils in private/special schools

FACTOR 3

VAR 18	per capita property value
VAR 19	per capita property tax
VAR 14	migration rate in the general population

FACTOR 4

VAR 8	per pupil state current expenditure for the community college
VAR 2	percent of white pupils in the community college

FACTOR 5

VAR 4	per pupil state current expenditure for public schools
VAR 6	percent of high school juniors passing the North Carolina Competency Test
VAR 13	percent of labor force in new and expanding industry

CRITERION VARIABLES

VAR-A	per pupil local current expenditure for the public school;
VAR-B	per pupil local current expenditure for the community college.

TABLE 13

Analysis of Variance Report The Regression Predicting Per Pupil Local Current Expenditure For The Community College By County Chracteristics

Dependent Variable: VAR-B

Source	df	Sums of Squares	Mean Square	F-Ratio	Prob. Level
Constant	1	119936.9	119936.9		
Model	5	85174.81	17034.96	53.82	0.000
Error	94	29753.03	316.5216		
Total	99	114927.80	1160.887		

Root Mean Square Error	17.79105
Mean of Dependent Variable	34.63191
Coefficient of Variation	.5137186
R Squared	0.7411
Adjusted R Squared	0.7273

criterion variable B. Also, the "Results Of Factor Significance After Automatic Stepwise Regression With Per Pupil Local Current Expenditure For The Community College" is shown in Table 14.

The information shown in Table 14 illustrates that Factors 2 and 4 were retained and that Factors 1, 3, and 5 were deleted from the stepwise regression model. The standardized regression coefficients (shown as "S-EST" in Table 14) allow the creation of the following formula:

Criterion Variable B = + .16 (Factor 2)
+ .84 (Factor 4)

Note: R^2 = + 0.74

It can be seen by this formula that Factor 4 provided the greatest amount of explanation of the variance in criterion variable B. Factor 2 was the next greatest. Factors 1, 3, and 5 have been deleted during the stepwise regression process. Because the results of stepwise regression produced an R^2 = 0.74, the indices explained approximately 74 percent of the variance in the criterion variable B. Factor 4 had, by far, the greatest amount of prediction (with a beta weight of .84) for criterion variable B. The two predictor variables for Factor 4, including their amount of variance and sign ($\pm$), are as follows:

+.9302	VAR 8	per pupil state expenditure for the community college

TABLE 14

Results of Factor Significance
After Automatic Stepwise Regression With Per Pupil
Local Current Expenditure For The Community College

Dependent Variable: VAR-B

IN	Variables	S-Est	R2-Add	R2-Xs	T-Value	Prob	%RMSE
Yes	Factor 2	0.16	0.026	0.000	3.1	0.0027	4.2
Yes	Factor 4	0.84	0.710	0.000	16.2	0.0000	91.2
No	Factor 1		0.002	0.000	0.8	0.4260	0.2
No	Factor 3		0.003	0.000	1.0	0.2991	-0.0
No	Factor 5		0.000	0.000	0.3	0.7453	0.5

R-Squared: 0.7361 Root Mean Square (RMSE): 17.68207

LEGEND

FACTOR 1

VAR 3	percent of white persons in the general population
VAR 1	percent of white pupils in the public schools
VAR 16	percent of voters voting for Helms in the senatorial race
VAR 15	percent of voters registered Democrat
VAR 5	per pupil federal current expenditures in the public schools

FACTOR 2

VAR 9	median years of education completed by the general population
VAR 10	percent of general population under 18 and over 65 years of age
VAR 17	per capita income
VAR 12	percent of labor force in non-manufacturing
VAR 11	percent of unemployment
VAR 7	percent of pupils in private/special schools

FACTOR 3

VAR 18	per capita property value
VAR 19	per capita property tax
VAR 14	migration rate in the general population

FACTOR 4

VAR 8	per pupil state current expenditure for the community college
VAR 2	percent of white pupils in the community college

FACTOR 5

VAR 4	per pupil state current expenditure for public schools
VAR 6	percent of high school juniors passing the North Carolina Competency Test
VAR 13	percent of labor force in new and expanding industry

CRITERION VARIABLES

VAR-A	per pupil local current expenditure for the public school;
VAR-B	per pupil local current expenditure for the community college.

+.8950	VAR 2	percent of white pupils in the community college

Discussions with state department officials about VAR 8 revealed that revenues are allotted on a per pupil (FTE) basis after a specific guaranteed base has been funded. Accordingly small community colleges would receive more revenue per pupil than large community colleges. It appeared that the counties served by small community colleges also allocated greater per pupil revenues. Having VAR 2 included in Factor 4 indicated that schools with higher percentages of white pupils received greater per pupil local current expenditures for the community college. As noted previously VAR 1, VAR 2, and VAR 3 involving racial characteristics were excluded as predictor variables for criterion variable A. Such was not the case in criterion variable B. The percentages of non-white attending the community colleges proved to be a strong predictor variable.

Factor 2, by its low beta weight of .16, was much weaker in predicting criterion variable B than was Factor 4. The Predictor Variables, including their amount of variance and sign (±), are as follows:

+.8424	VAR 9	median years of education completed by the general population
-.7772	VAR 10	percent of general population

		under 18 and over 65 years of age
+.7646	VAR 17	per capita income
+.7164	VAR 12	percent of labor force in non-manufacturing
-.7064	VAR 11	percent of unemployment
+.6426	VAR 7	percent of pupils in private/ special schools

Factor 2 had a much higher impact on criterion variable A than it had on criterion variable B in part because with reference to criterion variable B, Factor 4 was so strong that it overpowered Factor 2. Nonetheless, high median years of education completed, high employment and high income appeared to be valid predictor variables in relation to per pupil local current expenditures for the community college.

Eleven predictor variables were excluded from consideration of predicting criterion variable B when the stepwise regression procedure removed Factors 1, 3, and 5. These predictor variables were:

VAR 1	percent of white pupils in the public schools
VAR 3	percent of white persons in the general population
VAR 4	per pupil state current expenditure for the public schools
VAR 5	per pupil federal current expenditure in the public schools
VAR 6	percent of high school juniors passing

	the North Carolina Competency Test
VAR 13	percent of labor force in new and expanded industry
VAR 14	migration rate in the general population
VAR 15	percent of Democratic registered voters
VAR 16	percent of voters voting for Helms in the senatorial race
VAR 18	per capita property value
VAR 19	per capita property tax

The eleven predictor variables listed above were not significant in developing factor scores for the prediction of per pupil local current expenditure for the community college.

Findings

1. Factor 1 contained VAR 1, percent of white pupils in the public schools; VAR 3, percent of white persons in the general population; VAR 5, per pupil federal current expenditure in the public schools; VAR 15, percent of voters registered Democrat; and VAR 16, percent of voters voting for Helms in the senatorial race. In the stepwise regression analysis done for criterion variable A (per pupil local current expenditure for the public schools) and for criterion variable B (per pupil local current expenditure for the community college), these predictor variables were not considered because Factor 1 was

eliminated.

2. Factor 2 proved to be a strong predictor for criterion variable A and a weak but significant predictor for criterion variable B. Factor 2 seemed to emphasize VAR 9, median years of education completed by the general population and a combination of high employment and income.

3. Factor 3 contained with VAR 18, per capita property value and VAR 19, per capita property tax. These two variables combined are often referred to as a "tax effort." Also included in Factor 3 was VAR 14, migration rate in the general population. Stepwise regression kept Factor 3 in predicting criterion variable A, but removed it in predicting criterion variable B.

4. Factor 4, a strong predictor for criterion variable B, was excluded from criterion variable A. This Factor contained VAR 2, percent of white pupils in the community college. As already noted, VAR 1, per cent of white pupils in the public schools and VAR 3, percent of white persons in the general population were in Factor 1; therefore, they were eliminated from Factor 4. Racial make-up was not a consideration for the public schools but is a serious concern for the community colleges. Factor 4 also included VAR 8, per pupil state expenditure for the community college.

5. Factor 5 included VAR 4, per pupil state current

expenditure for the public schools; Var 6, percent of high school juniors passing the North Carolina Competency Test; and VAR 13, percent of labor force in new and expanded industry. Stepwise regression retained this factor for criterion variable A and excluded it for criterion variable B.

6. Factors 2, 3, and 5 were as significant predictors for criterion variable A, per pupil local current expenditure for the public schools (Factors 1 and 4 were excluded) as evidenced by the predictive:

$$\begin{aligned} \text{VAR A} = &+ .68\ (\text{Factor 2}) \\ &- .33\ (\text{Factor 3}) \\ &+ .34\ (\text{Factor 5}) \end{aligned}$$

7. Factors 2 and 4 served as significant predictors for criterion variable B, per pupil local current expenditure for the community college (Factors 1, 3, and 5 were excluded) as evidenced by the predictive formula:

$$\begin{aligned} \text{VAR B} = &+ .16\ (\text{Factor 2}) \\ &+ .84\ (\text{Factor 4}) \end{aligned}$$

CHAPTER V

CONCLUSIONS, IMPLICATIONS, RECOMMENDATIONS, AND RECOMMENDATIONS FOR FURTHER STUDY

This study was initiated because of a concern about state versus local funding for the North Carolina Public Schools and the North Carolina Community College System. Since North Carolina used a basic flat grant method of funding and not a full funding method, local revenue was being used from each county to add to the state educational package. But in 1985 local revenue per pupil in the public schools for current expenditure ranged from $2,486 in the five highest ranking counties to only $699 in the five lowest ranking counties (North Carolina Public Schools Statistical Profile -- 1986. Therefore, the question was raised: "Which of the 19 county characteristics fit into a regression equation (that permits significant prediction at the .01 level) in regard to local current expenditure for the public schools and community college at the county level for North Carolina?" Surely this difference in expenditure was represented by underlying characteristics of the counties.

Nineteen predictor (independent) variables and two criterion (dependent) variables were chosen for use in this study to predict local current expenditures for public .fo

schools and community college education at the county level in North Carolina. These variables are identified near the beginning of Chapter III and examined in Chapter IV. All data were collected from the year 1985 with the exception of general population data, which was secured from the Census of 1980.

Factor analysis was performed on the nineteen predictor variables (county characteristics) in order to remove multicollinearity between the variables and to reduce the data to a manageable size for subsequent multiple regression analysis. Stepwise regression was then utilized to determine which factors (containing all of the original nineteen predictor variables) significantly predicted the amount of local revenues spent for educational current expenditures.

For purposes of brevity "per pupil local current expenditure for the public schools" (criterion variable A) will be referred to as "public schools expenditure." "Per pupil local current expenditure for the community college" (criterion variable B) will be referred to as "community college expenditure."

"Not significant," "mildly predictive," "highly predictive," and "most predictive" are terms used by this writer to provide the importance in predictability of each

county characteristic for public school expenditure and community college expenditure.

Conclusions

Examination of Table 6 (Rotated Factor Loadings), Table 10 (Results of Factor Significance AFter Automatic Stepwise Regression With Per Pupil Local Current Expenditure For The Public Schools), and Table 14 (Results Of Factor Significance After Automatic Stepwise Regression with Per Pupil Local Current Expenditure For The Community College) done in Chapter IV, make possible the following conclusions and implications.

Local governments, as evidenced by the amount of per pupil expenditure, allotted more funds to the public schools than they did for the community colleges. This study has also shown that the same county characteristics were not predictors for allotting funds to the public schools as they were for the community colleges.

Per capita property value, per capita property tax, migration rate in the general population, and percent of labor force in new and expanding industry were county characteristics which were highly predictive for public schools expenditures but were not significant in predicting community college expenditures.

Per pupil states current expenditure for public

schools, percent of high school juniors passing the North Carolina Competency Test, percent of labor force in new and expanding industry were highly predictive of public schools expenditures but were not significant for community college expenditures.

Median years of education completed by the general population, percent of general population under 18 and over 65 years of age, per capita income, percent of labor force in non-manufacturing, percent of unemployment, and percent of pupils in private/special schools were most predictive in predicting public schools expenditures, but were only mildly predictive of community college expenditures.

Per pupil state current expenditure for the community college and percent of white pupils in the community college were most predictive of community college expenditures but were not significant for public school expenditures.

Implications

Community college expenditures were determined more by political influence than by a need to provide basic education to everyone. It appeared that if the community college had the political power to obtain additional state funds, it also had the political power to obtain local funds.

As stated earlier, the percent of white pupils enrolled in the community college was most predictive for community college expenditures. However, the percent of white students in the public schools was not significant for public schools expenditures. Although this study was statistically inclusive of curriculum and extension course enrollment in the community college system, further study might include investigation of the educational and socio-economic profile of the white pupil population within this system.

It appears that the more highly educated white population is politically sensitive, and is not hesitant in using its influence to assist community college growth. Conversely, it would appear that the political strength of the non-white population of North Carolina seldom addresses the growth needs of the community college system.

Recommendations

This study has provided insight on why absolute fiscal equity of educational opportunity, as defined by equal expenditure per unit, has not succeeded in the North Carolina Public School System nor in the North Carolina Community College System. Either these school systems need stronger regulations and a truly equalizing state funding support system, or these school systems should be fully

state funded with no local funds involved.

One alternative recommended for consideration by North Carolina policymakers would be a gradual phase-in of full state funding. The use of full state funding of K-12 and community college would satisfy the requirements of fiscal equalization of educational opportunity. If appropriate differences in funding per unit were taken into consideration, absolute pupil equity would be satisfied. The hundred percent dependence upon the total tax base of the state would also meet the requirements of taxpayer equity.

Another alternative that could be used to achieve near absolute pupil and taxpayer equity would be to superimpose district power equalization or guaranteed tax base/yield programs on the current flat grant programs used to distribute state aid to K-12 and community college systems. Similar to the use of the full state funding alternative, consideration should be given to providing different levels of funding appropriate to differing client needs. While use of district power equalization or guaranteed tax base/yield programs superimposed on the current programs will permit local discretion for fiscal decision-making and absolute taxpayer equity, it will not insure absolute pupil equity. However, use of this alternative could provide considerable improvement of fiscal equalization of

educational opportunity that is provided by the current programs.

Recommendations For Further Study

The following recommendations are made for further research as a result of this study:

1. Examine per pupil local current expenditure for the public schools by individual school district instead of by county;
2. Include additional variables possibly to identify unanswered variance in the regression models;
3. Replicate this study in other states to compare results and to determine if it is possible to identify a national trend;
4. Replicate this study in North Carolina again for validity and reliability;
5. Since disparities do exist in local funding for current expenditures, determine the impact of full state funding in North Carolina;
6. The percent of white pupils in the community college proved to be a strong influence on local current expenditures. The apparent variation needs further study because equal educational opportunity requirements appear not to be met in relation to race.

7. A useful study could be made to determine the racial, educational, political and socio-economic make-up of county boards of commissioners, boards of trustees of community colleges, and local boards of education for the public schools;

8. Because North Carolina is a "sun belt" retirement state, a study might consider the importance of the effects of inward migration in specific counties as that migration effects funding.

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