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An analysis of the relationship between funding levels and expenditure patterns in New Hampshire high schools, 1985-1986 to 1993-1994

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AN ANALYSIS OF THE RELATIONSHIP BETWEEN FUNDING LEVELS AND EXPENDITURE PATTERNS IN NEW HAMPSHIRE HIGH SCHOOLS 1985-86 TO 1993-94

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ABSTRACT

AN ANALYSIS OF THE RELATIONSHIP BETWEEN FUNDING LEVELS AND EXPENDITURE PATTERNS IN NEW HAMPSHIRE HIGH SCHOOLS 1985-86 TO 1993-94

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Thomas J. Carroll
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The purpose of this research was to determine if there was a relationship between the level of funds available and the pattern of expenditure in New Hampshire high schools. For example, was there a relationship between the percentage of its budget a high school spends on regular education programs and its overall per pupil cost? The hypothesis was that there would be less than a moderate correlation between each of eight variables and per pupil expenditure. A Pearson r value of 0.30 or greater was defined as indicating a moderate correlation.

The study also examined each high school's spending pattern over time to determine if there was a change in the pattern of expenditure. The hypothesis was that there would be only small changes in expenditure patterns. Finally, the study examined the expenditure pattern of the 38 high schools taken as a group to determine if the pattern of spending across the state was the same. This was examined for each year and for the total time period examined. The hypothesis was that there would only be small differences in expenditure patterns across

the 38 schools and only small changes over the nine year period. A coefficient of variation of 0.10 or less was used to define a small change.

The research examined four different expenditure areas: (a) regular education, (b) guidance services, (c) educational media and (d) school administration. The amount of money expended in each area was broken down into personnel costs and the cost of supplies and materials.

The data supported the following conclusions:

1. There was a negative correlation between regular education expenditures and per pupil cost, in some cases this correlation reached the moderate level.

2. There was a positive correlation between guidance personnel spending and per pupil cost.

3. While there was a consistent pattern of expenditure within individual schools there was not a consistent pattern across schools.

4. The 38 schools, taken as a group, had a consistent expenditure pattern during the period covered by the study.

CHAPTER ONE

THE PURPOSE OF THE STUDY

Introduction

Picus (1994a) pointed out that we know surprisingly little about how the approximately $300 billion dollars spent yearly on education are actually used, or how new or additional funds are likely to be spent. Barro (1992) stated that there is not a fully satisfactory answer to even so seemingly straightforward a question as how much of total expenditure for elementary and secondary education goes to pay teachers' salaries?

The key point here is summarized by Cooper (1993) who states there is considerable misinformation about how schools use their money. Because of this, there is insufficient information on how to put dollars to productive use in schools and classrooms. Unless we understand how schools spend their money, it is difficult to judge if they are doing so wisely.

The purpose of this research is to determine how certain New Hampshire high schools spend their funds. The study will attempt to determine if there is a relationship between the pattern of expenditure and the level of funds available. The study will also examine each school's spending pattern over time to determine if there has been a change. Additionally, the study will examine the resource allocation pattern of the schools as a group to determine if the pattern

of spending across the state has changed over time. This information is important because it is directly tied to several larger questions that are the focus of local, state and national debates on school finance reform:

- What level of expenditure is necessary to provide equal and/or adequate education?
- Does money matter?
- Where has the additional spending on education gone and where should new money go?

Attempts to answer each of these questions have been hampered by a lack of knowledge about how money is spent at the most basic level -- the individual school. Since we lack this type of data, we cannot make rational policy recommendations on effective allocation patterns. By providing data that shows how schools are currently using their funds we can focus on the question of "how can we make money matter?". Educators need to track educational dollars in order to understand the relationships among money, quality, and achievement.

A Question of Public Policy

Since the A Nation at Risk report in 1983 no issue on the public agenda has caused more concern, study, and debate than the quality of public education. A large portion of this discussion has focused on the cost of education. This is not a new issue. Public debate concerning the quality and cost of public education began long before the release of A Nation at Risk. Cubberley (1934), in his history of education in the United States, traces the

debate concerning how the states can most effectively use their wealth to educate children to the 1820s.

Since the early 1970s, the debate has grown more heated as various groups have undertaken legal challenges to the way their state funds public education. These challenges were first based on the principle that all children deserve an equal educational opportunity. This was usually translated into "equal dollars". The legal theory many of these cases were based on was developed by Wise who drew upon precedents from United States Supreme Court cases dealing with desegregation, reapportionment, and the right of a person accused of crimes (DeMitchell & Fossey, in press). Wise's basic premise was that a child's educational opportunity should not be a function of his/her parents' circumstance. In a later work, Wise and Gendler (1989) stated this issue in similar terms, expressing the view that when the advantaged have better-financed schools and the disadvantaged the poorly financed schools, America continues to provide unequal education to those who most need what school has to offer.

Cases such as Serrano v. Priest (1971), Robinson v. Cahill (1973) and San Antonio Independent School District v. Rodriguez (1973) were brought by parents from property poor school districts. Because, the majority of the funding for public education comes from the property tax, districts with a small tax base are at a disadvantage when compared to districts with a large tax base. Under

this system, property poor districts are faced with the choice of either having less funding or paying higher taxes than a district with a larger tax base.

New Hampshire is a prime example of this problem. The State of New Hampshire provides the lowest level of state support for education in the country (Fulton & Sonovick, 1993). From 1983-84 to 1991-92 New Hampshire's average level of support was 7.1% . The next lowest in level of support was Nebraska at approximately 28%. The national average during this period was just over 50% (Augenblick, Van de Water, & Fulton, 1993).

The lack of state support leaves the burden of funding to individual communities. Because there is a great variance in property values among communities, there is a great deal of disparity in a community's ability to raise tax dollars to support education. For example the Raymond, Litchfield, Hooksett, and Somersworth, New Hampshire school districts all service approximately the same number of students. The difference in the property tax base in each community results in a wide variation in tax impacts when it comes to raising funds to support education. In Hooksett an increase of $640,000 in the school budget would add approximately $1 to the tax rate. This same increase would add $1.80 to Somersworth's tax rate, $2.02 to Litchfield's tax rate, and $2.80 to Raymond's tax rate. Tax payers in property poor communities such as Raymond and Litchfield are faced with the choice of having to tax themselves at a higher rate or provide less for their students.

One of the results of the funding suits was that a state's share of education funding increased from 40% to 47% during the 1970s (Odden, 1991). There was also a significant increase in the total dollars spent on public education.

In the late 1980s the focus of these court challenges switched from the need to provide an equal education to providing an adequate education. The Kentucky Supreme Court in its decision on Council for Better Education v. Rose (1989) upheld a lower court ruling that the vast majority of the State's schools did not have the resources to provide students with an adequate education. Rose was the first of a new series of cases that successfully used the adequacy argument.

Whether the plaintiff's case was based on equity, adequacy, or a combination of both, the key to success was to convince the courts that there is a positive relationship between educational opportunity and available resources. While there has been some success in convincing courts that this relationship exists, controversy continues in the arenas where public policy is established.

The following sections illustrate why the lack of data on how money is used at the building level impacts the arguments surrounding equal and adequate education and ultimately the question of "does money matter?". The final section discusses what research in this area has revealed about how districts spend their resources and what this information adds to the current debate.

Equal and/or Adequate Education

The question of equal and/or adequate education has really been a battle over whether money makes a difference in student achievement. The answer frequently comes as a result of school funding lawsuits which are very complex matters. In these cases, the first issue that must be addressed is the existence of a duty on the part of the state to provide an equal and/or adequate education. This was the case in New Hampshire where the Supreme Court first ruled that education was a right under the State Constitution; and therefore, the trial court needed to hear the plaintiff's petition (Claremont, 1993).

Once the issue of a state's duty to provide an equal and/or adequate education is determined, the question becomes what is the impact of funding on a student's education? Since *Serrano v. Priest* (1971) no plaintiff has ultimately prevailed without convincing the court of the existence of a positive correlation between expenditures and educational opportunity (Dayton, 1993). While the debate over this alleged correlation continues, some scholars have argued that it is misguided. The real issue should be what services are, in fact, educationally valuable to children (Dayton, 1993). Since these suits are usually based on the premise that the lack of sufficient funding has a negative impact on students from poor school districts, experts on both sides have had to focus on district level expenditures. However, they rarely go beyond this level of investigation to look at individual differences between schools. School finance

cases seem to focus on the differences between districts and neglect variations among schools within districts (Barnett, 1994)

If the question at hand is truly one of adequacy, there needs to be a high level of understanding of both the needs and resources of individual schools. Adequacy lawsuits provide the opportunity to take new dollars and use them to improve the quality of education. The problem is centered on the model of distribution we use (Slavin, 1994). Hanushek (1994a) looks at these cases as a time of real opportunity and significant peril. He fears that the additional funding these cases can generate will be put towards things that do not generate enhanced student outcomes.

Does Money Matter?

The Coleman Report , published in 1966, concluded in part that schools have little influence on a child's achievement that is independent of his background and general social context. Researchers have responded to the Coleman Report by attempting to establish a relationship between educational resources (inputs) and educational outcomes (outputs). Depending on which group of researchers you find more credible there either is, or is not, a positive relationship between higher expenditures and increases in student performance.

Most of the research done in this area has used the production function format. This approach measures some type of educational input variable, such as per pupil expenditure or teacher salary, and compares it to some type of

student outcome -- usually standardized test scores. The researcher then analyzes what happens to the outcome as the particular input is increased.

In the early 1980s, Hanushek (1981) began to synthesize a large number of these production function studies and came to the conclusion that higher school expenditures per pupil bore no visible relationship to higher student performance. His findings became a rallying cry during the 1980s for those who opposed the increases in spending on education.

Hanushek's results went largely unchallenged until the early 1990s. Baker (1991) began questioning Hanushek's interpretation of the data. Hanushek's work was further challenged by Hedges, Laine, and Greenwald (1994a). Their reanalysis of the same data used by Hanushek resulted in the conclusion that money does matter.

The debate over "does money matter" seems to ignore one very significant factor -- how is the money being spent? The production function approach usually looks at gross inputs like per pupil expenditure, average teacher salary or average class size. It also looks at gross output measures, usually the results of standardized tests. It does not analyze the ways in which districts allocate the resources available to them. Hanushek (1994b) reflects this principle in his response to Hedges, Laine, and Greenwald. He points out that the better evidence comes from studies of individual students and individual classroom teachers -- studies that investigate the components of instructional expenditures.

Monk (1992) questions the value of the whole production function method of measuring the impact of funding on the quality of education. His concern is that, except for a short period in the 1970s, these studies focused on the quality of schools at either the district, state, or regional level. One of the major problems with the use of such global units is how the aggregate data is analyzed in order to deal with the great differences that may exist between districts within a state or schools within a district.

Where has the additional spending on education gone?

There is no question that the amount of money spent on K-12 public education has increased greatly during the past decade. The exact amount of the increase depends on the set of statistics chosen. According to the Education Commission of the States in 1982-83 (the year A Nation At Risk was released) about $108.4 billion was spent on public school education. In 1991-92 about $210.4 billion was spent. Adjusting for inflation this represents an increase of $57.2 billion during that period (Augenblick, Van De Water, and Fulton, 1993).

Few studies have examined the question of how these additional dollars have been allocated. In general, the data show that per pupil expenditures have increased significantly. However, the data are not broken down to the point where one can determine the specifics of the per pupil increase. How has the additional money been spent: higher teacher salaries; new technology; or new textbooks and materials? It is difficult to answer the question of where the money went on any type of large scale. Different districts used the increases

differently. Unless we can look at individual schools and see how they have used their resources we cannot begin to develop recommendations on the most effective way to expend funds.

Some research has focused on answering the question of where the money is being spent. Studies done by Picus (1993b); Cooper (1993); Odden, Palaich and Augenblick (1979); and Sherman, O'Leary, and Lancaster (1992) all report finding that approximately 60% of operating expenditures are used for instruction. The problem is that the smallest unit examined by most of these studies is the district rather than the individual school. The exception is Cooper (1993) who took a bottom up approach, looking first at building level expenditures.

Another finding of the Picus (1994a) study that is useful is that nationally approximately 5.8% of total expenditures are devoted to school site administration. As districts receive additional dollars approximately 40% is devoted to reducing class size and 10% to increasing teacher salaries. The balance is used to provide more of the existing services outside of the classroom.

The Research Questions

The goal of this research is to determine if there is a relationship between the pattern of expenditure and the level of funds available in New Hampshire high schools. For example, is there a relationship between the percentage of its budget a high school spends on regular programs and its overall per pupil cost?

The hypothesis is that there will be less than a moderate correlation between each of the eight variables and per pupil expenditure. A description of the eight variables is included in the next section.

The study will also examine each high school's spending pattern over time to determine if there has been a change in the pattern of expenditure. The hypothesis for this section is that there will be only small changes in expenditure patterns. Additionally, the study will examine the expenditure pattern of the 38 high schools as a group to determine if the pattern of spending across the state is the same. This will be examined for each year and for the total time period being examined. The hypothesis here is that there will only be small differences in expenditure patterns accross the 38 schools and that there will be only small changes over the nine year period.

Research Methodology and Data Analysis

The first part of the research examined four different expenditure areas common to all high schools: regular education (re), guidance services (gs), educational media (em) and school administration (sa). These services impact the vast majority of high school students; and, all have specific minimum standards established by the New Hampshire State Department of Education. Regular education programs include all core subjects such as English, mathematics, science, and social studies as well as the practical and fine arts courses. The amount of money expended in each area was broken down into

personnel costs (salaries and benefits; (p)) and the cost of supplies and materials (s).

The data set was the 38 high schools in New Hampshire that contain grades 9-12. In order to maintain consistency, those high schools which have different configurations were not included. The study examined the spending patterns of the 38 schools starting with the 1985-86 school year and running through the 1993-94 school year. Reviewing the spending patterns of these districts over this nine year period diminished the impact of a large, single year, increase or decrease in budgets that would not reflect a normal spending pattern. Since the study examined these spending patterns over time the high schools selected must have maintained the same 9 - 12 grade configuration since the 1985-86 school year. Any 9-12 high schools which came into existence after the 1985-86 school year were not included in the data set.

The four expenditure areas described above were broken down to show the personnel and supply costs separately. The eight variables (rep, res, gsp gss, emp, ems, sap and sas) were expressed as a percentage of the total high school expenditure for the district as reported to the State Department of Education on Form MS-25 for school years 1985-86, 87-88, 89-90, 91-92, and 93-94. Picus (1993a), Augenblick, Van de Water, and Fulton (1993) and Sheman, O'Leary, and Lancaster (1992) all used similar state mandated year end reports in research projects examining expenditure patterns.

Each of the eight variables, expressed as a percent of total high school cost, was related to per pupil costs to determine if there were relationships between the spending patterns of the high schools and their overall per pupil cost. For example, did high schools with a higher per pupil expenditure tend to spend a higher percentage of their budget on school administration? This analysis will be done for each of the five years included in the study. A Pearson correlation coefficient was calculated for each of the eight variables and the school's per pupil expenditure in an attempt to answer this question. The hypothesis for this section of the research project was that there will be less than a moderate correlation between each of the eight variables and per pupil expenditure. For the purpose of this research, a Pearson r with an absolute value greater than 0.30 indicated that there is a moderate relationship between a given variable and per pupil cost.

The second section of the research project examined the expenditure pattern of each high school in the study using the same eight variables. Using the values for each of the five years included in the study a mean and standard deviation was calculated for each of the variables. For the purpose of this research the equity standard postulated by Odden and Picus (1992) was used to define small. This equity standard is defined as a coefficient of variation of 10 percent or less. The coefficient of variation is the quotient of the standard deviation and the mean (Sheret, 1984). The coefficient of variation has been used in a number of school finance studies including Kearney and Chen (1989)

and Berne and Stiefel (1994). This statistic was calculated and analyzed for each of the variables.

The third section of the research project is similar to the second. However, in the third section the expenditure pattern for all 38 schools was examined for each of the five years. The mean and standard deviation for each of the variables was calculated for each of the five years. A coefficient of variation of 10 percent or less again signify a small difference in the expenditure pattern. The hypothesis for this section is that there will be only small differences in expenditure patterns. In order to gain a prespective on any trends over the nine year period covered by the project the average percent expended in each of the five years was analyzed. This analysis looked for patterns of change in any of the eight variables over time. It is anticipated that there will only be small changes over the nine year period. A coefficient of variation of 10 percent or less will signify a small change.

Summary

In a recent series of articles Molnar (1995), Hanushek (1995) and Bracey (1995) presented different views on the question of does money matter. While each had a different perspective on what research on this issue has shown, all agreed that money, if used wisely, can improve the quality of educational opportunity for all students. Chapter 2 will review some of the research in each of the areas discussed above.

CHAPTER TWO

REVIEW OF PREVIOUS RESEARCH

Introduction

For the past 30 years there has been an ongoing public policy debate centered on the issue of the impact of resources on educational outcomes. The issue has been debated in two primary arenas -- academic research and the courts. Researchers from the fields of education, economics, and political science have undertaken scores of studies in an attempt to determine if there is a relationship between educational resources and student performance. At the same time, groups of parents, school boards, school administrators, and politicians have undertaken a series of legal challenges to the way their state funds education. These challenges have their legal grounding in either the equal protection or education clause of the state's constitution. To be successful, however, the plaintiffs must convince the court that there is a positive relationship between educational inputs and outcomes.

It is only natural that there has been a great deal of overlap in the data used on these two fronts. The courts have relied on the experts from the field of educational finance to help reach their decisions. Given the inconsistency of the research results in this area, it is not surprising that there has been a similar

level of inconsistency in the results of the legal challenges. The following pages will review some of the significant, although inconsistent, findings in both arenas.

The Academic Debate

The origins of the current debate over the relationship between resources and educational outcomes can be traced to a 1966 report which reached conclusions that were very different from the conventional wisdom of the day. Included within the Civil Rights Act of 1964 was a provision that the United States Commissioner of Education determine the degree of inequality of educational opportunity that existed across the nation (Bowles & Levin, 1968). A major result of this mandate was the publication of Equality of Educational Opportunity (Coleman, Campbell, Hobson, McPaertland, Mood, Weinfield, & York, 1966). In the years since its publication this report has become known simply as the Coleman Report. It was generated from data collected from approximately 3100 schools and 645,000 students, teachers, and administrators. The intent of the research project was to determine the extent of racial and ethnic segregation and the degree of inequality of educational opportunity that resulted from this segregation. This is not surprising as it was commissioned under a major piece of civil rights legislation.

The legacy of the Coleman Report is far different from its intended goal. The most commonly quoted findings of the report are that per-pupil expenditures and school facilities show little relationship to student achievement levels, that

schools have little influence on a child's achievement that is independent of his background and general social context; and the effect of a student's peers is a very strong influence on achievement. (Coleman et. al., 1966). As soon as the report was released it came under considerable criticism. Bowles and Levin (1968) noted that less than 60% of the high school surveys were returned. A large percentage of the non-responding schools were large urban schools. Cain and Watts (1970) were critical of the high rate of non-responses to questions concerning parents' education -- especially in grades one, three, and six.

Another problem with the study was that the measure used in the regression analysis was an average per-pupil expenditure for an entire school district. The difference expenditure patterns between schools, or even between elementary and secondary schools, was ignored (Bowles & Levin, 1968). Kozol (1991) pointed out that one of the problems with this type of district wide per-pupil expenditure figure is that it tends to overestimate the expenditure in schools serving students from lower class homes and underestimate the dollars spent in schools attended by students from upper class families.

Despite the criticism of the Coleman Report, its "production function" format has been used repeatedly over the past 30 years. These production function studies examine various school related inputs. The seven most common input variables are: per pupil expenditure, teacher experience, teacher education, teacher salary, teacher-pupil ratio, administrative inputs, and facilities. In addition, many studies include various student inputs such as

student background characteristics (socioeconomic-economic background, parents' education, etc.), school related student characteristics (peer group influence) and student attitudes.

Glasman and Biniaminov's (1981) analysis of production function studies conducted between 1959 and 1980 showed that three-fifths of the studies used only cognitive outputs. These studies used standardized achievement test scores from instruments such as the Iowa Test of Basic Skills, the California Achievement Test, and Metropolitan Achievement Test as the measure of cognitive output. The balance of the studies used a combination of cognitive and student outputs such as student attitude and educational aspirations. Monk (1992) reports that between 1980 and 1990 there were at least 18 similar input/outcome studies reported in the Journal of Economic Literature. With few exceptions, these studies used the same types of gross inputs and outcomes as described by Glasman and Biniaminov.

The obvious question is what have we learned from 30 years of these production function studies? Given the inconsistency of results, the answer seems to be not a great deal. Reviewing a few of these studies will demonstrate this lack of consistent findings.

One of the most interesting and important of the production function studies was done by Ferguson (1991). The study is significant not only because of its results but also because of the data set he used. Ferguson was critical of many prior production function studies. He stated that the reason it was so

difficult to determine which educational inputs might increase outcomes was the available data. He thought the data many of these studies used was out of date and limited in size and scope. For his study, Ferguson collected data from almost 900 districts and over 2.4 million students from across Texas. Ferguson had a wide range of up-to-date data available to him including a statewide reading examination and state wide teacher recertification examination. Using these and other data Ferguson found that the quality of school accounts for between one quarter and one third of the variation among schools in the standardized reading test. The inputs Ferguson found to have a significant positive impact were teachers with better literacy skills, and more experience and smaller class sizes.

Another study which reported a positive relationship between inputs and outcomes was a ten year study of Scholastic Aptitude Test results done by Hashway, Clark, Roberts, and Schnuth (1990). This study demonstrated positive relationships between student scores on the SAT and teacher salary and per pupil expenditure. The results showed that once states were equalized in terms of wealth, revenue sources, and proportion of students taking the SAT, the greater per pupil expenditure, and the higher the teacher salary -- the better the student performance.

Card and Krueger (1992) used a different outcome measure for their study. Rather than measuring cognitive gain or student attitudes, they did an analysis of men's earnings. The earning data used by Card and Krueger came

from the United States Censuses of 1960, 1970, and 1980. Not only did this study use gross output data, it also used gross input measures. The input data used was statewide information on the characteristics of the schools that had educated these men during the first half of the century. The Card and Krueger study is one which found that teacher salary, number of students per teacher, and length of school year each are statistically significant predictors of men's later earnings.

There are a number of studies that produced results very different from those described above. These studies used similar production function techniques.

In his review of four quantitative studies (Ammor et. al. 1976, Hansushek 1971, Murnane 1975, and Murnane & Phillips 1981) on effective schools, Murnane (1983) found no consensus regarding the role of any school resource in contributing to student achievement. In the cases of all four studies achievement was measured by improvement in scores on standardized achievement tests of cognitive skills. The input variable in most of these studies was class size. The results in this area are mixed. The majority of the studies show that very small class size does have a positive impact on the improvement of achievement. However, a class size of 20 resulted in only marginally higher achievement than classes of 30 to 40.

Rossmiller (1983) found similar results in his summary of work done by Rossmiller & Geske (1977), Cohen (1979), Bridges, Todd, and Mrock (1980),

and Murnane (1980). The studies examined several input variables and their impact on student achievement. Rossmiller's summary concluded that in each of the studies per pupil expenditure did not appear to have a significant impact on student achievement. A similar conclusion was reached by Odden and Picus (1992).

Given the inconclusive results of many of these studies it is surprising that the production function methodology remained so popular. During the 1970s a few studies, Murnane (1975), Summers and Wolfe (1977) and Hanushek (1971), used more of a micro approach. They looked at inputs and outcomes at the classroom level rather than at the district or state level. Murnane (1975) and Hanushek (1971) both looked at the direct effectiveness of teachers by looking at individual student performance in the classroom rather that on a standardized test. Both of these studies produced results that showed striking differences in average gains by students across teachers. The findings are not the most significant outcome of these studies. While many of the district or state level production function studies produced inconsistent or insignificant results these classroom level studies tended to have strong, clear results. Unfortunately, this type of classroom level research has not continued. Monk (1992) notes that the rationale for going back to global measures of school quality relies on the claim that new and more refined data analysis techniques are available that give researchers the ability to control for distorting effects.

A major problem with the production function approach to assessing the impact of resources on the quality of education is that two well respected researchers can examine the same data set and reach opposite conclusions. This is demonstrated in a recent exchange of articles between Hanushek (1994b) and Hedges, Laine, and Greenwald (1994b). The exchange was initiated by Hedges, Laine, and Greenwald who did a reanalysis of Hanushek's data from his seminal work The Impact of Differential Expenditures on School Performance (1989). In the original, work Hanushek analyzed 187 production function studies of the effect of expenditures on student performance. His analysis examined seven input variables: per pupil expenditure, teacher/pupil ratio, teacher education, teacher experience, teacher salary, administrative inputs, and facilities. Reviewing each study, Hanushek determined whether the input variable had been measured, if the results showed a positive or negative impact, and if the impact was statistically significant at the 5% level. In the majority of these studies, the impact of the variables analyzed was insignificant. Only three of the seven variables showed a statistically significant (positive or negative) impact in more than 20% of the studies. Teacher experience was significant in 36% of the studies, per pupil expenditure was significant in 25% of the studies, and teacher salary was significant in 22%. Hanushek concluded that the lack of consistent findings across this large sample of studies had to indicate there was no strong or systematic relationship between school expenditures and student performance (Hanushek, 1989).

Hedges, Laine, and Greenwald (1994a) took the same data set used by Hanushek and analyzed it using more sophisticated statistical methods. Their analysis took into account the strength of the findings in each of the studies, not just if it was significant. The results of Hedges, Laine and Greenwald's work were far different from Hanushek's. They concluded that the effect magnitude of their analysis was large enough to suggest that there is a positive relationship between school expenditures and student performance. They go on to say that they do not suggest that throwing money at the schools is the most effective method of improving student achievement; but, they do find that money does matter after all (Hedges, Laine and Greenwald, 1994a).

In his response to Hedges, Laine, and Greenwald, Hanushek (1994b) was critical of the statistical methodology used in their report. He was especially concerned about their conclusions regarding per pupil expenditure. Hanushek's major objection was that per pupil expenditure studies generally rely on district level data which can significantly mismeasure resources going to individual students. Hanushek agreed that there are districts that make effective use of additional resources; but, this does not provide any guide to effective policy making, unless many more details can be supplied. It is not that money does not matter -- just that it must be allocated wisely. This is the key issue.

Murnane (1991), who has conducted a number of these studies, pointed out one of the problems with them is that they do not adequately address the question of causation. Another problem with the production function approach is

that the inputs do not affect education in isolation. For example, two schools within a district may both use additional resources to reduce class size. In one setting the principal and teachers may also change teaching styles to take advantage of the smaller class while in the other school there is no change in instructional delivery. It is unrealistic to expect that the results of reduced class size would be the same in both schools.

It is also the case that some schools are simply more efficient to operate than others (Reischauer & Hartman, 1973). Older, urban systems have higher operational costs than newer suburban systems. This is due, in part, to the age of the facilities and in part to the fact that they typically serve a high percentage of disadvantaged students.

Monk (1992) makes that point that the positive side of this pattern of inconsistent results from years of production function research is that it is leading to a shift that will raise the individual classroom to a level of importance in the conduct of productivity research. The one consistent finding has been that student learning depends on the identity of the school and classroom to which the student is assigned. The teacher is the key.

Conclusions

Thirty years of debate over the relationship between educational inputs and outcomes has produced very little solid information on which public policy can be built. Even Hanushek would agree that few people would go so far as to say that school expenditures could not have an important effect on performance

(Baker, 1991). The question that is still unanswered is how to make the most effective uses of the resources available. In order to do this we need to change the focus of the debate from "does money matter" to "how can we make money matter."

The Legal Arena

Equity Arguments.

Five years after the Coleman Report was released, the parents of a student in Los Angeles County filed suit against the State of California claiming that the state's method of funding education made educational quality a function of the wealth of children's parents (Fulton & Long, 1993). As a result of this case, Serrano v. Priest (1971), the California Supreme Court invalidated the state's method of funding public education by ruling that the funding scheme violated both the state and federal equal protection provisions (Thro, 1993). Serrano v. Priest began a succession of court cases that continues to the present.

When challenging a states' method of funding education, the first hurdle a plaintiff must overcome is to prove that the state has an obligation to provide an equal, quality, or adequate education. The courts will base their decisions on either an education clause or equal protection clause included in the state's constitution. With the exception of Mississippi, each of the states has an education clause in its constitution. However, these clauses differ from state to state. Thro (1993) reports a system of categorizing various state educational

clauses developed by Grubb and Ratner. They divided the clauses into four groups. Category I clauses merely mandate a system of free public schools. New Hampshire and 16 other states fall into this category. Category II clauses impose some minimum standard for quality. There are 22 such clauses. Category III clauses also mandate public school systems; but, use stronger language than category I or II clauses. There are six such clauses. Category IV clauses make education an important, if not the most important, duty of the state. Four states have these clauses. If plaintiffs are successful in this portion; they can move forward with the remainder of their case.

Since Serrano v. Priest no plaintiff in a school funding case has ultimately prevailed without convincing the court of the existence of a positive correlation between expenditures and educational opportunity (Dayton, 1993). If this link between expenditure and the quality of educational opportunity cannot be shown, the court has no rational basis, or constitutional issue, on which to act and will not recommend the funding changes the plaintiffs are seeking (Dayton, 1995). The courts, like researchers, have not always agreed that there is a relationship between expenditures and opportunity.

In 1973, the appeal of a suit brought by a group of parents from the Edgewood School District in Texas reached the United States Supreme Court. The Court, in a 5-4 decision, held that Texas' system of funding education did not violate the United States Constitution (Fulton & Long, 1993). The decision was based on a number of arguments, the most important of which was that

education was not a right guaranteed under the United States Constitution. This meant that all future funding cases would have to be argued based on individual state constitutions. Another significant implication of San Antonio Independent School District v. Rodriguez (1973) was that the majority opinion in the case questioned the alleged correlation between expenditures and educational opportunity (Dayton, 1993). Justice Marshall did not share this view. In his dissenting opinion he stated that it was an inescapable fact that if one district has more funds available per pupil than another district the former will have greater choice in educational planning than the latter (Dayton, 1993). It was Justice Marshall's position that the courts needed to look at opportunities available to students -- not how well students took advantage of the opportunities. Rodriguez was a serious, but not fatal, setback to those involved in school finance reform.

The next major case in this ongoing battle was decided in the same year as Rodriguez. The issue presented to the New Jersey Supreme Court in Robinson v. Cahill (1973) was that there is a relationship between expenditures and educational opportunity. The Court agreed, ruling that while equal dollar inputs will not ensure equal educational results, educational opportunity does depend to a substantial measure on the number of dollars invested (Dayton, 1993). The Supreme Court of Connecticut reached a similar conclusion in Horton v. Meskill (1977) when it stated that there is a direct relationship between per pupil expenditure and the breadth and quality of educational programs.

Wyoming's Supreme Court in Washakie v. Herschler (1980) also recognized the correlation between expenditure and educational opportunity (Dayton, 1993). Not all plaintiffs were as successful as those in New Jersey, Connecticut, and Wyoming. In fact, only eight of the 23 suits filed between 1973 and 1989 were successful (Thro, 1991).

In many of the unsuccessful cases the relationship between expenditures and educational opportunity was never addressed. The courts ruled that the funding method did not violate one or the other of the clauses. McDaniel v. Thomas (1981) is an example of one such case. In 1981, the Georgia Supreme Court upheld the State's funding system because education was not a "fundamental right" under the State's equal protection clause and the "adequate education" requirement in its education clause did not require the State to provide equal educational opportunity. Even though the State prevailed in this case, the legislature undertook financing reforms that led to a dramatic increase in the State's contribution to education. There were similar findings in Colorado (Lujan v. Colorado State Board of Education, (1982)), Idaho (Thompson v. Engleking,(1975)), Maryland (Somerset County Board of Education v. Hornbeck, (1983)) and Michigan (East Jackson Public Schools v. State of Michigan, (1984)). In each of these cases the State's Supreme Court ruled that the funding method being challenged did not violate either the equal protection act or the education clause. The issue of the relationship between expenditures and educational opportunity was not the deciding factor.

In 1991, a group of parents and students from Claremont, Franklin, Allenstown, Lisbon, and Pittsfield School Districts filed suit alleging that New Hampshire's method of funding public schools violates the State's constitution. At the Superior Court level Judge Manias ruled that the education clause found in New Hampshire's Constitution imposed no qualitative standard of education nor any quantifiable financial duty regarding education. The only duty set forth was the amorphous duty to 'cherish public school' and to 'encourage private and public instruction'. The language was hortatory not mandatory (Claremont, 1991). This decision was appealed to the State Supreme Court.

The Supreme Court relied on two 'tests' in its effort to determine whether the State had a duty to support public education. The first was the 'same meaning' test. This means the Court interprets the words in the education clause using the meanings that they had when they were written. The second 'test' was to review other state constitutions which influenced the authors of New Hampshire's Constitution. The second test is of particular interest because it focused on Massachusetts' Constitution and a recent ruling by its Supreme Court. The Massachusetts Supreme Court had just ruled in McDuffy v. Secretary of the Executive Office of Education et. al. (1993) that the State's method of funding education was unconstitutional. The New Hampshire Supreme Court relied heavily on this finding, citing some of the language from McDuffy in its final ruling.

The decision of the Court was that the state does have an affirmative constitutional duty to support public education; and therefore remanded the case back to Merrimack County Superior Court for trial (Heneghan & Messore, 1994). This suit will now address the issue of the relationship between educational resources and outcomes.

Quality and adequacy arguments.

Most educational financing suits filed before 1989 used the "equality" approach; each child is entitled to have approximately the same amount of money spent on her/his education irrespective of where they happen to live. Beginning in 1989, a new tactic, still focusing on the education clause of the state constitution, was undertaken by some groups who were challenging state funding methods. In these cases, plaintiffs argued that the state had an obligation not just to provide an education; but, that a certain level of quality was also guaranteed. This new view of a state's obligation was not just to provide equal opportunity but to provide an adequate level of education. Funding that was equal but low was considered unacceptable.

In 1989, plaintiffs won three major cases using this "quality /adequacy" argument. In Council for Better Schools v. Rose (1989) the Supreme Court of Kentucky found that: "Students in property poor districts receive inadequate educations and inferior educational opportunities as compared to those offered to students in more affluent districts" (Dayton, 1993, p. 174). In its ruling the Supreme Court listed seven attributes of a child's education: (a) sufficient oral

and written communication skills to enable the student to function in a complex and rapidly changing civilization; (b) sufficient knowledge of economic, social, and political systems to enable the student to make informed decisions; (c) sufficient understanding of governmental processes to enable the student to understand the issues that affect his or her community, state and nation; (d) sufficient self-knowledge and knowledge of his or her mental and physical wellness; (e) sufficient grounding in the arts to enable each student to appreciate his or her cultural and historical heritage; (f) sufficient training or preparation for advancement in either academic or vocational fields so as to enable each child to choose and pursue life work intelligently; and (g) sufficient level of academic or vocational skills to enable public school students to compete favorably with their counterparts in surrounding states, in academics or in the job market. The Rose decision was followed by similar rulings in Montana (Helena v. State) and Texas (Edgewood v. Kirby) and marked the beginning of a new era in finance litigation, with the focus on quality and adequacy.

While none of the courts have taken the view that more money is directly related to improved opportunity, they have taken the view of Justice Marshall in his dissenting opinion in Rodriguez. He concluded that a district which is property poor is powerless to match the education provided by a property-rich district, assuming that each district allocates funds with equal wisdom (Rodriguez, 1973).

Funding suits in Idaho and Massachusetts have also successfully used the adequacy argument. In Schools for Equal Educational Opportunity v. Evans, the Idaho Supreme Court held that the plaintiffs were entitled to a trial to determine whether the present funding formula provided certain school districts with sufficient funds to meet state-defined educational standards (Minorini, 1994).

In the second case, the Massachusetts Supreme Court overturned the current funding system and ordered the legislature to develop a more appropriate system. The plaintiffs in McDuffy v. Secretary of Education argued that the Commonwealth's school financing system denied some students an adequate education which was guaranteed under the Commonwealth's Constitution. Both of these cases are of great interest to the plaintiffs in the Claremont suit. The Massachusetts case is of particular interest because of the similarities in the constitutions of the two states.

Harper v. Hunt, a case decided in favor of the plaintiffs by the Alabama Supreme Court, deserves a brief comment. This case is unique because the plaintiffs built their case using both equity and adequacy arguments. In its ruling the Court stated that the quality of educational opportunity available to a child in Alabama was dependent on the fortuitous circumstance of where the child resides. In addition, the Court found that the level of educational opportunities available to students in Alabama were constitutionally inadequate (Minorini, 1994).

The only case that has gone against the tide of successful suits by finance reform advocates is the Coalition for Equitable School Funding v. State (1991). In this case, the Oregon Supreme Court upheld the state's finance scheme. The plaintiffs in the Coalition case argued that the state does not give school districts sufficient money to meet all state requirements. Districts must raise additional funds from property taxes. Given the differences in property wealth, there are differences in per pupil expenditures. Therefore, the state is not providing a "uniform" education. These arguments fall more into the category of an equity suit than the quality suits that were successful in Texas, Montana, and Kentucky. The court rejected the plaintiff's case on a number of grounds including the fact that a "uniform" education did not necessarily require uniform per pupil expenditures (Thro, 1991).

The cost of adequacy.

The adequacy argument, used in cases such as Rose, presents many new problems. The impact of cases won under the old "equity" arguments generally led to a change in the state's funding formula to insure that property poor districts were not at a disadvantage in terms of total dollars available when compared to other districts. Adequacy is not easy to define. What is an adequate education? How much money does it cost to provide an adequate education?

These are questions that policymakers have a difficult time answering. Slavin (1994) notes that equity and adequacy suits are providing new dollars to

improve the quality of education. The problem is what model of distribution should be used. This view is shared by Clune (1994) who is also concerned about defining adequate educational inputs and outcomes. Hanushek (1994a) views this as time of real opportunity and significant peril because when schools have additional resources they frequently do not use them in ways that enhance student outcomes. To take more dollars and misuse them will have a long term negative impact on education.

The view taken by most policymakers tends to be too wide -- it looks at the state or district level not individual schools. This is a an problem that exists whether the question is equity or adequacy. Barnett (1994) is concerned that this mistake will be repeated when additional resources are made available. The variations among individual schools within a state or district must be the focus if the opportunity for an adequate education is going to be provided for all students. This concern is shared by Cooper (1993) who points out that it's not how much you spend -- it's how much you spend in the classroom.

Conclusion

In the cases that have been decided since 1989 the courts have shown a clear pattern of coming down on the side of equality of educational opportunity. The problem with battling these issues in court is that the court usually only rules that the funding system is unconstitutional and needs to be corrected. The state's legislative body is usually given the task of developing a new system -- not an easy job. One only needs to review the recent history in Texas and New

Jersey to see the problems that follow these rulings. In Texas, the legislature has developed three different funding formulas to meet the guidelines set by the State Supreme Court in its Edgewood decision. Each of these formulas has been challenged; and, each time the court has supported the plaintiffs by ruling the new formula unconstitutional. The situation is similar in New Jersey where the court battle has been going on virtually non-stop since Abbott v. Burke was first filed in 1981. In New Hampshire, the opposing sides will not even sit down and discuss a settlement before the case goes to court.

Each of the cases discussed, except for Rodriguez, was decided in a state supreme court. Therefore, they only affect that one state and its children. Taken as a whole, however, they have had a very powerful impact on the educational finance reform movement. Each victory encouraged groups in other states to act. Each defeat seemed to cause advocates to develop new and more effective arguments. The progression in these arguments has been very positive. They have moved from equality to quality to adequacy. Hopefully, there has been a sufficient number of victories so that the focus can now shift from spending time and effort battling in court to dealing with the issue of making better use of the resources.

Where has the New Money Gone?

Between 1982-83 and 1991-92 spending on public schools across the United States has increased from $108.4 billion to about $210.4 billion. After

adjusting for inflation this is an increase of approximately $57.2 billion. A higher level of state support accounts for $32.5 billion of this increase (Augenblick, Van de Water, & Fulton, 1993). Some of the increase is attributable to the court cases outlined previously. Another factor that spurred increased spending was a series of reports issued in the early 1980s critical of the current state of education. Many of these reports made recommendations that required additional funding. Increases in spending have also been caused by increases in enrollment, teacher salaries and benefits, graduation requirements, and the cost of special education.

The issue that concerns policymakers and the public alike is that there is not a clear picture of where the additional dollars have gone. Adams (1994) reports that the new dollars that were available to districts in Kentucky, as a result of a new educational reform law, did increase per-pupil spending. However, these increases did not result in different expenditure patterns between high and low wealth districts. In both high and low wealth districts continued to allocate their resources in the same manner. All the finance reform measure did was to increase the total dollars each district had to spend. This did allowed poor districts to provide educational opportunities not previously available.

Firestone, Goertz, Nagle, and Smelkinson, (1994) found similar results in their analysis of New Jersey's Quality Education Act (QEA). Their study reviewed expenditures in 11 districts during the first year of QEA. They found

that all of the districts allocated their resources in a similar manner. This does not mean they all spent the same amount -- only a similar percentage. Poorer districts tended to increase staff rather than increase the salaries of existing staff. They also put more of the new dollars into classroom materials. While the first year of QEA did have a positive impact on the poorest districts, it did not significantly reduce the gap between rich and poor districts.

Picus (1994b) studied four school districts in Texas to determine the impact of finance reform in that state. The first finding of interest is the impact finance reform had on the high wealth, high enrollment districts in the study. Because of a reallocation of state revenues, these districts received less state funding which required a significant increase in local property taxes to maintain the same level of spending. The two low wealth districts received a substantial increase in funding with little idea on how to spend it. Given the volatility of the finance reform issue in Texas, the districts were apprehensive about using the money for long term projects and used most of their new funds for capital projects like building a new school or purchasing materials. These districts tended not to have a long range plan for the use of additional resources.

Picus (1994a) reports that studies done in Florida, California, and New York, as well as data for the country as a whole, show a similar pattern of expenditure. In each case, approximately 60% of all funds were expended on direct instruction. Another 5.8 % was expended for site level administration. One of the areas where there is some variation is operation and maintenance

which range from 7.5% to 13%. This could be caused by the age and size of facilities or differences in how these expenditures are reported. These studies reported that as districts receive additional funds about half goes toward direct instruction, 40% goes to reducing class size and 10% goes to increase teacher salaries. Any remaining funds are used to provide services outside the classroom.

Picus (1994b) summarizes the key issue in these studies by stating we must gain a stronger knowledge of how existing resources are used by school districts. The next step is to learn how these resources affect student outcomes and to direct future educational resources toward methods that improve student's performance.

Summary

In a recent commentary, Odden (1996) noted that it is time to move beyond these informative, but not so useful, debates about the past and figure out how educational systems can use their resources more effectively. The increases in funding seen during the 1980s have ended. The inflation adjusted per pupil spending between 1990 and 1995 has been flat and is not likely to increase significantly (Odden, 1996). If educational reform is going to happen, it is going to happen using the resources currently available. To be successful, policymakers must turn away from the old debates and learn how to make money matter. The first step in doing this is to understand how resources are being used at the school level.

The studies reviewed in this chapter, with very few exceptions, have focused on either district or state level measures of educational inputs and outcomes. The findings have been inconsistent and have not resulted in the development of models which have improved educational quality. If we continue asking the same questions in the same way we should not expect different answers. Therefore, the focus must shift to the individual school level.

CHAPTER THREE

RESEARCH METHODOLOGY

Introduction

As outlined in chapter one, the goal of this research was to determine if there was a relationship between the pattern of expenditure and the level of funds available in New Hampshire high schools during a given period. For example, was there a relationship between the percentage of its budget a high school spent on regular education programs and its overall per pupil cost? The study also examined each high school's spending pattern over time to determine if there was a change in the pattern of expenditure. Additionally, the study examined the resource allocation pattern of the schools as a group to determine if the pattern of spending across the state changed over time.

The Data

The data set for this research was generated from 38 New Hampshire high schools containing grades 9-12. In order to maintain consistency, those high schools with different configurations, such as 10-12, 7-12, or 1-12, were not included. The three high schools in the city of Manchester were not included because the data from the three schools are combined on the MS-25. Nashua and Concord high schools were not included because they service grades 10-12.

The study examined the spending patterns of the 38 schools beginning with the 1985-86 school year and running through the 1993-94 school year. Reviewing the patterns over a nine year period diminished the impact of a large, single year, increase or decrease in a budget that would not reflect a normal spending pattern. Because the study examined the spending patterns over time, the high schools selected must have maintained the same 9 - 12 grade configuration since the 1985-86 school year. Any 9 -12 high schools which came into existence after the 1985-86 school year were not included in the data set.

The research examined four different expenditure areas: regular education (re), guidance services (gs), educational media (em) and school administration (sa). These areas are common to all high schools and impact the vast majority of high school students. In addition, the areas all have specific minimum standards established by the New Hampshire State Department of Education.

The four expenditure areas described above were broken down to show the personnel and supply costs separately. Personnel costs included both salaries and benefits. Supply costs included expenditures for paper, workbooks, textbooks, furniture, and equipment. The resulting eight variables were: regular education - personnel (rep), regular education - supplies (res), guidance services - personnel (gsp), guidance services - supplies (gss), educational media - personnel (emp), educational media - supplies (ems), school

administration - personnel (sap), and school administration - supplies (sas). Each variable was expressed as a percentage of the total high school expenditure for the district as reported to the State Department of Education on Form MS-25 for school years 1985-86, 87-88, 89-90, 91-92, and 93-94. The MS-25 is the end of the year financial report each school district is required to file with the State Department of Education. The report is a breakout of expenditures by accounting function (regular programs, special education, etc.), object (salaries, benefits, supplies, etc.), and level (elementary, middle/junior high, high school and district) (see appendix A). Table 1 shows an example of the data from one of the high schools in the study.

Table 1.
Data for High School 01

	ID	PPC	REP	RES	GSP	GSS	EMP	EMS	SAP	SAS
FY86	01	4002	.532	.041	.033	.016	.008	.003	.056	.010
FY88	01	3730	.525	.038	.040	.001	.009	.002	.061	.011
FY90	01	5078	.526	.033	.042	.001	.008	.003	.067	.009
FY92	01	5049	.525	.030	.041	.001	.009	.001	.065	.010
FY94	01	5545	.453	.028	.038	.001	.008	.001	.062	.017

Note. ID = school identification; PPC = per pupil cost; REP = regular education - personnel; RES = regular education - supplies; GSP = guidance services - personnel; GSS = guidance services - supplies; EMP = educational media - personnel; EMS = educational media - supplies; SAP = school administration - personnel; SAS = school administration - supplies.

The per pupil cost data came from the New Hampshire Department of Education Division of Program Support (see appendix A). This report is published annually, breaking out per pupil costs for each school district in the state by level -- elementary, middle/junior high, high school and district totals. This is the same data source used by Goldrick and McDermott (1995) in their analysis of New Hampshire schools. Picus (1993a), Augenblick, Van de Water, and Fulton (1993) and Sheman, O'Leary, and Lancaster (1992) all used similar state mandated year end reports in research projects examining expenditure patterns.

Relationship Between Expenditures and Per Pupil Cost

The hypothesis for this section of the research project was that there is less than a moderate correlation between each of the eight variables and per pupil expenditure. For the purpose of this research, a Pearson r with an absolute value greater than 0.30 indicates that there is a moderate relationship between one of the variables and per pupil cost. The selection of an r value of 0.30 to indicate a moderate relationship was based on guidelines reported by Wolf (1986) in his discussion of the interpretation of effect size for correlational studies. Therefore, an r value less than 0.30 would support the hypothesis.

This analysis was done for each of the five years included in the study. A Pearson correlation coefficient was calculated for each of the eight variables and the school's per pupil expenditure. Each variable, expressed as a percentage of total high school cost, was related to per pupil costs to determine

if there was a relationship between the spending patterns of the high schools and their overall per pupil cost. For example, do high schools with a higher per pupil expenditure tend to spend a higher percentage of their budget on school administration?

Expenditure Patterns by School

Looking at the same eight variables, the second section of the research project examined the expenditure pattern of each of the individual high schools in the study. Using the values for each of the five years included in the study, a mean and standard deviation were calculated for each of the variables for each school. These were used to calculate the coefficient of variation for each of the variables. The coefficient of variation is discussed below.

The hypothesis for this section of the study was that when examining each individual school over time there would be only small differences in the percentage represented by each variable. The statistic selected to measure these differences was the coefficient of variation -- defined as the quotient of the standard deviation and the mean (Sheret, 1994). It was calculated and analyzed for each of the eight variables. Bonckaert and Egghe (1991) described the coefficient of variation as a good "concentration measure"; that is, it can be used to measure both the concentration and dispersion of data. The smaller the value of the coefficient of variation, the more concentrated the data. For the purpose of this question, a coefficient of variation of 0.10 or less denoted a small difference in spending patterns for a school over the nine year period. This

value was selected based on state level, school finance studies conducted by Odden and Picus (1992). The coefficient of variation has also been used in a number of other school finance studies including Kearney and Chen (1989), Berne and Stiefel (1994), and Hertert, Busch, and Odden (1994).

Expenditure Patterns Across Schools

The third section of the research project was similar to the second. However, in the third section, the expenditure pattern for all 38 schools, taken as a group, was examined for each of the five years. The mean and standard deviation for each of the variables across all the schools were calculated for each of the five years. The hypothesis for this section was that there would be only small differences in expenditure patterns across schools. A coefficient of variation of 0.10 or less again signified a small difference in the expenditure pattern.

In order to gain a perspective on any trends over the nine year period covered by this research, the average percent expended on each variable in each of the five years was analyzed. This analysis looked for patterns of change in any of the eight variables over time. It was anticipated that there would be only small changes over the nine year period.

In addition to doing a coefficient of variation to ascertain the degree of difference in expenditure patterns among the sample of high schools, the data were also analyzed to determine if results were affected by a few extreme values (outliers). Based on a recommendation by Dr. Richard Barton (personal

communication, March 6, 1996), any data point that had a z-score with a absolute value of 3.00 or higher was identified as an outlier. Each of the data points for each year was converted to a z-score, and any with a value of 3.00 or larger was noted. Once the outliers were removed, the mean, standard deviation, and coefficient of variation were recalculated for each of the variables and the results compared to the initial results.

In order to gain an additional perspective on expenditure patterns, the 38 schools were divided into quartile groups based on enrollment. Average Daily Membership (ADM) data from the New Hampshire Department of Education Division of Computer and Statistical Services was the measure of enrollment used (see appendix A). The mean, standard deviation, and coefficient of variation were calculated for each of the groups. These results were analyzed to determine if the expenditure patterns for schools within the same quartile had the small variation predicted for the schools as a group. This procedure was repeated for each of the five years.

Finally, the schools were divided into two groups based on governance -- those governed by a single district and those that were part of a regional or cooperative district. A coefficient of variation was calculated for each group and the results were compared both to each other and group as a whole.

CHAPTER FOUR

THE DATA AND ANALYSIS OF THE DATA

Introduction

Before presenting the actual data generated from the 38 high schools included in the research project, some demographic data will help provide a perspective on the makeup of the schools. During the 1985-86 school year, the enrollment in the 38 schools ranged from 226 to 1652 students. By 1993-94, the range was 209 to 1340. In the 1985-86 school year, 10 of the schools had enrollments of less than 500 and 10 had enrollments of 1,000 or more. During the 1993-94 school year, 16 of the schools had enrollments of less than 500 and 6 had enrollments of 1,000 or more. Twenty-three of the schools had their largest enrollment during the 1985-86 school year and 12 during the 1993-94 school year. Only three schools reached their peak enrollment during one of the other years. As can be seen in Table 2, the average enrollment declined in the period from 1985-86 to 1991-92 with an increase in 1993-94.

Table 2.

Enrollment Data

	1985-86	1987-88	1989-90	1991-92	1993-94
Mean	768	724	675	665	672
Median	657	628	573	598	610

Twenty-two of the high schools served either regional or cooperative districts and therefore were governed by school boards comprised of citizens from more than one community. The remaining 16 schools were located in single districts. In most cases, they accepted tuition students from neighboring communities; but the 'sending' districts had no voice in the governance of the school.

Within the 38 high schools, per pupil expenditure ranged from a low of $2,216 to a high of $3,980 in 1985-86. In 1993-94, this range was a low of $4,208 to a high of $8,814. Table 3 shows the mean, population standard deviation, and median per pupil expenditure for each of the years included in the research.

Table 3.

Per Pupil Expenditure Data

	1985-86	1987-88	1989-90	1991-92	1993-94
Mean	$2,936	$4,226	$5,422	$6,001	$6,282
Median	$2,907	$4,180	$5,309	$5,871	$6,085
Std. Dev.	$464	$669	$851	$1,099	$1,098

Note. Std. Dev. = Population Standard Deviation

The average per pupil expenditure grew rapidly between 1985-86 and 1987-88. The rate of growth declined by about half over each of the ensuing two year periods. This trend is compatible with the growth in per pupil expenditure on the national level (Augenblick, Van de Water, and Fulton, 1993).

It is also important to note that most of the data used for this project was obtained from the Department of Education's Form MS-25. The data in this project are only as accurate as the data on the forms. It was apparent in reviewing 190 of these forms that some school districts were more concerned about accuracy than others. In a few cases, no expenditures were listed for supplies in areas where there were personnel. This is possible, but not likely, especially in an area like educational media. It is possible that some schools included supplies for both the guidance and educational media areas under regular education or somewhere else. No assumptions were made in gathering the data. The figures that were used were the ones reported.

The Correlation Between Per Pupil Cost and Other Variables.

The first part of the research examined the relationship between eight variables and per pupil cost. The variables were: regular education - personnel (rep), regular education - supplies (res), guidance services - personnel (gsp), guidance services - supplies (gss), educational media - personnel (emp), educational media - supplies (ems), school administration - personnel (sap), and school administration - supplies (sas). A Pearson correlation coefficient was calculated for each of the variables and per pupil expenditure. This was repeated for each of the five years. The results are shown in Table 4.

Table 4.

Pearson Correlation Coefficients

	rep	res	gsp	gss	emp	ems	sap	sas
1985-86	-0.071	-0.131	0.129	-0.128	0.012	-0.068	0.071	0.058
1987-88	-0.271	-0.312*	0.109	-0.099	-0.042	0.106	0.270	-0.098
1989-90	-0.063	-0.357*	0.330*	-0.129	-0.041	0.081	0.003	0.334*
1991-92	-0.141	-0.176	0.181	-0.180	0.025	-0.106	-0.187	0.149
1993-94	0.104	-0.045	0.367*	-0.047	-0.046	0.101	-0.225	-0.138

The hypothesis for this portion of the project was that there would be less than a moderate correlation between per pupil expenditure and any of the variables. A Pearson r with an absolute value of 0.30 or higher would indicate a moderate correlation. As can be seen in Table 4, there were only five cases where this occurred. The first two data points that produced a moderate correlation were for the variable regular education supplies. The r-values for 1987-88 and 1989-90 indicated a moderate negative correlation between per pupil expenditure and regular education supplies. The r-values for the other three years are well below the 0.30 level.

It should be noted, that all five r-values show a negative correlation between the percentage of the budget spent on regular supplies and per pupil expenditure. This is not an unexpected result given that a negative correlation denotes a relationship where one variable increases while the other decreases.

Districts, regardless of the total amount of money they have to spend, attempt to provide a basic education. Items such as textbooks and paper supplies that are needed to provide this basic education are funded under this area. Because there is little variation in the cost of these items, the unit cost to all districts will be similar. Therefore, these types of supplies represent a higher percentage of overall expenditure for districts with fewer dollars to spend per student. There is also a negative correlation between per pupil cost and the percentage of the budget allocated to regular education personnel in four of the five years analyzed.

The next variable where a moderate correlation occurred was in guidance personnel. Once again, there were two years when the r-values were greater than 0.30 -- 1989-90 and 1993-94. This case is the antithesis of regular education supplies. All five of the r-values for this variable showed a positive relationship between per pupil cost and the percentage of the budget a school spent on guidance personnel. A positive correlation means that as one of the variables increases or decreases the other will do the same. The positive relationship between these two variables was not unexpected. While the State Department of Education does have a minimum standard for number of guidance counselors a school needs to employ, it is not unreasonable to expect a district with more available funds to increase services to its pupils. Guidance personnel was the only one of the eight variables that had a positive correlation for all five years.

The final variable that had an r-value greater than 0.30 was school administration supplies at 0.334 in 1989-90. This is difficult to explain. It may just be an anomaly. The r-values for the other four years were all less than half of the 1989-90 value. The preceding two years had r-values of 0.058 and -0.098. The two years following have r-values of 0.149 and -0.138. There is no obvious pattern to these r-values. It should be noted that there was a large change in the correlation between per pupil cost and school administration personnel for the 1989-90 school year. The r value for the previous year was 0.270, the following year it was -0.187. This represents a change from a nearly moderate positive correlation to a negative correlation. This trend continued through the 1993-94 school year where there was an even larger negative correlation. This was the most consistent trend shown by any of the variables.

The fact that three of the five cases of moderate correlation occurred in 1989-90 is also difficult to explain. There does not appear to be any difference in spending patterns during the year. The percentage of the budget spent in each of the eight areas is almost exactly the same as it was in 1987-88 and 1991-92. There was not any greater variation in per pupil cost than in the previous two years. The coefficients of variation for the three years were 0.158, 0.158 and 0.157. A review of documents from the State Department of Education did not show any significant changes in either policy or minimum standards that would have effected these variables.

An analysis of outliers was done to see if there was an unusual number contained in the data for the year. There wasn't. Only 3 of 304 data points for that year were outliers. The only explanation for the three cases of moderate correlation during 1989-90 may be that it was just a coincidental occurrence.

Summary

The hypothesis for this section was that the r-value for each of the variables, relative to per pupil cost, would indicate less than a moderate level of correlation -- a value less than 0.30. Of the 40 variables compared to per pupil cost, 35 (87.5%) had r-values less than 0.30. The results would indicate that there is a low to moderate negative correlation between per pupil cost and the percentage of the budget spent on regular education supplies. The results would further indicate that there is a low to moderate positive correlation between the percentage of the budget expended for guidance personnel and per pupil cost. The remaining variables showed no consistent correlation with per pupil cost.

Expenditure Patterns by Individual Schools

This section of the research examined the spending pattern of each of the 38 high schools. The mean and standard deviation was calculated for each of the variables. The coefficient of variation was then calculated for each variable. Table 5 shows an example of this information. Tables B1 and B2 (see appendix B) list the mean percent expended for each variable and the coefficient of variation for each of the variables.

Table 5.

Five year average and coefficient of variation for each variable -- school 01

	REP	RES	GSP	GSS	EMP	EMS	SAP	SAS
FY86	0.532	0.041	0.033	0.016	0.008	0.003	0.056	0.010
FY88	0.525	0.038	0.040	0.001	0.009	0.002	0.061	0.011
FY90	0.526	0.033	0.042	0.001	0.008	0.003	0.067	0.009
FY92	0.525	0.030	0.041	0.001	0.009	0.001	0.065	0.010
FY94	0.453	0.028	0.038	0.001	0.008	0.001	0.062	0.017
MEAN	0.512	0.034	0.039	0.004	0.008	0.002	0.062	0.011
S.D.	0.030	0.005	0.003	0.006	0.000	0.001	0.004	0.003
C.V.	0.058	0.143	0.082	1.500	0.058	0.447	0.060	0.252

The hypothesis for this section was that there would be only small variations in the spending pattern for each school across the five years reviewed, -- i.e. a coefficient of variation of 0.10 or less. The results for each variable will be discussed.

Regular education -- personnel.

Using the mean for each of the schools, the percentage of the budget spent for regular education personnel ranged from 33.3% to 51.2%. The average amount expended by the 38 schools in this area was 42.5%. Table 6 shows how the spending patterns for the 38 schools broke down.

Table 6.

Percent of the budget spent on regular education -- personnel

	> 50%	50% to 45%	45% to 40%	40% to 35%	< 35%
# of Schools	2	9	15	8	4

While there was a fairly large range in the percentage expended across schools, there was very little change within a given school over the five years examined. Of the 38 schools, 35 had a coefficient of variation of 0.10 or less. The majority of these, 25 of 35, were less than 0.05. This indicates that the percentage spent on regular education personnel changed very little in these schools. It appears that, once a school has established an allocation pattern in this area, it tends to remain constant. Determining the reason for this is beyond the scope of this research project; but, it would be an important question to answer.

Regular education -- supplies

Using the mean for each of the schools, the spending for regular education supplies ranged from 2.2% to 5.3% of the budget. The average amount expended by the 38 schools was 3.2%. There was little consistency within schools over the five years. In contrast to personnel spending for regular education, only one school had a coefficient of variation less than 0.10. The average percentage of the budget spent in this area declined from 1986-87 to 1991-92, with a small increase in 1993-94. This pattern appeared in 17 of the

38 schools examined. The remaining schools exhibited a more random series of ups and downs in this area. This period of overall decline, with a small increase in the final year, mirrors the enrollment pattern during the same period.

Another pattern noted with this variable was that the mean percentage expended, over the five years, by smaller schools was higher than for larger schools. Of the ten schools with the highest mean percentage expended in this area, seven had average enrollments of less than 500 students. This is a large percentage, given that only 36% of the schools had enrollments of less than 500 students.

A Pearson correlation coefficient was used to further test the relationship between regular education supplies and average daily membership. The r-values for the five years ranged from -0.151 to -0.387. The average r-value was -0.265 which would indicate a low to moderate negative correlation between the two variables. This indicated that schools with lower per pupil costs spent a larger percentage of their budgets for regular education supplies.

Guidance services -- personnel

Using the mean for each of the 38 schools, the range of spending on guidance services was from 2.2% to 5.3% with a mean expenditure of 3.7%. Table 7 show the distribution pattern for the 38 schools.

Table 7.

Percent of budget spent on guidance services -- personnel

	> 4.5%	4.5% to 4%	4% to 3.5%	3.5% to 3%	< 3%
# of Schools	5	6	12	12	3

There were a number of different expenditure patterns in this area. Fourteen schools had a coefficient of variation less than 0.10. This indicated that there were only small variations in the percentage spent on this area during the period analyzed. One more school was added to the group with the removal of an outlier. The overall impact of outliers will be discussed later in this chapter. There were another 5 schools which had coefficients of variation between 0.102 and 0.108. Each of these, while larger than the 0.10 cutoff, still showed little variation. The remaining 18 schools fell into one of three expenditure groups. The first group was comprised of three schools which showed a decline in the percent spent in this area over the course of the five years. A second group of six schools had a mixed expenditure pattern. The third group, 10 schools, had consistent increases in the percent of the budget expended for guidance personnel.

There was no clear connection among the 14 schools with coefficients of variation of 0.10 or less. The group included four of the largest schools, as well as three of the smallest. There was also a wide range of per pupil costs among the 14 schools, seven were above average and seven were below

Guidance services -- supplies

The data gathered from the 38 schools shows that a minimal amount of money is spent in this area. Using the mean for each of the schools, the range of expenditure was from 0% to 0.6%. The mean percent expended was 0.2%, with a total of six districts indicating they spent less than 0.1% in this area. There were two districts that reported no dollars allocated for this area in any of the five years surveyed.

Only four schools had coefficients of variation of 0.10 or less for this variable. In all four cases, the coefficient was 0.0, with the schools showing the same expenditure in each of the five years. It is not surprising that there were not more cases where the coefficient of variation was 0.10 or less, given the very small values of the variable. A difference of only 0.1% in any one of the five years generates a standard deviation large enough to cause the coefficient of variation to be greater than 0.10. Because of this, the statistic does not tell us a great deal about this variable.

In order to gain an additional perspective on this variable, it was combined with the percentage expended on guidance personnel. A mean, standard deviation and coefficient of variation was calculated for each of the schools. These results were compared to the results for just the gsp variable. This resulted in only three minor changes. Three of the five schools having a coefficient of variation previously described as being very close to the 0.10 had new values that were below the 0.10 level.

Educational media -- personnel

Using the mean for each of the 38 schools, the range of expenditures for this variable was from 0.6% to 2.6% with a mean expenditure of 1.6%. Table 8 shows the distribution pattern for the 38 schools.

Table 8.

Percent of budget spent on educational media -- personnel

	> 2.5%	2.5% to 2%	2% to 1.5%	1.5% to 1%	< 1%
# of Schools	3	4	18	7	6

The majority of the schools, 21 of 38, had a coefficient of variation of 0.10 or less. There were an additional three schools which had coefficients between 0.101 and 0.104. This is an indication that there was very little variation in the expenditure patterns for most of the schools over the period of time covered by this study. The remaining 14 schools were evenly divided between having spending patterns that were a mixture of increases and decreases and schools which showed a consistent increase in the percentage of the budget spent for educational media personnel.

These spending patterns were closely related to school size and changes in size over time. This is not unexpected, given that state standards require a certified media specialist for a high school regardless of size. It would be highly unusual for a high school to employ more than one such person. Most schools deal with an increased workload by adding classified staff in this area. As

enrollments increase or decrease, full or part time aides are added or deleted. This causes small changes in the percent of the budget expended in this area. Therefore, it is not surprising that the six schools in the study that maintained an enrollment of at least 1,000 students during the period from 1983 to 1994 all had a coefficient of variation of 0.10 or less. Nor is it surprising that schools which experienced large decreases in enrollment had large coefficients of variation. Another factor that may have contributed to the increase of the percentage of the budget expended in this area is that some districts included the salaries of technology professionals under educational media.

Educational media -- supplies

The spending for media supplies does not represent a very large percentage of the budget in any of the high schools examined. The range of expenditures, based on the mean for each of the schools, was from 0.2% to 2.7%, with a mean of 0.7%. It was determined that the 2.7% figure was an outlier. The adjusted range was from 0.2% to 1% and the recalculated mean was 0.6%. A total of 24 schools expended between 1% and 0.5% of their budget in this area. The remaining 14 spent between 0.5% and 0.2%. There was only one school which had a coefficient of variation of 0.10 or less. As was the case with guidance supplies, a very small percentage of budget was allocated for this area. This means that any increase or decrease has a magnified impact on the standard deviation and, in turn, on the coefficient of variation. For example, a school, which over the five year period, expended 0.6%, 0.5%, 0.7%, 0.8% and

0.5% of its budget in this area only has a range of 0.3% but a coefficient of variation of 0.194.

Twenty-two of the districts had spending patterns which showed a decrease in the percentage of the budget they were spending in this area over the period studied. Of the remaining 16 districts, 11 had a mixed pattern of ups and downs, while five showed an increase in the percentage spent. Based on the average of all 38 schools, the percent of the budget spent on media supplies declined from 0.8% in 1985-86 to 0.5% in 1993-94.

School administration -- personnel

Using the mean for each of the schools, the percent of the budget spent on school administration personnel ranged from 4% to 13%, with an average expenditure of 6.1%. The 13% expended by one school was determined to be an outlier. Once this value was removed, the new range was 4% to 10.4% and the recalculated mean was 5.9%. Table 9 shows the distribution pattern for the 38 schools.

Table 9.

Percent of the budget expended on school administration -- personnel

	> 8%	8% to 7%	7% to 6%	6% to 5%	5% to 4%
# of Schools	3	3	11	12	9

A total of 24 schools had a coefficient of variation of 0.10 or less for this variable. Again this was not unexpected. There should be a consistent level of

staffing in this area given that there are specific state standards. Each high school is required to have a principal. The number of assistant principals could range from none, in some small schools, to as many as three in some of the larger schools. The variations in expenditure patterns for a given school could be related to the addition or deletion of administrative positions as enrollments changed. Another factor could be turnover -- where a new administrator is hired at a lower salary. Both of these would be reflected in the overall high school budget. Therefore, the percent of the budget related to this area should remain fairly constant.

Variations among schools can be related to the administrative structures of the schools. Some schools only include building level administrators in this category while others include department heads or other coordinators. Another factor that impacts expenditures in this area is the number of support staff who are included in the category. Some schools only include secretaries, while others include any classified staff working in a clerical position within the school.

The 14 schools which had a coefficient of variation greater than 0.10 did not show any consistent variation pattern. Seven of the schools had a year to year decline in this area, while five schools showed an increase from year to year. The remaining two schools had a mixture of increases and decreases. There did not appear to be any common link, such as size or per pupil expenditure level, shared among these schools.

School administration -- supplies

Using the mean for each of the 38 schools, the range of expenditure for school administration supplies was 0.3% to 1.3% with an average expenditure of 0.9%. As was the case with expenditures for supplies in the guidance and media areas, very few schools had a coefficient of variation of 0.10 or less. In this instance, only three schools fell into this category. The three schools had very different enrollments, ranging from a high of 1,189 to a low of 289. They also ranged from the well above, to below, average in per pupil expenditure. The only similarity was that they all maintained consistent levels of enrollment.

Only 15 of the 35 schools with coefficients of variation greater than 0.10 had consistent expenditure patterns. Of this group 13 showed a decline in the percentage expended in this area over the five years reported. The other two showed an increase. The remaining 20 schools had a mixed pattern of change. A possible explanation for this lack of consistency could be that most of the supplies in this area tend to be purchased in bulk and stockpiled from year to year. Items such permanent record cards, class schedule forms, and report card forms are not usually purchased on an annual basis. Years when stockpiles must be rebuilt may have a higher expenditure level than years when just general office supplies are purchased.

Summary

While the data did not support the hypothesis that there would be only small differences in expenditure patterns within a given school over the five

years examined, it did show that there was a fairly high level of consistency for some of the variables. This was the case in the personnel areas to a much greater degree than in supplies. Of the 38 districts, 35 had a coefficient of variation of 0.10 or less in regular education personnel, 14 in guidance personnel, 21 in educational media, and 24 in school administration.

There were 10 districts with coefficients of variation of 0.10 or less in all four personnel categories. The only consistent link among these 10 schools was that they all experienced about the same degree of change in population over the period of this study. However, there were other schools with similar enrollment patterns that did not maintain the same level of consistency in expenditures. In attempting to find other commonalties among the schools, it was noted that four were large schools, four were medium size and two were small. Five of the schools were from single districts and five were from cooperative or regional school districts. The percentage of the budget spent on each of the variables showed great differences. In terms of per pupil cost, the 10 schools ranged from among the highest to the lowest. One factor that would be interesting to investigate is whether these schools have had the same principal and/or superintendent during the period covered by the study.

Expenditure Patterns Across Schools

The third portion of this research examined the spending patterns across the 38 schools taken as a group for each of the five years. The hypothesis was that there would only be small differences among the schools for each of the

eight variables examined. Stated another way, the hypothesis was that the coefficient of variation for each of the variables would be 0.10 or less. This was not the case. Of the 40 values calculated (eight variables in each of five years) only one had a value less than 0.10. The coefficient of variation for regular education personnel in the 1993-94 school year was 0.099. In each of the years, the coefficient of variation was the smallest for regular education personnel, ranging from a low of 0.099 in 1993-94 to a high of 0.137 in 1985-86. While none of the other variables had coefficients of variation less than 0.10, in most cases the values of the coefficients were fairly consistent across the five years. Two exceptions were guidance services supplies and educational media supplies. This appears to be related to the very small percentage of the budgets allocated to these areas. As was stated in the discussion on spending patterns of individual schools, these were the areas with the greatest degree of variation. The coefficients of variation for all eight variables are shown in Table 10.

Table 10.

Coefficient of Variation for each variable -- by Year.

	rep	res	gsp	gss	emp	ems	sap	sas
FY86	0.137	0.304	0.282	1.582	0.432	0.790	0.331	0.362
FY88	0.124	0.322	0.200	1.053	0.405	1.235	0.355	0.354
FY90	0.128	0.324	0.214	0.956	0.369	0.454	0.295	0.402
FY92	0.124	0.351	0.234	1.162	0.348	0.449	0.284	0.353
FY94	0.099	0.381	0.287	1.119	0.274	0.437	0.284	0.468

A review of Table 10 shows that the coefficients for each of the personnel variables have a narrow range, as do the coefficients for regular education and school administration supplies. This indicates that, while the variation among schools is larger than hypothesized, it is consistent. This matches the results from the previous section where the expenditure patterns across a single school remained consistent in these areas.

Another example of the consistency of the spending patterns for the schools taken as a group was found when the average expenditure for each of the variables in each of the five years was analyzed. This analysis produced the following coefficient of variation: regular education personnel = 0.009, regular education supplies = 0.155, guidance personnel = 0.051, guidance supplies = 0.198, media personnel = 0.043, media supplies = 0.204, school administration personnel = 0.020 and school administration supplies = 0.114. This indicates that there was little change in the spending pattern of the 38 schools, taken as a whole, during the period covered by this research.

Because the results for this section did not match the hypothesis additional analysis was undertaken in an effort to identify a factor, or factors, that may have influenced the results.

Combined variables

The first of these was to combine the personnel and supply costs for each of the four major areas. A coefficient of variation was calculated for each

variable. This process produced no coefficients of 0.10 or less. The coefficients of variation for each variable were consistent across the five years. This was expected, given that the coefficient of variation for each of the personnel areas showed few differences; and that the percent of the budget spent on personnel was larger than the percent spent on supplies in all areas.

Schools grouped by size

The next level of analysis was to group the schools by student population and determine if schools of similar size had expenditure patterns that would produce coefficients of variation less than, or equal to, 0.10. For each of the five years, the 38 schools were sorted by size and then divided into quartiles. Coefficients of variation were calculated for each quartile. When analyzed by year, the coefficients of variation for each of the quartiles were in the same range as those for the entire group. There were a few exceptions; but, no clear pattern. For example, the coefficient of variation for guidance personnel was smallest for 3rd quartile schools in 1985-86, for 2nd quartile schools in 1987-88, for 4th quartile schools in 1989-90, then back to 3rd quartile schools in 1991-92. A similar, inconsistent, pattern was found for each of the variables. The pattern of expenditure within each quartile over the five years studied was consistent. However, the level of consistency was not as high as it was for the group of 38 schools taken as a whole. For example, the coefficient of variation for the group average expenditure for regular education personnel is 0.009. When the same procedure is carried out by quartile groups, the four coefficients were 0.016,

0.017, 0.057 and 0.015. Each quartile coefficient was at least 50% larger than the group coefficient. A similar pattern existed for each of the seven other variables. Based on this analysis, it does not appear that spending patterns were related to size.

Single town versus regional/cooperative districts

In a final attempt to find a link that combined schools with similar expenditure patterns, schools were grouped by governance structure. They were divided into two groups -- single districts (16 schools) and regional/cooperative districts (22 schools). A coefficient of variation was calculated for each variable in each group and the results compared. They were almost identical. All of the coefficients of variation were larger than 0.10. All of the coefficients of variation for each pair of variables were within 0.02 of each other with the exceptions of guidance supplies and media supplies. This is not surprising given the inconsistency of these variables throughout the data analysis. The results indicate that there is no difference in expenditure patterns based on school governance.

Outliers

The final step in the data analysis was to determine if the difference between the observed and hypothesized expenditure patterns was caused by outliers. For this project, an outlier is defined as a data point that, when converted to a z-score, had an absolute value of 3.00 or greater. A z-score was calculated for each of the data points and only 15 outliers were found. No

variable had more than two outliers in any one year. Over the five year period, school administration personnel had 6 outliers. Guidance services supplies, which had 4, was the only other variable to have more than one outlier.

The removal of outliers had little impact on the results previously reported on either the spending patterns of schools taken as a group or individual schools. Recalculating the coefficient of variation for each variable in each of the five years for the group of 38 schools still did not produce any results of 0.10 or less. It did result in some significant changes in coefficients which had been very large. For example, the coefficient for media supplies in 1987-88 was 1.235, removing the one outlier it was reduced to 0.405. Removing two outliers from school administration personnel in the same year reduced the coefficient from 0.355 to 0.258. Since removing an outlier changes both the mean and standard deviation, and because the coefficient of variation is the ratio of these to values, it is not unexpected that eliminating an outlier does not have a more dramatic impact.

Summary

The analysis of data in this section of the research project produced results similar to the first two sections. The degree of variation in spending patterns across the schools was larger than hypothesized. In other words, the coefficient of variation for each of the variables was larger than 0.10. The variable which behaved closest to the predicted pattern was regular education

personnel. The remaining personnel areas were the next most consistent set of variables. The supplies variables were the least consistent.

The analysis of the data did not find a factor that linked similar spending patterns. From the correlations calculated in the first section of the research, it was determined that there were no consistent relationships between the variables and per pupil costs. In this section, schools were grouped by size and again, no consistent expenditure pattern was found. The same was true when the schools were compared on the basis of single versus multi-district governance patterns. There are other factors not included in this research which could be investigated in an effort to establish a link which results in a common expenditure pattern. Some of these are: whether the district has a city or town meeting form of government; whether the district works with a municipal budget committee; or is the community served by the school property poor or wealthy. The answer to each of these requires data which was not included in this project.

CHAPTER FIVE

CONCLUSIONS AND IMPLICATIONS

The goal of this research was to determine if there is a relationship between the expenditure patterns and the level of funding available to certain New Hampshire high schools. This was examined in three ways. The first was to determine if less than a moderate relationship existed between the per pupil cost of the high school and the percentage of the budget spent on each of the eight research variables. These eight variables were: regular education - personnel, regular education - supplies, guidance services - personnel, guidance services - supplies, educational media - personnel, educational media - supplies, school administration - personnel, and school administration - supplies. The second was to determine if the expenditure pattern of individual high schools changed over the period from 1985-86 through 1993-94. The third was to determine if the expenditure pattern of the 38 high schools, taken as a group, changed during the same period. The data generated was reviewed in Chapter Four. The following section will discuss some conclusions that can be drawn from that data.

Conclusions

Relationship Between Expenditures and Per Pupil Cost

It is clear, from the data generated in the first section of the research, that schools with lower per pupil costs spend a higher percentage of their budget on regular education programs. While there were only two cases where the negative correlation was moderate, nine of the ten r values for the regular education variables were negative. Recalling that a negative correlation is a relationship where one variable increases while the other decreases, this means that districts with lower per pupil costs spend a higher percentage of their budget on regular education. The fact that these districts expend a higher percentage of their budget on regular education programs does not mean that they have the same level of resources, in total dollars, as schools with a higher overall per pupil cost. For example, a school with a per pupil cost of $5,504 that spends 46% of its budget on regular education programs has $214 less to spend in this area than a school that spends 38% of its $7,224 per pupil cost. It does, however, mean that the district spending 46% of its budget on regular education programs has less to spend on all its other needs.

The data also show that the schools with a higher per pupil expenditure spend a higher percentage on guidance personnel. All five of the r values for this variable were positive. Two of the five years showed a moderate correlation, while the other three showed a low correlation. This indicates that the level of guidance services available to students in schools with higher per

pupil expenditure are greater than those available to students in schools with a lower level. This difference in funds available for guidance services is magnified by the fact that these schools expend a larger percentage of a larger per pupil cost in this area.

The data related to the spending on school administration personnel shows that spending patterns in this area changed over the period from 1985-86 to 1993-94. In 1985-86 and 1987-88 there was a positive correlation between per pupil cost and school administration personnel. This changed to a zero correlation in 1989-90, and to a negative correlation in both 1991-92 and 1993-94. This pattern indicates that schools with lower per pupil costs are spending an increasingly larger percentage of their budgets on administrative personnel. As is the case with regular education, this means that they have a smaller percentage of their budget to spend in other areas.

It seems clear that the three examples cited above lead to the general conclusion that schools with lower per pupil costs spend a larger percentage of their budgets on the basics needed to operate a school -- teachers and administrators. This is certainly not surprising; but, it does point out the problem these schools face. How do they provide the other services students need and deserve without cutting back on regular education programs? It needs to be reiterated that the larger percentage of the budget these schools with low per pupil costs spend does not mean they have more dollars to put into these areas.

Expenditure Patterns by School

The data on how individual schools allocated resources over the period covered by this research leads to the conclusion that once a spending pattern for personnel is established, it does not change significantly. During the period from 1985-86 to 1993-94, the average per pupil cost for the 38 high schools increased from $2,936 to $6,282 -- a 114% increase. During this same period, only 3 of the 38 schools had more than a small change in the percentage spent on regular education personnel, the largest single item in a school's budget. This would lead to the conclusion that most schools used a large portion of new dollars in the same manner that they had used existing resources.

While the expenditure pattern for individual schools remained consistent, there was little consistency among the schools. As discussed in Chapter Four, a number of different factors were examined in an effort to identify a factor that linked the different spending patterns. Factors such as level of expenditure, size, and governance were examined; but, none of these provided the common link.

This can be viewed as a positive result. If the expenditure patterns were a factor of size, level of expenditure, or governance they would be difficult to change because none of these factors are easily altered. However, the question of the common link still remains. A reasonable conclusion is that there may be none. The best answer that could be hoped for is that the expenditure pattern for each of the high schools is a result of the collective wisdom of all of the

stakeholders associated with that high school acting in the best interest of the students.

Given the penchant for local control that exists within New Hampshire communities, it is not surprising that there are many different expenditure patterns. While school boards have the ability to decide how to allocate resources, it is the legislative body that decides the level of those resources. Regardless of recommendations made by superintendents, principals, or school boards, the final decision on how much money schools will receive is the decision of the voters. Given the extremely low level of support communities receive from the State, it is not unexpected that local control is a closely guarded right. While the State has established minimum standards in each of the areas examined in this project, each community decides how it will meet those standards. It is also up to individual communities to determine if they wish to provide services beyond those required.

It is a well accepted maxim that change is a long, slow process. We should not be surprised that changing the way money is allocated in school budgets is a difficult process. The method in which budgets are approved under the Municipal Finance Act does not make the process any easier. It is a process that requires convincing a number of groups that a new allocation pattern would be more effective. In all districts, the budget must first be approved by the school board. Adding a budget committee, city council, or school district meeting to the process makes change even more difficult. In theory, no group,

other than the school board, can mandate how education dollars are spent. Budget committees and voters approve a bottom line but do not have line item veto power. However, a school board that allocates money in a manner strongly opposed by voters, taxpayer groups, or budget committees does so at their own risk.

Expenditure Patterns Across Schools

Research shows that different spending patterns across a state are not indigenous to New Hampshire. Most states exhibit a degree of variation among communities. It is important that individuals using data from this, or other similar research, pay attention to these differences rather than focus on aggregate results. If only the five yearly averages for each of the variables is examined, a pattern of homogeneous spending appears. This is quite different from the patterns one would observe looking at individual schools. The reliance on gross data may be one of the reasons why the production function research, reviewed in Chapter Two, has produced such inconsistent results. If a gross input variable, such as per pupil cost, is not carefully analyzed to determine where the dollars are being spent the results will not be useful. For example, in this study, the percentage of the budget spent on regular education personnel ranged from 33% to 52%. Unless this is factored into an analysis when per pupil expenditure is being related to some output variable, accurate results should not be expected.

The fact that a number of different spending patterns occurred makes the results more interesting because it provides the opportunity to examine a number of different allocation patterns. Unfortunately, there are no current data that can be used to measure the relative success of each of the schools. An examination of such data would help to determine if there are allocation patterns that are conducive to developing successful schools. These data could also help to identify expenditure patterns that appeared to have a negative impact. The data from the New Hampshire Educational Improvement and Assessment Program may assist in this effort. This is a program that began testing third grade students during the 1993-94 school year. Students in grades 6 and 10 will be tested for the first time during the 1995-96 school year. The tests are designed to measure what students know, and can do, at the end of grades three, six and ten. These criterion reference tests are designed to measure how students are doing compared to specific standards and a set curriculum. It will take several years of data from these tests to measure the progress schools are making. The results from these tests, combined with data on how individual schools are allocating resources, hold the promise of providing models for making effective use of resources.

Questions for Future Studies.

There are a number of questions that were not addressed in this study that would increase our understanding of why districts spend their resources in a particular manner. The first of these would be to examine the relationship

between consistency in leadership and the way resources are allocated. This consistent leadership may come from the high school principal, the superintendent, or the school board. In some communities the consistent force may be the budget committee.

A second factor to examine is the relationship between a community's property wealth and spending patterns. As was noted in Chapter One, there is great variation in the property wealth of communities throughout New Hampshire. Since New Hampshire communities rely almost exclusively on local property taxes to fund education, property wealth may be a significant factor in how resources are allocated. For example, in 1993 the total valuation supporting the Farmington School District was $94,023,578. In the same year, the Pelham School District had a total valuation of $273,729,995. Both of these communities support high schools with approximately the same enrollment -- yet one has three times the property wealth. Does this difference affect how each of the communities allocates resources? This is a complex issue to address because of the need to examine the allocation of resources at all levels: elementary, middle, and high school. An analysis of this topic would also need to address the issue of tax effort -- the ratio of the amount of taxes paid and the ability to pay.

A final factor which might provide additional insight into this issue would be to examine the relationship between the allocation of resources and the governance structure of the community or school district. For example, are the

allocation patterns for towns different from cities? It was determined that there does not appear to be any difference between single communities and cooperative and regional districts. However, are there differences between communities which have budget committees versus communities that do not? In the future, it would be important to see if there are differences in expenditure patterns between communities which continue to operate under the open school district meeting versus those that vote by secret ballot.

Final Comments

This project was undertaken in a effort to gain an understanding of how resources are allocated at the school level. It has produced some baseline data concerning how certain high schools allocated their resources. One of the most important results of the project is that the basic hypothesis was incorrect. If the hypothesis had been correct, there would not be the variety of allocation patterns to evaluate. The fact that the variety exists improves the chances of finding an effective pattern. It is important to note that more investigation is necessary. It should not be assumed that because two districts spend the same percentage of their budget in a particular area that they spend the money in the same manner. One district's personnel costs may be driven by high salaries, while another may be driven by a low student/teacher ratio.

Another factor which must be recognized is that the results of this research are only as reliable as the data used. The importance of accurate reporting of this type of data must be emphasized. The increased use of the

computerized form of the MS-25 report helps to ensure accuracy and make the data easier to access.

This project began with a discussion of the impact of the Coleman Report (1966) which said, in part, that the factors which had the greatest influence on a student's success in school where things that were beyond the school's ability to control. Rather than accepting that fact, and going about the business of strengthening the areas schools could influence, researchers and policymakers argued over the question of "does money matter". While this debate was being carried on, the amount of money spent on education increased by billions of dollars (Augenblick, Van de Water, and Fulton, 1993). We currently find ourselves in a period where the rapid increases have slowed, if not stopped altogether (Odden, 1996). We can no longer afford to debate the past, we must shift the focus to a discussion on how to make money matter -- and this discussion begins at the individual school level.

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APPENDIX A

GENERAL FUND: STATEMENT OF EXPENDITURES — *HIGH*
For the Year Ended June 30, 1993

School District _____

Function	Acct. No.	(1) 100 Salaries	(2) 200 Employee Benefits	(3) 300, 400, 500 Purchased Services	(4) 600 Supplies	(5) 700 Property	(6) 800 Other	(7) Total
Instruction	1000							
1. Regular Education Programs	1100							
2. Special Education Programs	1200							
3. Vocational Education Programs	1300							
4. Other Instructional Programs	1400							
Supporting Services	2000							
Pupils	2100							
5. Attendance and Social Work	2110							
6. Guidance	2120							
7. Health	2130							
8. Psychological	2140							
9. Speech Pathology & Audiology	2150							
10. Other Pupils	2190							
Instructional	2200							
11. Improvement of Instruction	2210							
12. Educational Media	2220							
13. Other Instructional Staff	2290							
General Administration	2300							
14. School Board	2310							
15. Office of the Superintendent	2320							
16. Special Area Administration	2330							
17. Other General Administration	2390							
18. School Administration	2400							
Business	2500							
19. Fiscal	2520							
20. Operation & Maint. of Plant	2540							
21. Pupil Transportation	2550							
22. Centralized Internal Servs.	2570							
23. Other Business	2590							
24. Managerial	2600							
25. Other Supporting Services	2900							
26. **Total** (Total of Lines 1 thru 25)								

June 22, 1995

New Hampshire Department of Education
Division of Program Support
Office of Information Services
101 Pleasant Street
Concord, NH 03301-3860

COST PER PUPIL BY DISTRICT, 1993-94

The following costs per pupil are based on current expenditures as reported on each district's Annual Financial Report (MS-25) for 1993-94. Cost per pupil represents current expenditure less tuition and transportation costs. Also, any food service revenue is deducted from current expenditures before dividing by ADM in attendance. Capital and debt service are not current expenditures and are not included.

The cost per pupil for all school districts operating schools and the state average are as follows:

School District	Elementary	Approved Middle/ Junior High	High	Total (K-12)
STATE AVERAGE	4,712.11	4,972.39	6,091.54	5,109.73
ALBANY	NO SCHOOLS			
ALLENSTOWN	4,310.26	.00	0.00	4,310.26
ALTON	4,791.88	.00	7,270.30	5,456.52
AMHERST	5,481.17	6,167.04*	0.00	5,834.14
ANDOVER	4,306.27	.00	0.00	4,306.27
ASHLAND	5,800.76	.00	0.00	5,800.76
AUBURN	4,150.60	.00	0.00	4,150.60
BARNSTEAD	4,468.51	.00	0.00	4,468.51
BARRINGTON	3,923.59	3,898.17*	0.00	3,908.86
BARTLETT	5,944.74	.00	0.00	5,944.74
BATH	5,492.98	.00	0.00	5,492.98
BEDFORD	5,502.95	5,438.87*	0.00	5,472.46
BENTON	NO SCHOOLS			
BERLIN	4,868.22	4,436.22*	5,300.64	4,886.95
BETHLEHEM	4,611.11	.00	0.00	4,611.11
BOW	4,950.27	6,246.03*	6,408.68	5,617.72
BRENTWOOD	4,759.51	.00	0.00	4,759.51
BROOKLINE	3,461.58	.00	0.00	3,461.58
CAMPTON	4,795.36	.00	0.00	4,795.36
CANDIA	5,314.29	.00	0.00	5,314.29
CHATHAM	NO SCHOOLS			
CHESTER	4,905.13	.00	0.00	4,905.13
CHESTERFIELD	4,828.44	.00	0.00	4,828.44
CHICHESTER	3,706.61	.00	0.00	3,706.61
CLAREMONT	4,781.05	5,608.11*	6,493.49	5,419.43
CLARKSVILLE	NO SCHOOLS			
COLEBROOK	3,619.21	.00	5,515.70	4,289.60
COLUMBIA	NO SCHOOLS			
CONCORD	5,592.10	5,796.57	6,308.42	5,836.49
CONTOOCOOK VALLEY	5,130.93	6,041.88*	7,223.74	5,964.31

NEW HAMPSHIRE STATE DEPARTMENT OF EDUCATION
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1993 - 94 AVERAGE DAILY MEMBERSHIP BASED UPON ATTENDANCE AND RESIDENCE

	ADM IN ATTENDANCE							ADM IN RESIDENCE						
1993-94	PRE-SCH	KIND	ELEM	MID/JR	TOTAL ELEM	HIGH**	TOTAL	PRE-SCH	KIND	ELEM	MID/JR	TOTAL ELEM	HIGH**	TOTAL
ALBANY	NO SCHOOLS							0.5	4.3	63.7	8.6	77.1	15.6	92.7
ALLENSTOWN	0.0	35.7	526.6	0.0	562.3	0.0	562.3	5.2	35.7	525.8	0.0	566.7	175.7	742.4
ALTON	0.0	17.9	396.9	0.0	414.8	160.7	575.5	0.0	17.9	398.9	0.0	416.8	156.3	573.1
AMHERST	0.0	0.0	642.1	680.8 *	1,322.9	0.0	1,322.9	2.0	0.0	642.9	618.8	1,263.7	0.0	1,263.7
ANDOVER	0.0	0.0	248.9	0.0	248.9	0.0	248.9	1.3	0.0	251.7	0.0	253.0	87.7	340.7
ASHLAND	0.0	16.3	196.3	0.0	212.6	0.0	212.6	0.7	15.8	197.3	0.0	213.8	0.0	213.8
AUBURN	0.0	0.0	566.0	0.0	566.0	0.0	566.0	0.2	0.0	564.0	0.0	564.2	203.6	767.8
BARNSTEAD	6.0	29.3	420.3	0.0	455.6	0.0	455.6	6.0	29.3	421.8	0.5	457.6	156.2	613.8
BARRINGTON	0.0	0.0	324.9	447.9 *	772.8	0.0	772.8	4.5	0.0	326.9	449.8	781.2	292.2	1,073.4
BARTLETT	0.0	41.9	274.7	0.0	316.6	0.0	316.6	0.4	41.9	260.6	1.0	303.9	76.9	380.8
BATH	0.0	5.0	69.6	0.0	74.6	0.0	74.6	0.8	5.0	68.6	24.7	99.1	46.7	145.8
BEDFORD	7.4	81.9	916.2	912.8 *	1,918.3	0.0	1,918.3	7.4	81.9	916.2	921.7	1,927.2	682.2	2,609.4
BENTON	NO SCHOOLS							0.0	3.0	11.0	13.9	27.9	9.6	37.5
BERLIN	0.0	39.0	455.9	548.3 *	1,043.2	616.9 *	1,660.1	1.0	39.0	455.6	499.5	995.1	517.0	1,512.1
BETHLEHEM	0.0	15.5	216.4	0.0	231.9	0.0	231.9	1.5	15.5	216.4	0.0	233.4	0.0	233.4
BOW	4.0	48.9	408.4	398.9 *	860.2	72.4	932.6	4.0	48.9	408.4	398.9	860.2	279.5	1,139.7
BRENTWOOD	0.0	0.0	192.2	0.0	192.2	0.0	192.2	0.0	0.6	192.2	71.4	264.2	137.3	401.5
BROOKLINE	0.0	0.0	320.3	0.0	320.3	0.0	320.3	1.3	0.0	321.3	0.0	322.6	0.0	322.6
CAMPTON	0.0	16.6	339.5	0.0	356.1	0.0	356.1	1.8	16.6	341.8	0.0	360.2	0.0	360.2
CANDIA	0.0	0.0	453.0	0.0	453.0	0.0	453.0	1.8	0.0	456.0	0.0	457.8	167.4	625.2
CHATHAM	NO SCHOOLS							0.2	1.0	24.5	1.0	26.7	15.0	41.7
CHESTER	0.0	0.0	311.8	0.0	311.8	0.0	311.8	1.0	0.0	314.8	1.0	316.8	155.7	472.5

APPENDIX B

Table B1.
The mean percent expended on each variable

School	rep	res	gsp	gss	emp	ems	sap	sas
1	0.512	0.034	0.039	0.004	0.008	0.002	0.062	0.011
2	0.464	0.031	0.034	0.001	0.014	0.006	0.047	0.011
3	0.425	0.035	0.035	0.002	0.013	0.007	0.050	0.007
4	0.414	0.045	0.022	0.001	0.014	0.006	0.053	0.007
5	0.333	0.021	0.053	0.002	0.021	0.005	0.065	0.008
6	0.349	0.016	0.043	0.003	0.014	0.007	0.058	0.006
7	0.402	0.019	0.037	0.002	0.010	0.003	0.054	0.006
8	0.396	0.022	0.041	0.000	0.021	0.004	0.059	0.012
9	0.425	0.039	0.036	0.001	0.015	0.006	0.051	0.006
10	0.433	0.042	0.032	0.001	0.024	0.008	0.062	0.009
11	0.409	0.034	0.038	0.002	0.018	0.007	0.069	0.009
12	0.497	0.057	0.035	0.000	0.025	0.008	0.049	0.010
13	0.478	0.043	0.051	0.003	0.022	0.010	0.085	0.013
14	0.459	0.040	0.039	0.004	0.017	0.007	0.053	0.007
15	0.433	0.041	0.049	0.003	0.026	0.006	0.054	0.009
16	0.479	0.034	0.032	0.000	0.016	0.008	0.051	0.012
17	0.390	0.025	0.048	0.001	0.018	0.009	0.075	0.008
18	0.428	0.034	0.031	0.003	0.008	0.009	0.070	0.011
19	0.425	0.024	0.041	0.000	0.009	0.003	0.046	0.003
20	0.380	0.033	0.031	0.001	0.018	0.006	0.044	0.008
21	0.449	0.036	0.035	0.001	0.018	0.006	0.051	0.010
22	0.480	0.031	0.039	0.001	0.019	0.005	0.047	0.005
23	0.505	0.032	0.046	0.001	0.011	0.008	0.044	0.006
24	0.497	0.029	0.036	0.000	0.017	0.004	0.060	0.009
25	0.463	0.031	0.039	0.002	0.006	0.006	0.061	0.005
26	0.382	0.027	0.031	0.006	0.015	0.009	0.063	0.011
27	0.347	0.031	0.043	0.001	0.019	0.007	0.053	0.006
28	0.446	0.014	0.044	0.002	0.016	0.003	0.054	0.006
29	0.355	0.041	0.031	0.001	0.018	0.027	0.104	0.011
30	0.429	0.026	0.034	0.001	0.015	0.009	0.040	0.009
31	0.442	0.031	0.042	0.004	0.018	0.004	0.062	0.011
32	0.369	0.015	0.025	0.000	0.014	0.003	0.066	0.007
33	0.342	0.038	0.033	0.001	0.009	0.005	0.068	0.011
34	0.405	0.035	0.031	0.002	0.015	0.009	0.130	0.010
35	0.394	0.035	0.036	0.001	0.017	0.004	0.048	0.006
36	0.460	0.037	0.022	0.000	0.009	0.007	0.078	0.012
37	0.396	0.028	0.034	0.001	0.017	0.009	0.066	0.009
38	0.445	0.044	0.030	0.002	0.025	0.004	0.063	0.013

Table B2
The Coefficient of Variation for each Variable -- by School

School	rep	res	gsp	gss	emp	ems	sap	sas
1	0.058	0.143	0.082	1.500	0.058	0.447	0.060	0.252
2	0.036	0.256	0.145	0.500	0.231	0.229	0.066	0.271
3	0.028	0.266	0.058	0.316	0.000	0.074	0.041	0.108
4	0.032	0.121	0.177	0.000	0.069	0.334	0.092	0.480
5	0.078	0.315	0.165	0.416	0.058	0.224	0.152	0.282
6	0.049	0.258	0.066	0.308	0.101	0.322	0.204	0.258
7	0.038	0.387	0.090	0.222	0.098	0.308	0.038	0.087
8	0.040	0.249	0.179	1.225	0.256	0.603	0.099	0.316
9	0.024	0.200	0.201	0.350	0.105	0.188	0.094	0.277
10	0.046	0.184	0.199	0.935	0.373	0.599	0.080	0.243
11	0.100	0.323	0.121	0.445	0.268	0.216	0.179	0.253
12	0.043	0.272	0.159	1.225	0.040	0.307	0.096	0.329
13	0.027	0.202	0.081	0.143	0.053	0.115	0.067	0.237
14	0.091	0.240	0.117	0.445	0.287	0.327	0.095	0.171
15	0.044	0.271	0.080	1.049	0.029	0.272	0.035	0.253
16	0.042	0.169	0.099	1.225	0.065	0.274	0.080	0.264
17	0.024	0.095	0.088	0.350	0.079	0.222	0.105	0.121
18	0.043	0.190	0.369	1.431	1.231	0.174	0.315	0.091
19	0.016	0.253	0.106	2.000	0.057	0.546	0.055	0.144
20	0.024	0.344	0.181	0.632	0.105	0.279	0.158	0.195
21	0.067	0.205	0.108	0.000	0.074	0.234	0.045	0.569
22	0.039	0.182	0.104	0.935	0.114	0.106	0.053	0.179
23	0.047	0.281	0.102	0.000	0.087	0.150	0.036	0.279
24	0.030	0.241	0.056	0.000	0.098	0.182	0.157	0.313
25	0.022	0.373	0.181	0.416	0.236	0.214	0.064	0.106
26	0.065	0.210	0.172	0.527	0.049	0.157	0.121	0.205
27	0.071	0.178	0.176	0.632	0.280	0.478	0.080	0.267
28	0.076	0.157	0.152	1.287	0.357	0.188	0.216	0.182
29	0.104	0.324	0.226	0.728	0.244	0.929	0.185	0.207
30	0.035	0.204	0.061	0.000	0.060	0.270	0.097	0.242
31	0.038	0.251	0.107	0.436	0.050	0.232	0.043	0.464
32	0.115	0.223	0.504	0.000	0.082	0.500	0.083	0.377
33	0.111	0.243	0.064	0.935	0.108	0.156	0.232	0.377
34	0.024	0.108	0.096	0.222	0.168	0.158	0.112	0.188
35	0.050	0.309	0.131	0.632	0.069	0.222	0.040	0.290
36	0.060	0.201	0.539	2.000	0.571	0.654	0.309	0.178
37	0.026	0.220	0.079	0.350	0.045	0.290	0.058	0.185
38	0.039	0.201	0.097	0.750	0.098	0.652	0.127	0.060