EDUCATION EQUITY AND TAXPAYER EQUITY: A REVIEW OF THE ALASKA PUBLIC SCHOOL FOUNDATION FUNDING PROGRAM

by

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Education Equity and Taxpayer Equity: A Review of the Alaska Public School Foundation Funding Program

> In the next few years, school finance activity in the states is likely to grow as litigation focuses attention both on the inequities across school districts in particular states and the lack of sufficient funds to provide high-quality education services. There has always been a tension between the adequacy and equity issues. This tension will continue in the future and become complicated by questions about the efficiency of the education enterprise and the role of local control in its management. Both because the enterprise is so large and because it continues to be perceived as producing less-than-expected results, politics at the local, state, and federal levels will permeate decisions about education and particularly about the financing of education. Ultimately, the focus of much of this attention will continue to be the mechanisms used by states to distribute funds to school districts.

John Augenblick, Steven D. Gold, and Kent McGuire, *Education Finance in the 1990s*, Education Commission for the States, November 1990, p. 30.

Acknowledgments:

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Table of Contents

List of Tables

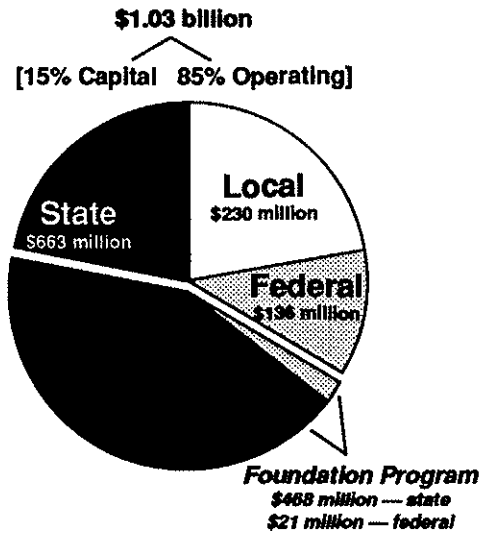
List of Figures

EXECUTIVE SUMMARY

In the 1989-90 school year, the state, federal, and local governments paid Alaska school districts more than $1 billion, or nearly $10,000 per student.

Figure A shows that state money made up about 65 percent of school district revenues in fiscal 1990, with local governments contributing another 22 percent and the federal government 13 percent. The School Foundation Program accounts for the bulk of state revenues, amounting to $468 million in fiscal 1990. It is by far the largest single item in the state budget. (About 5 percent of foundation funding is federal money which the state government passes through to school districts.)

Figure A. Total Revenues to School Districts FY1990

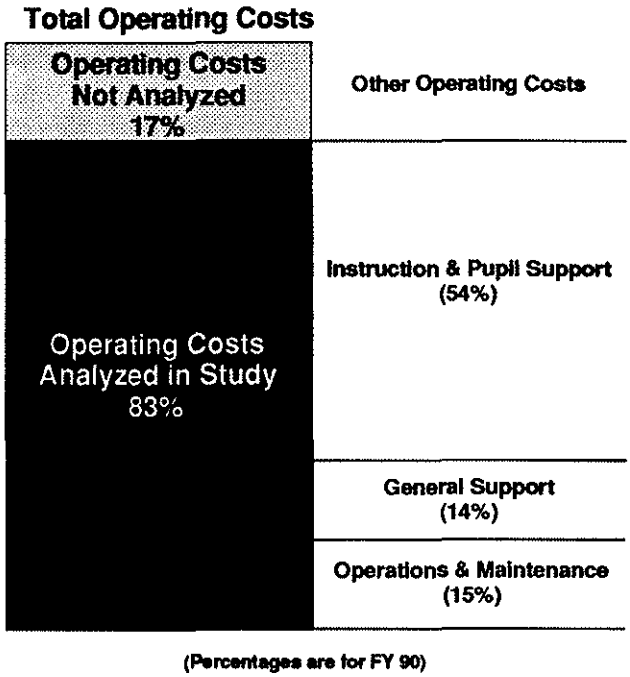


The Alaska Legislature asked ISER to examine what has driven up costs of Alaska's school districts in the past two decades, and to assess how the state's School Foundation Program could better achieve both taxpayer and education equity. This summary describes what we studied, reports how much specific categories of school costs went up and why, and outlines our conclusions and suggestions about taxpayer and education equity and the foundation program.

We examined changes in the major categories of school operating costs over the past two decades. We studied operations spending not only because it makes up most of school district spending, but also because it is recurring, with a similar pattern year after year. Capital projects, by contrast, differ each year, depending on what districts and the legislature decide is most urgent, and on how much money the state has to spend for capital projects.

Figure B shows the operating costs we analyzed. Operating costs made up about 85 percent of total school spending in fiscal 1990 (capital cost amounted to 15 percent). And we were able to analyze 83 percent of operating costs. Specifically, we looked at costs of instruction and pupil support (which includes things like libraries); general support (which includes the principal's office and other administrative functions); and operations and maintenance of school buildings. Inadequate data prevented us from analyzing changes in about 17 percent of operating expenses. Those expenses consist almost entirely of items which are paid with revenues restricted to specific purposes -- pupil transportation and school lunches, for instance.

Figure B. Costs Analyzed in Study



Forces of Change in Alaska's Schools

Since 1970, two major kinds of changes, in addition to inflation and enrollment growth, have made Alaska's public school system a much different and costlier system than it was before. Those changes were in programs offered, and in the structure of the system.

Program Changes: In the 1970s and 1980s, the federal government required states to bring special education programs into the broader public school system and to add bilingual education programs. Such special programs added to school costs because they required special teachers, equipment, and facilities; smaller special classes; and more administrators to set up and oversee them. We found that these required new programs substantially increased school costs not only in Alaska but in all states.

Structural Changes: After 1970, Alaska's growing oil wealth allowed it to make two kinds of structural changes in its public school system. It added a new type of rural school district, and it expanded and improved urban school facilities.

In 1970, school districts existed only in areas with organized local governments. Native children in rural areas without local governments attended local elementary schools operated by the federal Bureau of Indian Affairs. The BIA also operated a handful of regional high schools. After 1970 the state government began taking over BIA schools, first establishing a system of state-operated schools but soon replacing that system with Regional Education Attendance Areas (REAAs). These rural school districts were intended to give local residents more control over their schools. REAAs were to be funded almost entirely with state and federal money.

At roughly the same time, as part of an out-of-court settlement in a major suit brought by rural students, the state agreed to build high schools in virtually all small villages in Alaska. The state constructed hundreds of rural school facilities. At the same time, it added new urban schools and improved the quality of existing schools.

The State of Alaska was able to pay for all or most of these school capital projects with its oil wealth. And it also used petroleum revenues to help increase the foundation program enough to cover the costs of the new programs and pay the growing operations and maintenance costs of more and better school facilities. In fact, the legislature may have increased foundation funding beyond what was necessary because it had the money and no one knew how much more was required to cover the costs of the new programs and the new facilities without harming existing programs.

Growth in Major Operating Costs, 1971-1990

Figure C and Table A show how program and structural changes translated into growth in major types of operating costs. In this figure and table we show real changes in per student costs over the past 20 years. That means we've already adjusted the figures to eliminate the effects of inflation and growing enrollment. So the increases shown are beyond what we could attribute to higher prices and more students. Figure C and Table A show:

Figure C. Real Growth in Major Operating Costs Per Student FY 1971-1990 (In 1990 Dollars)

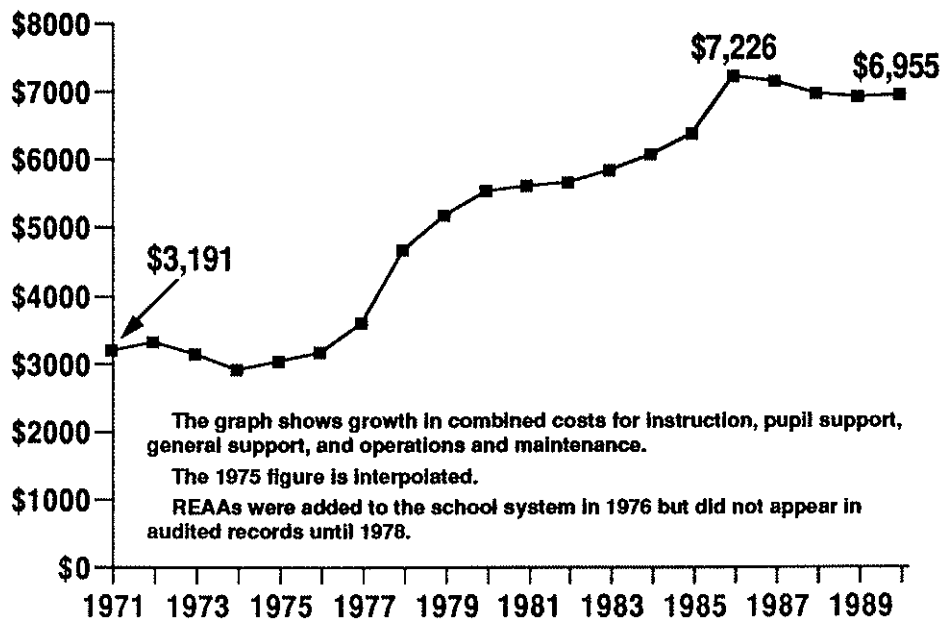


Table A. Per Student Operating Costs, FY 1971 and 1990 (In 1990 Dollars)

	1971	1990	Percent Change
Major Costs by Type			
Instruction & Pupil Support	$2,445	$4,562	+86%
General Support	245	1,127	+360%
Operations & Maintenance	501	1,266	+152%
Total	3,191	6,955	+117%
Major Costs by District			
Boroughs	3,113	6,135	+97%
Cities	4,159	8,229	+98%
REAAs	N/A	12,036	N/A
All Districts	3,191	6,955	+117%

Note: Includes only those operating costs analyzed in study (83% of total operating costs in FY90).

- Real per student costs more than doubled between fiscal 1971 and 1990. That overall increase in part reflects the state's decision to increase education funding to cover the costs of new programs and facilities.

- The fastest growth in per student costs occurred in the late 1970s and early 1980s. During that brief period, state oil wealth grew very rapidly; the REAAs were created; and hundreds of school construction projects took place in both rural and urban areas.

- Growth in per student costs continued at a slower rate up until 1986 when oil prices crashed, and the state's petroleum revenues plummeted. Between fiscal 1986 and 1990, real per student costs actually dropped about 3 percent.

- Costs of general support (administration) grew much faster -- 360 percent per student -- than other operating costs in the past 20 years. We attribute at least part of that fast growth to the increased administrative costs for the required new special programs.

- Costs of operations and maintenance of Alaska's schools increased more than 150 percent per student in the past 20 years. Much of that sharp growth occurred because the school system today includes more small rural schools and more and nicer urban schools than it did 20 years ago. Those small schools and better quality schools cost more to operate and maintain.

- Costs of instruction and pupil support remain the largest operating costs, but those costs increased less than other costs -- 86 percent between 1971 and 1990. Some of that increase in instructional costs is certainly due to the addition of required new programs. And some is due the higher costs of staffing more small schools in rural areas.

- Major operating costs per student vary sharply among the three kinds of districts, with costs in REAAs about twice as high as in boroughs and 50 percent higher than in cities. The costs of both borough and city school districts doubled (98 and 97 percent) over the past two decades. Small schools cost more per student than larger schools and in the late 1970s and early 1980s the state built many small schools. These costs are reflected in higher REAA costs.

Alaska's School System Then and Now

Table B shows us how Alaska's school system today compares with the system 20 years ago, after major program and structural changes.

- Enrollment in Alaska's school districts increased more than 60 percent between fiscal years 1971 and 1990, mainly because the number of students in borough districts grew more than 40 percent, but partly because rural students who had formerly attended BIA schools were shifted to Alaska's public school system.

- The number of Alaska school facilities (which are primarily schools, but which also include administration buildings and other school-related buildings) nearly tripled over the past 20 years. The number of schools grew even faster than school enrollment, so that by 1990 there was an average of 215 students per facility, as compared with 383 in 1971 -- a drop of nearly 50 percent. That drop reflects in large part the state's decision to use part of its oil wealth to build many small schools.

Table B. Alaska's School Districts Then and Now

	1971	1990	Percent Change
Total District Students	**64,265**	**104,035**	**+62%**
Boroughs	59,473	85,922	+44%
Cities	4,792	5,628	+17%
REAAs	N/A	12,485	N/A
Total Facilities	**168**	**483**	**+187%**
Boroughs	136	262	+93%
Cities	32	39	+22%
REAAs	N/A	182	N/A
Students per Facility	**383**	**215**	**-44%**
Boroughs	437	328	-25%
Cities	150	144	-4%
REAAs	N/A	69	N/A
Students per Certified Employee	**18.9**	**13.5**	**-29%**
Boroughs	19.4	14.7	-24%
Cities	13.9	10.7	-23%
REAAs	N/A	9.5	N/A

- In 1990, schools averaged 14 students per certified employee, as compared with 19 in 1971. The evidence available suggests that average classroom size in regular school programs may not have changed much. "Certified employees" include not only teachers but also administrators, counselors, and some others who do not teach. The drop more likely reflects changes associated with the addition of special programs, which involve smaller classes, and more administrators and other certified employees outside the classroom.

Equity of the Foundation Formula

We found that the Alaska School Foundation Program awards state funds to school districts with a reasonable degree of both education and taxpayer equity. Education equity is achieved when every district has the same access to funds for its schools, regardless of the local tax base. Taxpayer equity means that households contribute tax revenue for education based on their ability to pay (rather than according to where they live). Changes which became effective in fiscal 1988 substantially increased both types of equity. Nonetheless, there is room for improvement.

The foundation formula is complex, but broadly speaking money is distributed to each school district based on how many classrooms it needs. The legislature determines how much it will pay to operate a classroom, and then determines the "basic need" of a given district based on how many regular and special classrooms it operates. Districts with costs higher than Anchorage receive more money in proportion to their regional cost-of-living differential. City and borough districts are required to contribute a portion of basic need in property taxes -- currently set at 4 mills on the full value of property, up to 35 percent of basic need. Valdez and the North Slope Borough, because they have such valuable petroleum property, easily reach the 35 percent limit by paying only one or two mills. REAAs have no local governments to collect property taxes, so no local tax contribution is required.

Education Equity: The existing formula provides reasonable education equity in a number of ways:

- The formula awards more money to schools in small communities. This is equitable, because providing education in those small schools is more expensive.

- The formula does not, however, provide extra money to small school districts with only one or two schools. This is also equitable. There is little evidence that providing education in small districts is significantly more expensive than it is in districts with more schools. And if the state in fact paid more to very small districts with high administrative costs, it might encourage formation of less efficient districts.

- The foundation formula area cost differentials implemented in fiscal 1988 more accurately reflect regional variations in the cost of providing education services than previous versions. This change achieved a more equitable distribution of funds among the districts.

Despite those provisions, the formula could be made more equitable for school districts:

- More accurate area cost differentials are available than the ones the formula uses, and could be included in the formula.

- The formula allows districts with property tax bases to raise more funds for their schools by increasing tax contributions above the required amount. Without a provision to equalize contributions beyond basic need, inequities are created because some districts have much larger tax bases than others, and can contribute a lot of extra money with a small additional tax.

- Some districts are entitled to more Federal Impact Aid (PL-81-874) funds than others. Even though the state deducts 90 percent of these funds to finance part of the foundation grants, districts keep the remaining 10 percent. If the state did not allow districts to keep any of their PL 81-874 grants, however, districts might not bother to apply for them, and the state's cost of the foundation program might rise as much as $60 million per year.

- Area cost differentials are calculated for districts, not schools. The current foundation formula does not provide additional funds specifically to remote, inaccessible school sites. Providing additional funds for these more costly remote schools within larger districts might improve education equity.

Taxpayer Equity: The Foundation Program provides reasonable taxpayer equity, because it requires most cities and boroughs to collect the equivalent of a 4-mill property tax. (An individual income tax would achieve even greater equity among taxpayers, but local governments in Alaska can't levy income taxes.) But the program could be made more equitable:

- By capping the required local effort at 35 percent of basic need, the formula creates an inequity, because households in wealthy districts -- specifically the North Slope Borough and Valdez -- pay a much smaller fraction of their income in school taxes than households in other places. Removing this cap would create greater taxpayer equity.

- Residents of REAAs currently pay no property taxes at all. Taxpayer equity would increase if all Alaskans were required to make tax contributions to local school districts.

- Both of these inequities in the program would be eliminated if the Alaska state government levied the 4-mill property tax and paid rebates to boroughs and cities already raising 4 mills for schools.

- Local governments currently have no incentive to cut spending below the generous level the state defines as "basic need," because they would still have to contribute 4 mills in local taxes even if they could provide the same level of services for less money. This disincentive would be removed if the foundation formula were turned into a matching grant program in which the state provided a certain percentage (or multiple) of each dollar spent on education in the district. Districts could then increase or decrease budgets above or below basic need with a proportional accompanying change in the state contribution. The state's share might be close 100 percent for the poor districts, but very small for the richest districts. This type of matching grant formula -- in use in several other states -- would improve both education equity and taxpayer equity.

I. INTRODUCTION

Since the mid 1980s, Alaska legislators, as well as school board members, education administrators, and teachers, have become increasingly concerned about funding the state's 54 school districts. One concern is simply that the overall cost of education seems to have become intractably and bafflingly high. Appropriations to the Public School Foundation Program, the principal mechanism for distributing state education aid, have increased more than eight-fold over the past 20 years. Even when subtracting the effects of general price inflation, the School Foundation distributes more than three times as much money to school districts as it did in 1970, while school enrollments have increased by only 60 percent.

A continuing issue is whether the Public School Foundation Program allocates state funds equitably among school districts. In recent years, the need to control state spending has led legislators to scrutinize the foundation program more carefully; it is the largest single item in the state budget. The legislature made major changes to the Foundation program in 1987, and recent initiatives to freeze or even reduce the amount appropriated to the Foundation have kept the issues of equity in the foreground. Some of the more important perceived inequities in the formula for allocating state funds for education include:

1. The formula does not achieve equity among taxpayers.

2. Small single-site districts do not get sufficient additional funding to compensate them for their higher per-pupil costs.

3. Remote sites in mixed urban-rural districts cost more but do not get special treatment.

4. Federal Impact Aid PL 81-874 grants are not properly accounted in the allocation of state funds.

5. The state distribution is perceived as inadequate to meet "basic need," however that may be defined, in some districts. At the same time, communities which want to tax themselves to support schools at a level above the "basic need" feel they should be able to do so without having their state allocation reduced.

These equity issues may be related to the high cost of education, because one alleged problem is that the way the state distributes funds to school districts offers little incentive for schools to deliver educational services efficiently.

Previous Studies of Alaska Education Finance

Several studies have addressed one or more of the problems of equity in Alaska education finance during the past decade. These previous studies may generally be classified into one or more of the following types: (1) history of education finance in Alaska, (2) comparative statistics of costs and revenues and expenditures, (3) analysis of specific existing or proposed Alaska statutes, and (4) more in-depth studies seeking to explain education costs in Alaska schools.

Alaska school finance history. Cole (no date) details the history of funding for education in Alaska from territorial days up to 1984. His study contains an attempt to account for how much was spent on school capital and operating costs and sources of funds, including the only comprehensive attempt to account for school district construction expenditures. McGuire (1983) also summarizes the history of Alaska state aid to education.

Comparative statistics. Cole (no date) contains some historical comparisons for various school districts in Alaska. An Alaska Office of the Governor (1989) pamphlet compares Alaska to the rest of the U.S. on selected items in attempting to explain the high cost of Alaska education. The U.S. Advisory Commission on Intergovernmental Relations (ACIR 1990) study entitled, *The Structure of State Aid to Elementary and Secondary Education,* however, uses data from the National Center for Employment Statistics (NCES) to make systematic comparisons of education costs for all 50 states. The ACIR study also examines the relative cost of education adjusting for differences among the states in prevailing wage scales, and describes changes over time in the overall cost and sources of funds for each of the states.

Analysis of Alaska statutes. ACIR (1990) analyzes mechanisms for distributing state aid to local school districts in use nationwide in 1989, including a synopsis of recent court cases. More detailed analyses of Alaska statutes include Livey's (1987) analysis of the then-current law, and Thurlow's (1987) analysis of a proposed new law (enacted in 1987 in a slightly modified form). A number of school districts disappointed with the law enacted in 1987 produced the *Small District Funding Study* (Anonymous, 1989), which examines the impact of the new law on the budgets of school districts serving only one or two communities.

Studies of Alaska education costs. McDowell (1988) estimated area cost differentials for each school district based on a revision of their earlier cost-of-living study for state workers (McDowell, 1985). The McDowell area cost differentials for education include a personnel differential -- derived from surveys of the local cost of a hypothetical market basket of consumer goods -- and a non-personnel index -- based on estimates of costs for other purchases made by school districts. Area cost studies such as the McDowell reports address only the prices of education inputs such as teachers, administrators, fuel, and electricity. They cannot address the question of why some districts use a greater quantity of inputs per student -- i.e., have a lower pupil-teacher ratio -- than other districts, or why Alaska schools on the average use more inputs than schools in other states.

Studies building "program cost models" measure the quantity of education inputs such as teachers and other staff, as distinct from cost-of-education indexes such as McDowell (1988) which measure the prices of these inputs. Program cost studies estimate the statewide average amounts of resources put into various types of school programs. One advantage of this approach is that it can uncover the degree to which one school costs more because it offers a more costly program to a larger share of students than another school. McGuire (1983) discusses two problems with the use of program cost models. First, the model does not address variation in inputs for a given program among districts, or among sites within a district. For example, one school may use certificated personnel to do the same thing as another school does using non-certificated personnel. Second, historical data may not represent expected future costs.

The "resource cost model" approach addresses these problems with traditional program cost models. This approach builds a model to explain how resource inputs for each program vary among communities with different characteristics. One can use the model to compare how different districts have provided the same services in the past as a guide to possible alternative configurations of resource inputs for each program. Associates for Education Finance and Planning (1984) constructed a resource cost model for Alaska schools. This study also tried to explain variation in prices of some inputs such as salaries of school employees. For example, their analysis of teachers' salaries suggested that Alaska schoolteachers with a given set of qualifications need to be paid more to accept jobs in smaller communities and in communities with a higher percentage non-white population.

Researchers have completed comprehensive resource cost models and cost-of-education studies in several states in addition to Alaska. To date, however, according to Augenblick (1990), no state has actually implemented a financing system based on the program cost technology. One problem is that the method requires detail on many items, so the model requires lots of data -- for example, personnel inputs and enrollments by program for each school. A bigger problem is that such models are so complex that they serve more to mystify than clarify the cost of education to legislators and education officials who are supposed to use the model to make policy decisions.

Overview of the Study

The focus of our study is on determining what is driving the cost of education and on how to achieve taxpayer and education equity for Alaska public schools. We first address the total and relative contribution to the cost of education of three basic factors. The first factor is the series of program changes over the past two decades which have required schools to contribute more resources per pupil. The second factor is the addition of many small schools, creation of small, rural school districts, local control, and other changes in the structure of education delivery which require more resources per pupil than in the state's relatively urban schools. The third factor is inflation in the cost of teachers and other personnel, electricity and fuel. We analyze data on school districts across the state and over time in order to assess the contribution of each of the three factors to rising costs. As a part of the study of these three basic factors we also address whether the way in which the state funds education contributes to its high cost.

The second objective of the research is to reveal what a foundation funding formula must do in order to achieve both taxpayer equity and education equity. An equitable formula asks district residents to contribute an equitable amount (from the taxpayers' perspective) to education and provides school districts with an equitable amount of revenues to meet education needs. We do not pretend to be experts on how much money is needed for elementary and secondary education. Rather, our focus is on revealing the criteria for equitable *relative* contributions for one school district as compared to another. If local taxpayers want to contribute more than the state-defined basic need, we want them to be able to increase their tax burden beyond the "equitable" level without losing any of their state contribution. Another criterion for education equity relates to the power of districts to raise and spend money above the state-defined basic level.

From time to time it will be useful to pick a concrete example for discussing how the foundation formula works, how it has changed, and how its accounting provisions have shifted expenditures from one program to another. We use the Kenai Peninsula Borough, Matanuska-Susitna Borough (Mat-Su), and Anchorage School Districts as examples. We make no claim that these schools represent the state as a whole. However, these three districts do contain a wide diversity of conditions, including urban sites, towns, small, road-accessible school sites, and truly rural areas.

To provide perspective for this study, we first examine how much Alaska's public schools cost and where the money comes from, making some comparisons to the nation as a whole. In the third chapter we explain how the Foundation formula works in practice to allocate funds to each of Alaska's 54 school districts, and interpret how the formula has evolved over the past 20 years. Then we include three chapters addressing each of the three main potential factors driving the cost of education. Chapter 4 addresses the effect of changes in wages and prices on Alaska education costs. In Chapter 5 we analyze the impact of new federal program requirements, while in Chapter 6 we address the contribution of changes in the structure of education delivery on costs, specifically, the state takeover of BIA schools, the construction of many new high schools (we do not consider the capital costs of new facilities), and

the single-site issue. Following the analysis of education costs, we analyze the issue of taxpayer equity as it applies to local education finance in Chapter 7. Finally, the concluding chapter assesses what remains unexplained and offers suggestions for revising the foundation funding formula to achieve greater taxpayer equity and education equity.

II. ALASKA EDUCATION COSTS IN PERSPECTIVE

In this chapter we examine a number of questions about the cost of education in Alaska. First we discuss how much it costs to run public elementary and secondary schools in Alaska, and where school districts obtain the revenues they use to fund their activities. Then we compare the cost of education and sources of funds for school districts in Alaska to the cost and funding sources of public schools in other states. Finally, we discuss accounting categories of school expenditures according to Alaska state regulations so that we may begin in the next chapter to analyze the factors which have contributed most to the growth of education costs.

How Much Does Education Cost In Alaska?

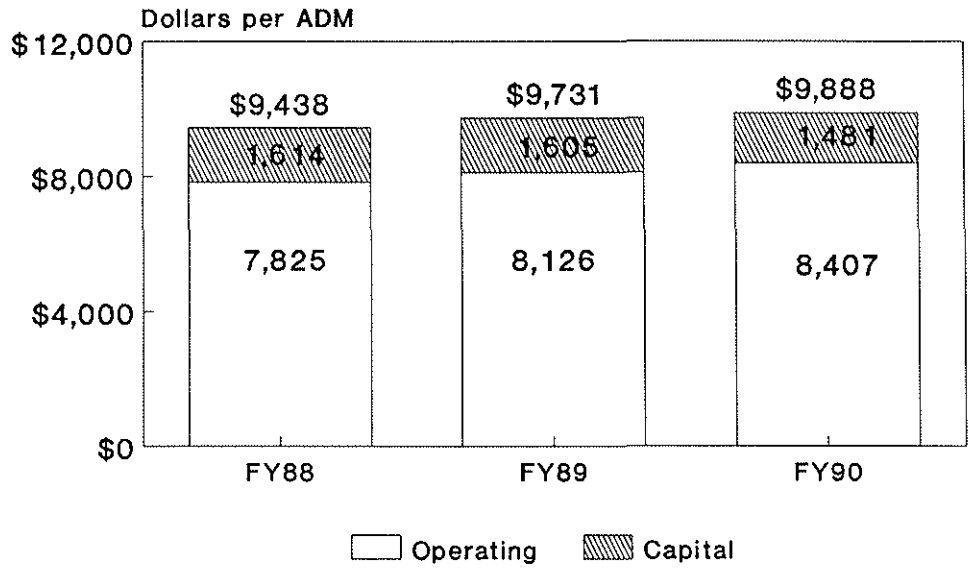
How much does Alaska actually spend on elementary and secondary public education? This is a simple and direct question, but obtaining an answer to it is more difficult than it might seem. It would probably be fair to say that no one actually knows exactly how much is spent in a given year to educate elementary and secondary school students in Alaska. We can provide an approximate answer, but not a complete one. First of all, what revenues and expenditures related to education should we count in the total? Certainly we want to include the costs of classroom instruction, school and district administration, and operating and maintenance costs of school buildings. Capital costs such as direct state appropriations for school construction and repair, and debt service on prior school construction should be considered, too. But what about such items as pupil transportation, school lunches, and school-sponsored extra-curricular activities?

Another problem with measuring the cost of public school education in Alaska is that accounting control over the reporting of expenditures rests with the state's 54 school districts. Although districts follow state regulations in preparing financial reports, and these reports are audited by the Alaska Department of Education, individual districts report the same type of expenditure in different ways. State regulations and local accounting practices have changed over time. Because of the variation in accounting methods, findings from comparative analyses of expenditures across districts and over time should always be viewed with caution. Another consequence is that one may obtain a better estimate of the total cost of running Alaska public schools by tabulating education revenues rather than expenditures.

Our best estimate is that it cost about $1.03 billion to run Alaska public elementary and secondary schools during the 1989-90 school year (FY90). This figure includes all operating expenditures, direct capital appropriations, and debt service. We estimate that operating expenditures totaled $875 million for FY90, or about $8,400 per ADM. In this report we consider only the costs incurred by Alaska's local school districts. We do not consider or analyze the cost of operating the Mount Edgecumbe boarding school, centralized state correspondence study, and other state-sponsored boarding homes and facilities. With an average daily membership (ADM) in all school districts of 104 thousand students, the total cost of $1.03 billion computes to just about $10,000 per student.

During the past three years, Alaska education costs have been rising at an annual rate of three to four percent. The student population has also risen but at a slower rate. Figure 1 shows that the cost per student of Alaska public schools has increased slightly since 1988. The rate of increase shown in Figure 1 has been slower, however, than the rate of general price inflation over this period. Trends in the cost of education and the underlying factors driving those trends are some of the main topics we consider below.

Figure 1. Operating and Capital Revenues per Pupil to Alaska School Districts



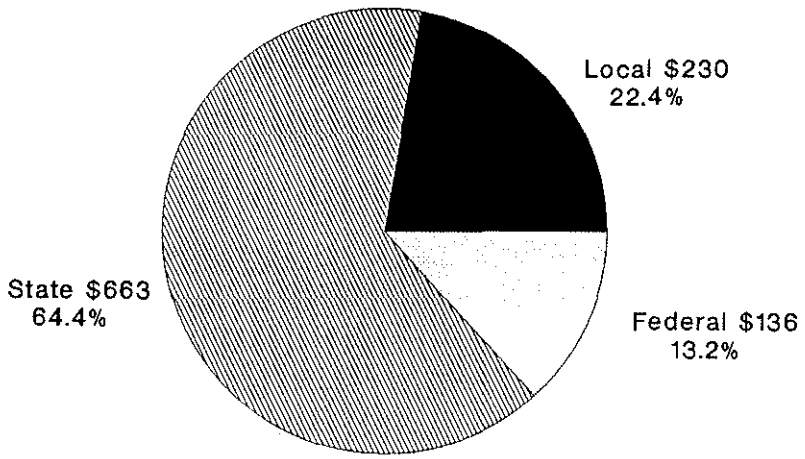
Source: Annual Financial Reports of Alaska School Districts, compiled by Alaska Department of Education.

Figure 2 shows the relative contribution of the federal, state, and local governments to school finance. In FY90, we estimate that the state of Alaska contributed $663 million to school districts for elementary and secondary education. This amounts to 64.4 percent of total education revenues. The federal government contributed $136 million, or 13.2 percent. The remaining 22.4 percent, or $230 million, came from local sources. The share of federal, state, and local revenues has changed relatively little in the past three years.

The largest single source of funds for Alaska school districts is the state Public School Foundation Program. Figure 3 shows that the foundation program distributed $468 million in state funds in FY90, about 70 percent of the total state contribution. The state also reimbursed local governments for about $110 million in debt service payments for school construction bonds. Other major state funding programs include grants for pupil transportation ($25 million) and state tuition for rural students to attend urban schools ($13 million), and capital appropriations for school construction ($34 million). State direct capital spending for schools, including grants to local governments for school construction, has fluctuated considerably over the past twenty years, but has typically been much larger than it was in 1990.

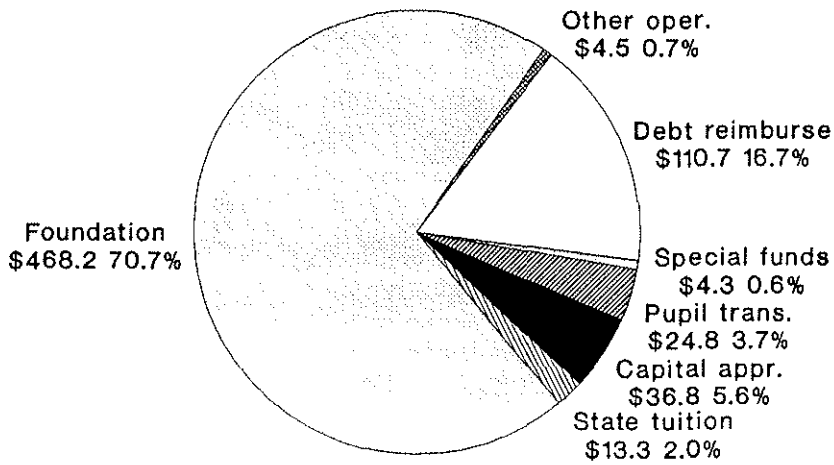
Figure 4 shows the sources of federal funds for Alaska school districts. After the state foundation and debt reimbursement programs, the next largest source of funding assistance for Alaska school districts is the federal law known as PL 81-874. This program makes payments in lieu of taxes for federal lands throughout the nation to state and local governments. Alaska, with its large federal landholdings, obtains a larger PL 81-874 entitlement than any other state. Alaska schools districts received $63 million directly in PL 81-874 funds. In addition, the state received another $20.6 million directly from the federal government for state correspondence, military base schools, and the Mt. Edgecumbe school.

Figure 2. Revenues to Alaska School Districts by Source of Funds, 1989-90 School Year



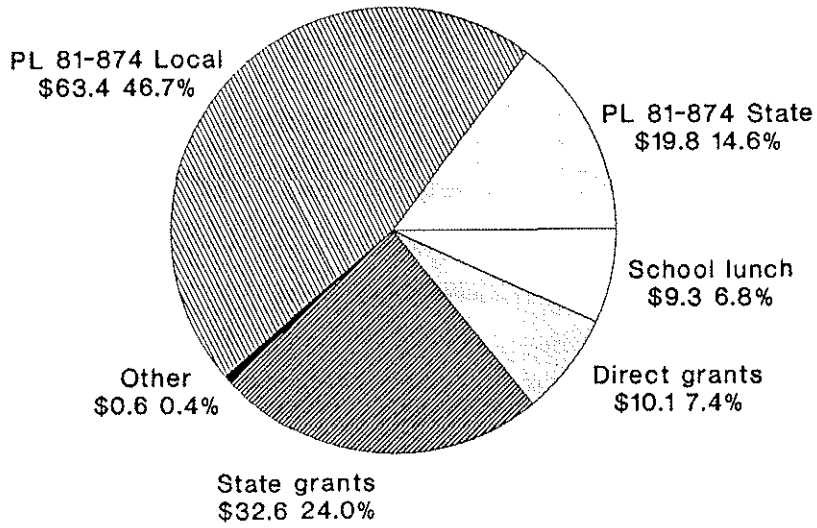
Source: Annual Financial Reports of Alaska School Districts, compiled by Alaska Department of Education

Figure 3. State Revenues to Alaska School Districts by Source of Funds, 1989-90 School Year



Source: Annual Financial Reports of Alaska School Districts, compiled by Alaska Department of Education

Figure 4. Federal Revenues to Alaska School Districts by Source, 1989-90 School Year



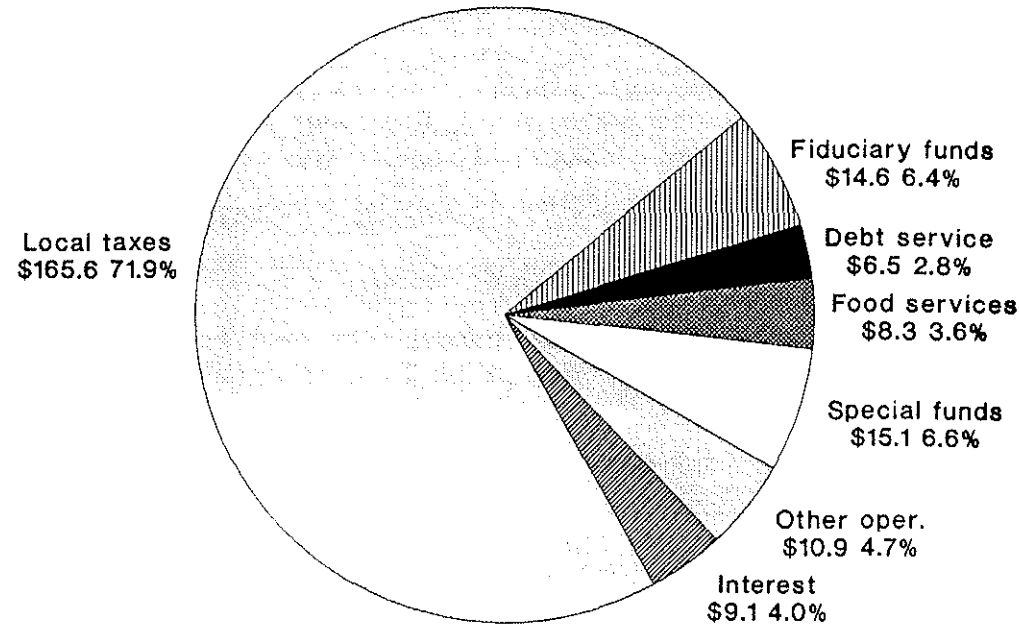
Source: Annual Financial Reports of Alaska School Districts, compiled by Alaska Department of Education

The state adds these federal revenues to the state appropriation for the foundation program fund and distributes them to school districts. We estimate that $20 million of the $488 million total state foundation aid received by school districts in FY90 were federal PL 81-874 funds.[1]

Other major federal funding sources include direct and state pass-through grants, and the school lunch program. State pass-through grants appear in the state operating budget and come mostly from national programs for assisting disadvantaged, handicapped, and gifted students, and for vocational education. These federal grants totaled $33 million in FY90. In addition, districts received $10 million directly from the federal government. Direct federal grants come principally from various Indian education programs, so districts with the most Native students receive the largest share of these funds.

Although the state government provides the majority of funds to nearly all school districts in Alaska, schools in the state's 21 Regional Education Attendance Areas (REAAs) serve 12.5 thousand students where no local governments are organized to collect property taxes. These districts are nearly totally dependent upon state and federal support. Alaska's 33 city and borough school districts, on the other hand, all benefit from local tax appropriations collected by municipal or borough governments. Figure 5 shows that Alaska cities and boroughs raised about three-fourths of the $224 million in local revenues to support education in FY90 from real and personal property taxes. This includes $6.5 million in local debt service payments not reimbursed by the state as well as $166 million in operating revenues. School districts raised the remaining $52 million of local revenues from interest on fund balances ($9 million), other operating revenues such as rental of school facilities ($11 million), school lunch fees ($8 million), and contributions to various special and trust funds for school-sponsored activities ($30 million).

Figure 5. Local Revenues to Alaska School Districts by Source, 1989-90 School Year



Source: Annual Financial Reports of Alaska School Districts, compiled by Alaska Department of Education

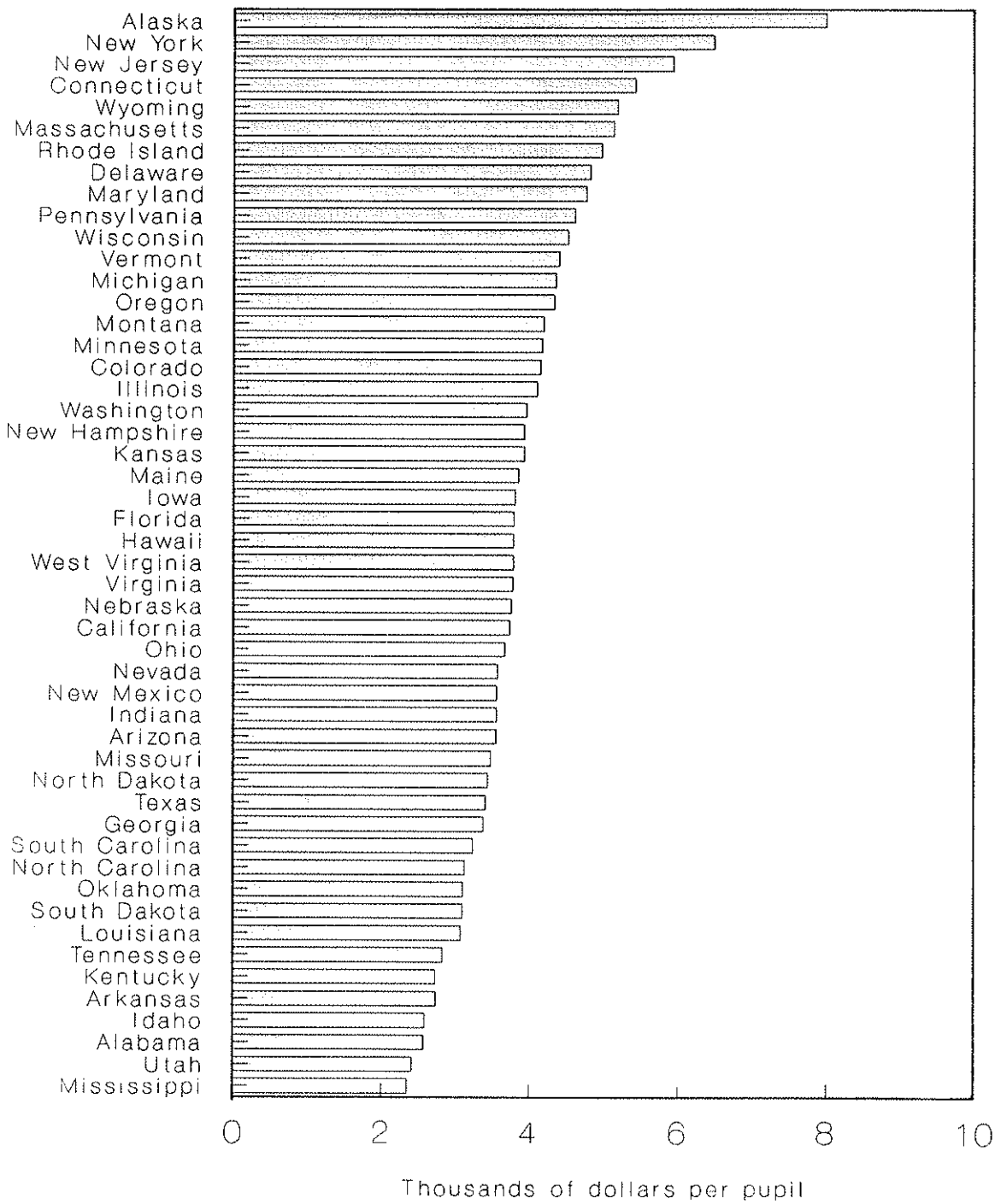
Alaska Costs Relative to the Costs In Other States

How does the cost of educating an Alaska schoolchild compare to the cost in other states? The National Center for Education Statistics (NCES) compiles revenue and expenditure data from each of the states. Figure 6 ranks the 50 states on the dollars spent per pupil for elementary and secondary education during the 1986-87 school year. According to these figures, compiled by the Advisory Commission for Intergovernmental Relations (1990) from NCES data, Alaska spent about $1,500 more per pupil than the next highest spending state, New York. Keeping in mind the problems with inconsistent accounting practices mentioned above, one should use these data with caution. However, Figure 6 shows that public education costs far more in Alaska than it does in any other state.

The NCES accounting shown in Figure 6 differs from our accounting in Figures 1 through 5 in that the agency includes school construction expenditures financed from bond sales but does not count payments to service bonded debt. We counted debt service payments but included only direct state capital appropriations, not proceeds from bond sales, in our revenue figures. Alaska school districts apparently completed relatively little construction in fiscal year 1987, but carried a high debt service load due to massive construction during the population boom of the early 1980s. So the NCES figure for Alaska of $8,010 per pupil is substantially less -- about $1,000 per pupil -- than it would be if debt service payments were included instead of proceeds from bond sales.

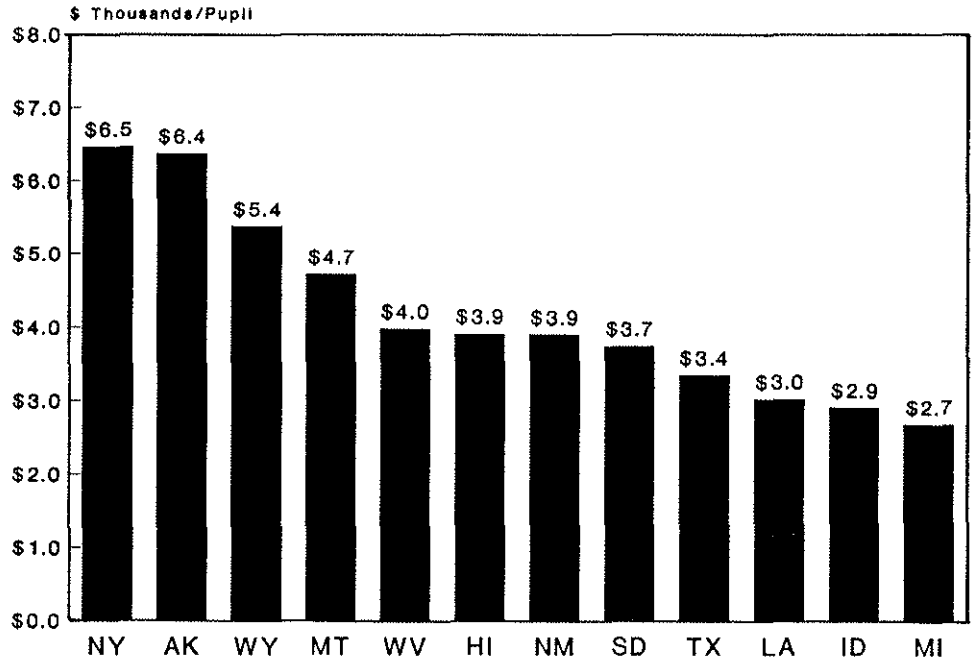
Even so, Figure 6 confirms that Alaska spends far more per pupil on education than any other state. Part of the reason for the elevated level of spending on education in Alaska is that teachers and other school employees generally receive higher pay than their counterparts in the rest of the U.S. Figure 7 shows how current school district expenditures per pupil would rank for selected states if they were adjusted for regional prevailing wage rates. Using the adjusted expenditures, Alaska ranks a close

Figure 6. School District Revenues per Pupil, FY 1986-87



Source: ACIR (1990), p.5

Figure 7. School District Expenditures per Pupil at National Wage Rates for Selected States, 1986-87 School Year



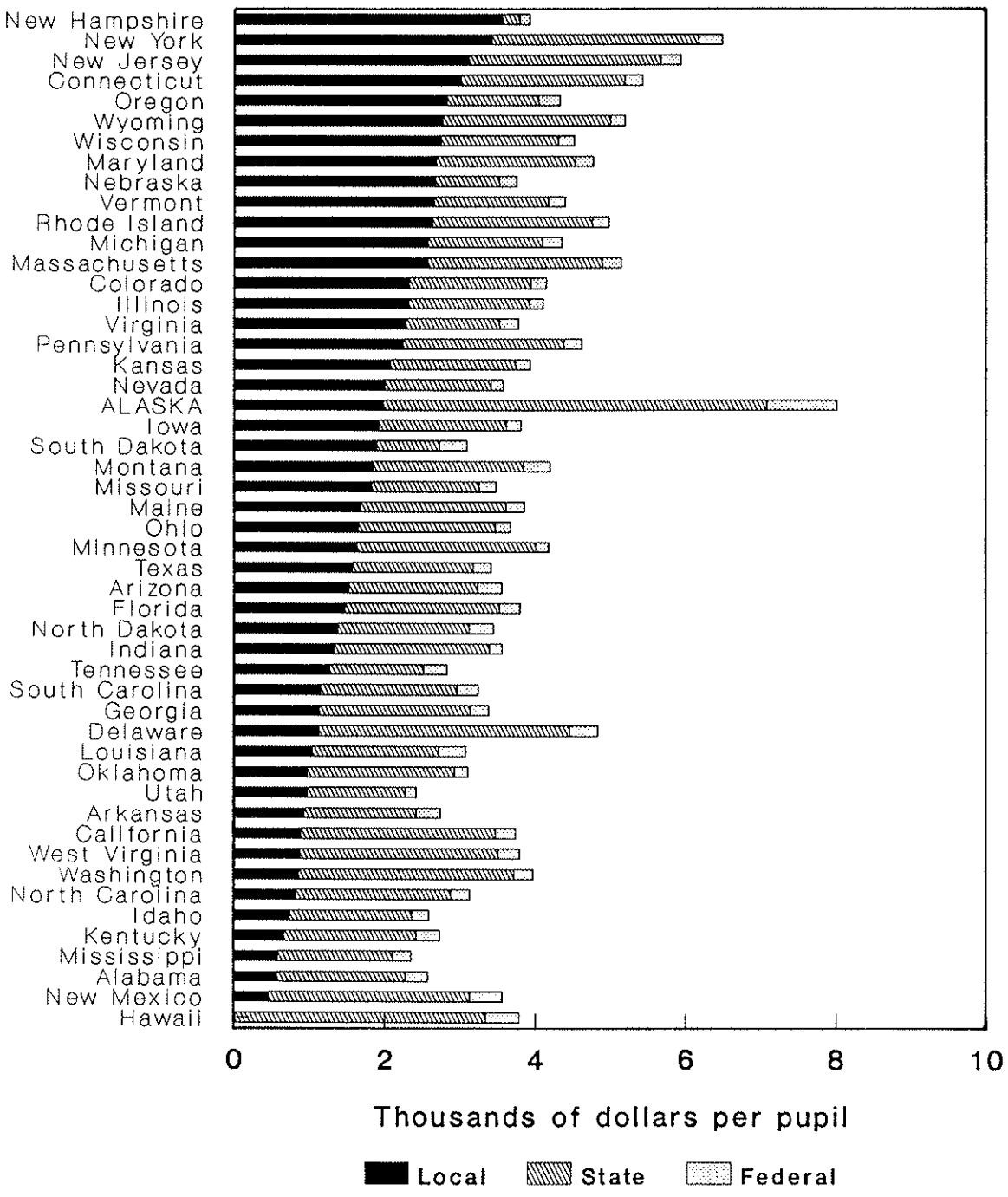
Source: ACIR (1990), p.7

second, after New York state, in the amount spent per pupil. The numbers in Figure 7 adjust for higher wages and salaries but do not take into account any cost disadvantage for operating schools in small rural communities. In addition, if we had the figures for capital expenditures for other states which included debt service payments instead of construction financed by new bond sales, Alaska would show far more expenditures per pupil than New York even after adjusting for higher prevailing wage rates. This is because there was little school construction taking place in Alaska in FY87, but debt service payments were high from the 1981-86 construction boom. Even with the accounting biased as it is, Figure 7 shows that the state spends 18 percent more per student than Wyoming, the third most costly state, and well more than twice as much as states such as Idaho and Mississippi.

Education costs in Alaska have also been rising at a faster rate than in other states. Between 1959 and 1987, Alaska education expenditures per pupil increased at an average annual rate of 5.1 percent faster than inflation. This rate was exceeded only by New Jersey and South Carolina. Nationally, education costs per pupil increased at an average annual rate of 3.9 percent faster than inflation during this period.[2]

Alaska makes by far the largest state contribution per pupil to school district finances, although Hawaii ranks first in the percentage state contribution. Alaska also receives the most federal education dollars per student as well, mainly because of the large amount of PL 81-874 grants mentioned above.[3] Although the state dominates education finance, Alaska local governments actually contribute more dollars to school districts than they do in many other states. Figure 8 shows the same total revenues by state as Figure 6, but now the ranking of the states is by the amount of revenue school districts in each state receive from local sources. Alaska ranks 20th out of the 50 states in the amount local

Figure 8. School District Revenues per Pupil by Source of Funds, 1986-87 School Year

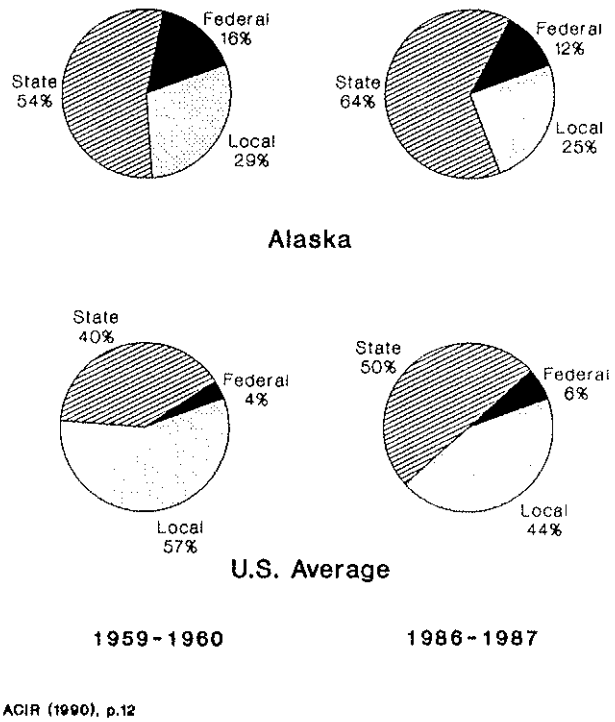


Source: ACIR (1990), pp. 5, 12

governments contribute. This contribution is even higher when one considers that 12 percent of the Alaska students go to schools in districts which receive no local government tax revenues.

Even after correctly accounting for all federal PL 81-874 funds, the state of Alaska still contributes a higher share of education revenues than the average state in the U.S. And the state's share has grown rapidly over the past two decades, while the federal share and the share picked up by local governments have both declined. Figure 9 shows, however, that Alaska's pattern of increasing reliance on state funds and decreasing reliance on local funds is part of a national trend. Between the 1959-60 and the 1987-88 school year, the latest for which national data are available, the share of school district revenues contributed by state governments rose from 39 percent to 50 percent, while the local share dropped from 57 percent to 44 percent.[4] Nationally, federal support for education rose during the 1960s and declined in the 1980s. Because the state took over federal Bureau of Indian Affairs (BIA) schools during the 1970s, the decline in the federal contribution to Alaska education is even greater than that shown in Figure 9 for the state's school districts.

Figure 9. Sources of School District Revenues for Selected Years



Source: ACIR (1990), p.12

Our summary comparison of Alaska to other states raises a number of questions. First, why does Alaska education cost so much? Education costs have clearly jumped nationally, but Alaska costs have increased more rapidly than the national average. What are the main factors that have been driving the cost of education upward? What was the impact of state takeover of rural schools from the U.S. Bureau of Indian Affairs? What was the contribution of program additions such as special and bilingual/bicultural education? How much was due to low teacher-pupil ratios and high operating and maintenance costs of newly constructed small rural high schools? How much of the contribution was due to inflation in salaries, utility rates, and prices of other items purchased by school districts? Do the higher teachers' salaries reflect simply the higher cost of living in Alaska? Did the increased funding for education bring

about any real improvement in the resources available for regular classroom instruction, such as might be visible in teacher-pupil ratios for regular school programs?

A second set of questions revolves around the issue of the local contribution to education finance. Local taxes are still a significant factor supporting education for most students in Alaska. A major role of state funding in Alaska as well as in other states is to help even out the difference in abilities of rich and poor districts to support education. Is Alaska's local tax contribution fair? The state has changed the specific provisions for required local effort several times in the past decade. Have the changes increased or decreased equity for the taxpayers? Addressing this issue requires a discussion of how to define equity for taxpayers.

Finally, since the state is the dominant source of funding for all districts, does the formula allocating funds among districts fairly compensate all districts for the cost of providing educational services? Is the amount of state support enough to meet the basic educational need? Does it provide equal education opportunity to students, regardless of where they live? Do differences in allocations reflect cost differences among communities?

Addressing these detailed questions about the foundation program requires us to spend some effort to understand the complex formula used to allocate funds to districts. What does the formula appear to be trying to do? What changes have been made in the past to adjust for perceived inequities? Has the way school districts account for their expenditures obscured or exaggerated changes in costs? In the next chapter we describe the formula used to distribute state foundation funds. First, however, we need to explain a little about the way school districts account for their expenditures.

Accounting for School Expenditures

According to regulations adopted under AS 14.17 (see Appendix A), Alaska school districts maintain a number of different accounts with separate recording of revenues, expenditures, and transfers of funds from one account to another. By far the largest account is the school district Operating Fund. All state aid distributed through the Public School Foundation Program, state tuition payments, federal PL 81-874 grants, and local appropriations are considered Operating Fund revenues. Records of additional school district operating costs are kept in several Special Funds. Unlike the Operating Fund, Special Funds receive revenues with restricted uses. Currently, Alaska school districts maintain separate accounts for federal grants, pupil transportation, food services, and several other activities. School districts also hold funds raised from parents and the community in fiduciary funds for school activities. Deficits in activities such as pupil transportation and food service are often subsidized with Operating Fund revenues. These subsidies show up in the accounts as transfers from the Operating Fund to the Special Funds. Revenues and expenditures for capital improvements require additional funds to account for state capital appropriations, debt service obligations, and construction funds.

Table 1 shows revenues and expenditures of Alaska school districts in the various accounts for school year 1989-90 (FY90). Operating fund expenditures--$737 million -- constituted 84 percent of total operating expenditures in that year. Figure 10 provides additional detail on the expenditure data shown in Table 1 by illustrating how three main categories of operating expenditures -- instruction and pupil support, general support, and operations and maintenance -- constitute over 98 percent of operating fund expenditures, or about 83 percent of all operating expenditures. Appendix B describes how we defined the three major types of operating expenditures. Expenditures for food services, pupil transportation, fiduciary funds, and other special funds are usually easy to distinguish from general operating fund expenditures such as instruction and administration. However, the $43 million in federal

Table 1. Revenues and Expenditures of Alaska School Districts FY 1990 (Thousands of Dollars)

	Operating Fund[a]	Federal Pass-thru Grants	Direct Federal Grants	Pupil Transportation	Other Special Funds[b]	Food Services	Fiduciary Funds[c]	Total Operating	State Capital Projects	Debt Service[d]	Total
Revenues											
Local	$185,650				$15,136	$8,337	$14,639	$223,762		$6,548	$230,310
State	$486,036			$24,839	$4,254			$515,129	$36,818	$110,675	$662,622
Federal	$83,731	$32,610	$10,136			$9,293		$135,770			$135,770
Total Revenues	$755,417	$32,610	$10,136	$24,839	$19,390	$17,630	$14,639	$874,661	$36,818	$117,223	$1,028,702
Fund Transfers in	$733			$3,750	$8,987	$5,891		$19,361		$3,268	$22,629
Fund Transfers out	$19,361							$19,361	$3,268		$22,629
Expenditures	$736,582	$32,610	$10,136	$28,589	$28,377	$23,838	$14,639	$874,771	NA	$120,491	NA
Change in Fund Balance	$207	$0	$0	$0	$0	($317)	$0	($110)	NA	$0	NA

Source: Alaska Department of Education, Annual Financial Reports from Alaska School District Audits.

[a] $20.624 million of PL 81-874 funds were received directly from the state and added to foundation funds we allocated $19.8 million to districts in proportion to their share of foundation funds, with remainder going to Mt. Edgecumbe and state correspondence study.

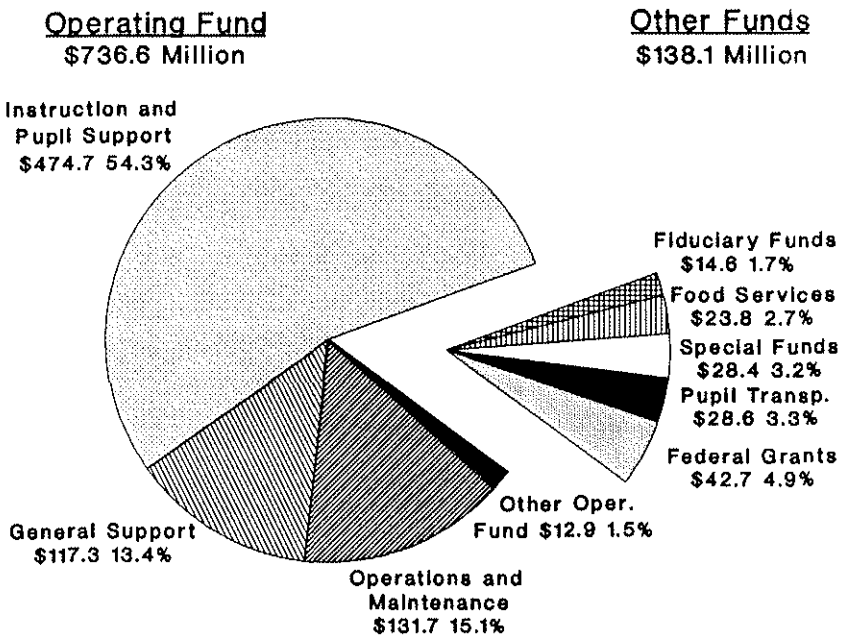
[b] Excludes cigarette tax entitlement. Fund transfers is treated as residual so that total transfers in equal transfers out.

[c] Pupil activities funds, other trust funds, and agency funds.

[d] Cigarette tax entitlement included in capital project revenues. Allocation of these revenues to debt service shown as a transfer.

Figure 10. Operating Expenditures of Alaska School Districts, 1989-90 School Year

(Millions of Dollars)



Source: Annual Financial Reports of Alaska School Districts, compiled by the Alaska Department of Education

grants fund activities such as special education and enhanced instructional programs for Native students. Expenditures such as these are not included in the operating fund but are indistinguishable in practice from operating fund expenditures. In addition, $17 million of the cost of school lunches, pupil transportation, and extracurricular activities was paid with operating fund revenues (shown as a fund transfer out in Table 1). In succeeding chapters, we use the three main categories of operating fund expenditures shown in Figure 10 to measure the cost of running Alaska's schools simply because comparable data are not available for all years for all the funds shown in Table 1. One should be aware that our comparisons are necessarily imprecise as a result.

Table 1 also shows accounts for capital appropriations and debt service. According to Alaska law (AS14.11.100(b)), state cigarette tax proceeds are distributed to school districts, which can use the funds for repairs, renovations, new construction, or debt service. We have included the FY90 cigarette tax entitlement ($2.7 million) in Table 1 as revenues in the state capital Funds column, along with direct state capital appropriations for school facilities. Most cigarette tax money actually went to service debt, so this item ($3.3 million in FY90 from funds received in the FY88 entitlement) appears as a transfer from the capital fund to the debt service account and as an expenditure for debt service. Debt service costs shown in Table 1 exclude the principal and interest on capital projects not included in the state debt reimbursement program, such as facilities for general community, rather than for a principally school-related use.

III. THE ALASKA SCHOOL FOUNDATION FORMULA

The Public School Foundation Program distributes nearly one-half of all funds for public elementary and secondary education in Alaska. Originally enacted in 1970, the legislature has made some revisions to the program nearly every year since. Many of the amendments have had significant effects on the relative amount of funds received by particular districts. In this chapter we first discuss how the formula works today to allocate program funds to school districts. Then we summarize the history of program changes, emphasizing the legislative amendments which have made the greatest adjustments in allocations to districts. Finally, we address the conceptual and practical problems with defining and measuring the cost of education when using a "cost-based" formula such as Alaska's for distributing state aid to schools.

How The Foundation Formula Works (AS 14.17)

As it currently works, the amount of state aid a school district receives depends on four factors. These are:

(1) Base instructional unit value

(2) Number of instructional units

(3) Area cost differential

(4) Equalization

The first factor, the base instructional unit value, is the primary factor which determines the overall level of state aid to education. The remaining three factors each address perceived problems of equity in allocation of funds across districts. Appendix A contains the exact definitions of the four factors and describes in detail how each is computed under Alaska law. Our intent here is to summarize the key elements of the formula and explain how it works in a general way.

The unit allotment, or unit value, is the dollar amount the state determines is sufficient to meet the basic educational need for one instructional unit. An instructional unit is basically a classroom of students; the number of pupils constituting an instructional unit varies according to the educational program and type of school district. The base value for an instructional unit used for Fiscal Years 1988 through 1991 is $60,000. This implies that the state considers the cost of running a regular school classroom to be about $60,000 for a school year, including the teacher's salary and benefits, materials, administration, and building operations and maintenance. Pupil transportation, school lunches, and some student activities costs are not included in basic educational need.

The mechanism which computes the number of educational units based on school enrollments is quite complex. Table 2 outlines the formula used to calculate the number of instructional units -- essentially classrooms which need to be staffed and maintained -- for a school site, given the education program type and the size of the school. Programs include regular elementary and secondary, vocational, special, bilingual, and correspondence education.

Secondary programs generate more units than elementary programs, implying that it costs more per pupil to run a high school class than it does an elementary school class. An enrollment increase of 17 students will add one additional unit for a regular elementary school program, while it takes only 13 more students to add one to the number of regular high school units.

Table 2. Current Instructional Unit Formulas

Enacted in 1987 and Effective in FY 1988 - 1990

Elementary Instructional Units for funding Communities with more than 200 students in grades K-6	**15 + (ADM - 200)/17**		
Secondary Instructional Units for funding Communities with more than 200 students in grades 7-12	**18 + (ADM - 200)/13**		
		Min ADM	Max ADM
Total Instructional Units for funding communities with fewer than 200 students in grades K-6 or fewer than 200 students in grades 7-12	**2**	1	10
	2 + (ADM-10)/5	11	20
	4 + (ADM-20)/8	21	60
	9 + (ADM-60)/12	61	120
	14 + (ADM-120)/15	121	525

Vocational Education

ADM * Weighting Factor * 0.05

Category	Weighting Factor
Category 1	0.2
Category 2	0.4
Category 3	0.6
Category 4	0.8

Special Education

ADM * Weighting Factor

Service	Weighting Factor
gifted and talented	0.025
resources	0.056
self-contained	0.100
intensive/hospital homebound	0.333

Correspondence Instruction

Included in ADM of largest funding community in district

Bilingual/Bicultural

ADM * 0.042 * Language dominance category weight

Category	Weighting Factor
Category A	1
Category B	1
Category C	0.2
Category D	0.2
Category E	0.1

Vocational Education Categories

Category 1: health, consumer, homemaking, horticulture, commercial art, clothing/textiles, general marketing, food production, renewable and natural resources, forestry, agricultural services/supplies, transportation and travel, wildlife management, child care management, and surveying

Category 2: aircraft mechanics, communication technologies, commercial photography, agricultural mechanics, accounting and related, small engine mechanic, and automotive body repair

Category 3: agricultural production, welding, industrial education, woodworking, automobile mechanics, electrical technician, drafting, fisheries and diesel engine repair.

Category 4: graphics, secretarial/word processing, construction trades

Bilingual Education Categories

Category A: students who speak a language other than English exclusively.

Category B: students who speak mostly a language other than English, but also speak some English.

Category C: Students who speak a language other than English and English with equal ease.

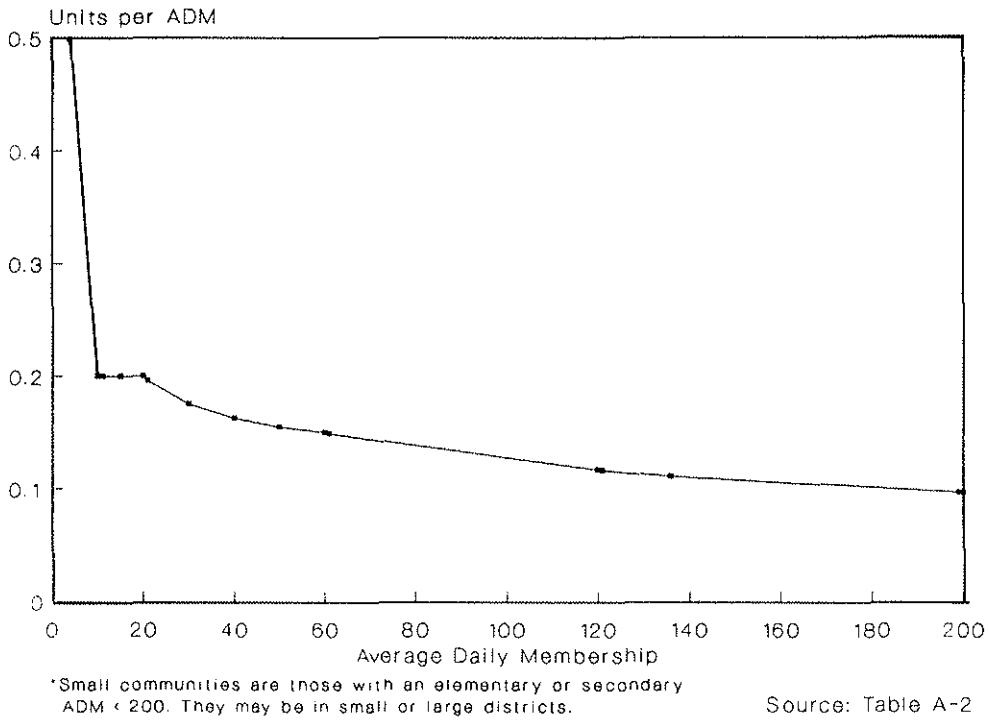
Category D: students who speak mostly English but also speak a language other than English.

Category E: Students who speak English exclusively but whose manner of speaking reflects the grammatical structure of another language.

Source: Table A-2

More importantly, although the number of units also varies with enrollment, the adjustment is not proportional. Communities with smaller enrollments receive more units per average daily membership (ADM) than do larger communities. In addition, communities with less than 200 students in either elementary or secondary schools -- mostly rural remote sites -- have an entirely different formula which gives them many more units than other schools. In calculating the number of units, the foundation program attempts to compensate districts for the higher cost of providing education in smaller communities. Figures 11 and 12 show how the number of units per ADM varies with elementary and secondary enrollments in larger communities and with combined elementary-secondary enrollment in small communities. Vocational, special, bilingual and correspondence programs generate additional percentage increments in the units generated by the regular instructional programs.

Figure 11. Average Instructional Units per ADM in Small* Communities

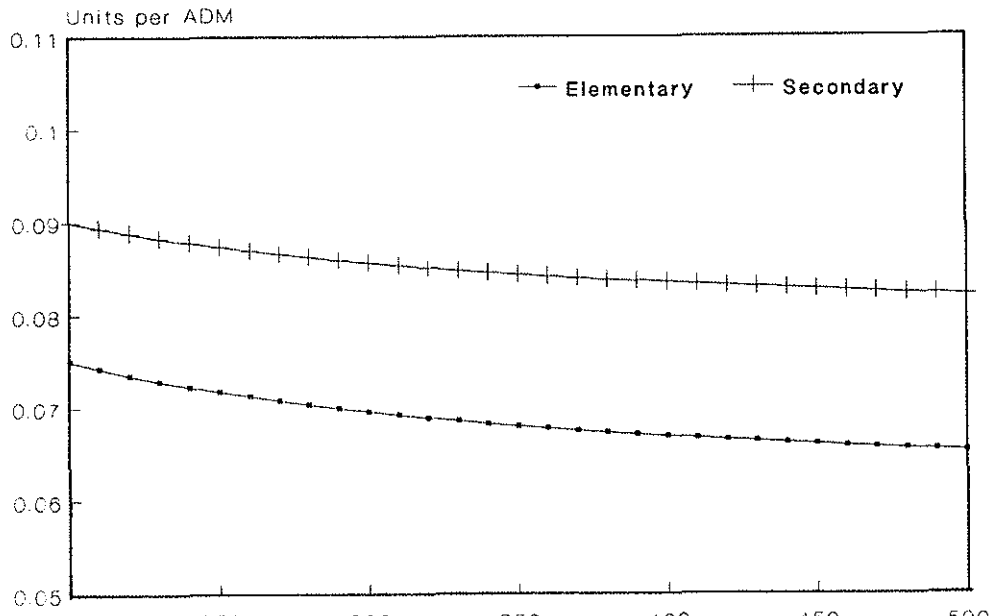


*Small communities are those with an elementary or secondary ADM < 200. They may be in small or large districts.

Source: Table A-2

By using average daily membership (ADM) in the community rather than ADM in the school to compute the number of units, the formula avoids providing an incentive for districts to build costly small schools in larger communities, a potential problem in the past. In past versions of the formula, a school administered by a small district also received more funds per ADM than the same school would have received if it had been part of a *district* with a larger enrollment. Before 1987, districts also received different numbers of units depending upon whether they were located within an organized borough, within a community incorporated as a first-class city under Alaska law, or were an REAA. Whether the formula equitably distributes funds to provide education in smaller *communities* is a technical question. One must also view the question of equity for smaller *districts* as a policy issue, however. Since smaller districts can always combine into larger ones and purportedly save money, one needs to ask how much subsidy the state should provide to small school districts in order to obtain the greater political responsiveness to local education concerns.

Figure 12. Average Instructional Units per ADM in Large** Communities



**Large communities are those with elementary and secondary ADM > 200. They may be in large or small districts.

Source: Table A-2

The third factor, the area cost differential (formerly called the instructional unit allotment multiplier) scales the base instructional unit value by a certain percentage for each region or district. The product of the base instructional unit value and the instructional unit allotment multiplier is called the *instructional unit allotment.* The product of the instructional unit allotment and the number of instructional units is called *basic need.* The area cost differential functions as a regional cost of living index. The state assigns a distinct area cost differential to each school district. The differential is fixed at 1.0 for Anchorage, and rises to over 1.4 for districts in western and northern Alaska. Table 3 displays the area cost differentials currently in use for the state's 54 school districts. Because rural districts also contain most of the small sites, the regional differentials interact with the formula which generates the number of instructional units. The potential confusion created by this overlapping intent is increased by the fact that the area cost differentials currently in use do not generally coincide with estimates of actual cost of education differentials in these communities. Appendix A addresses the relationship between the regional differentials and estimates by McDowell (1988) of true area cost differentials. Thus the multipliers may be seen more accurately as part cost differential and part political engineering.

Alaska law defines "basic educational need" for a given school district as the product of the base instructional unit value, the number of units, and the area cost differential. Basic need is essentially the dollar amount which the state determines is sufficient to provide the Alaska schoolchild with acceptable educational services wherever he or she lives. The idea of need goes far beyond simply a level of state aid appropriated to all districts. Education equity based on need means that each district receives enough units per pupil, given the size of its schools and its program mix, and that its level of funding is adjusted adequately to reflect the cost differential relative to Anchorage for paying salaries and non-personnel costs.

Table 3. Area Cost Differentials

Enacted 1987, Effective FY 1988-90

Adak	1.27	Hydaburg	1.03	Northwest Arctic	1.45
Alaska Gateway	1.19	Iditarod	1.33	Pelican	1.08
Aleutian Region	1.31	Juneau	1.00	Petersburg	1.00
Anchorage	1.00	Kake	1.03	Pribilof	1.30
Annette Island	1.03	Kashanamiut	1.33	Railbelt	1.23
Bering Strait	1.39	Kenai	1.00	Sand Point	1.27
Bristol Bay	1.27	Ketchikan	1.00	Sitka	1.00
Chatham	1.03	King Cove	1.27	Skagway	1.05
Chugach	1.14	Klawock	1.03	Southeast Island	1.04
Copper River	1.14	Kodiak	1.09	Southwest Region	1.31
Cordova	1.11	Kuspuk	1.33	St. Mary's	1.30
Craig	1.03	Lake & Peninsula	1.31	Tanana	1.30
Delta Greely	1.16	Lower Kuskokwim	1.42	Unalaska	1.27
Dillingham	1.27	Lower Yukon	1.35	Valdez	1.11
Fairbanks	1.04	Mat-Su	1.00	Wrangell	1.00
Galena	1.30	Nenana	1.20	Yakutat	1.08
Haines	1.05	Nome	1.34	Yukon Flats	1.46
Hoonah	1.08	North Slope	1.45	Yukon-Koyukuk	1.34
				Yupiit	1.41

Source: Table A-4

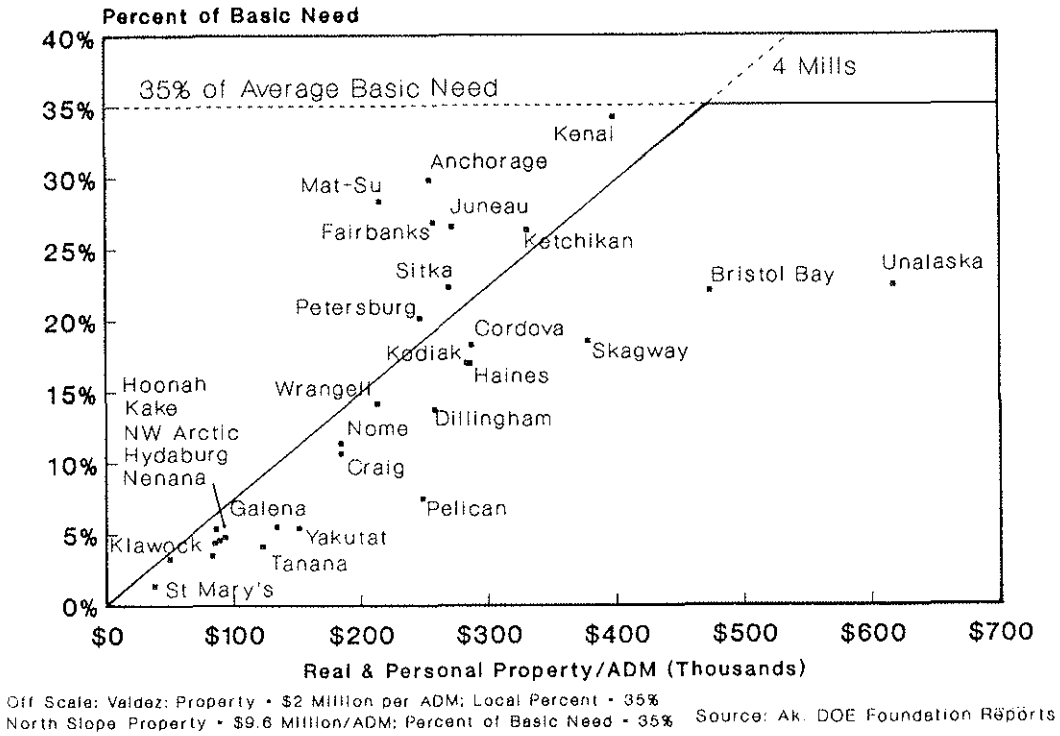
The policy intent of the foundation program is that the state will provide each school district with enough funds to meet basic need, if other sources of funding are not sufficient. In addition to providing at least some assistance to each district, the state is the education financier of last resort. The fourth factor which determines the amount of foundation funds a school district receives adjusts the level of state aid for the district's ability to pay its own way.

Under current Alaska law, the state makes two deductions from calculated basic need in order to "equalize" state support provided to various districts. First, the state deducts 90 percent of the federal grants a district receives under PL 81-874. This means, technically, that if a district receives a large amount of PL 81-874 funds, it can support education at above the state-calculated basic need. Although PL 81-874 grants are entitlements, school districts have to apply for them. It makes sense that districts are able to keep at least a portion of PL 81-974 funds in order to encourage them to apply for these grants.

Second, districts with the ability to levy local taxes (borough and city districts) must contribute a minimum level of local support for education. The state deducts from the amount of basic need the state will fund the amount which would be raised by a four mill (0.4%) tax on the full value of property in the district, or 35 percent of basic need, whichever is smaller. In other words, local governments with large tax bases may not have to contribute as much as 4 mills to education. The 35 percent cap currently affects only two Alaska school districts, the North Slope Borough and Valdez, although the Kenai Peninsula Borough and Anchorage are now or have been near the ceiling.

Figure 13 shows the required local contribution as a percentage of basic need as it depends upon the property tax base per pupil, for all borough and city school districts. There is no required local contribution for REAA districts, of course, since they are not contained in a borough or city with statutory authority to levy property taxes. Figure 13 shows that rural borough and city districts generally fund a smaller share of basic need locally than do urban districts. This results mainly because the foundation funding formula calculates a larger basic need for districts with smaller communities and higher area cost differentials.

Figure 13. Required Local Effort as a Percent of Basic Need City and Borough Districts, FY 1989



Local governments may increase the local contribution beyond the required level. Tax revenues raised by taxes exceeding 4 mills (or exceeding 35 percent of basic need) are not deducted from the amount of state aid to the district. The state, however, limits the tax rate a local government communities may levy to fund the education operating budget at 6 mills or an additional 23 percent of basic need (AS 14.17.025(b)).

History of Formula Changes

During the first few years of statehood, Alaska used a simple funding formula which specified that the state would finance a certain percentage of each school district budget. Starting in FY 1963 and continuing through FY 1970 the state used a more elaborate formula which based state funding primarily on the number of students in the district.

In 1970 the state legislature enacted a funding mechanism which incorporated components of these earlier plans into a formula based on instructional units. The legislature used this instructional unit formula to determine state funding from FY 1971 through FY 1983. The formula was suspended from FY 1984 through FY 1986 while the state investigated alternative funding procedures. The formula was reinstated in FY 1987 and revised in FY 1988.

The current formula resembles the original instructional unit foundation formula, but the formula has undergone substantial changes since it was enacted in 1970. In this section we describe the major changes to the components of the formula from FY 1971 through FY 1990. Appendix A discusses in more detail the technical changes to each component of the formula.

The state foundation funding formula enacted in 1970 consisted of four components: the number of instructional units, the base instructional unit value, the instructional unit allotment multiplier (later renamed the area cost differential), and the equalization percentage. Essentially, the product of these four components determined the level of state aid for most of the years in which it was in effect.

Instructional Units

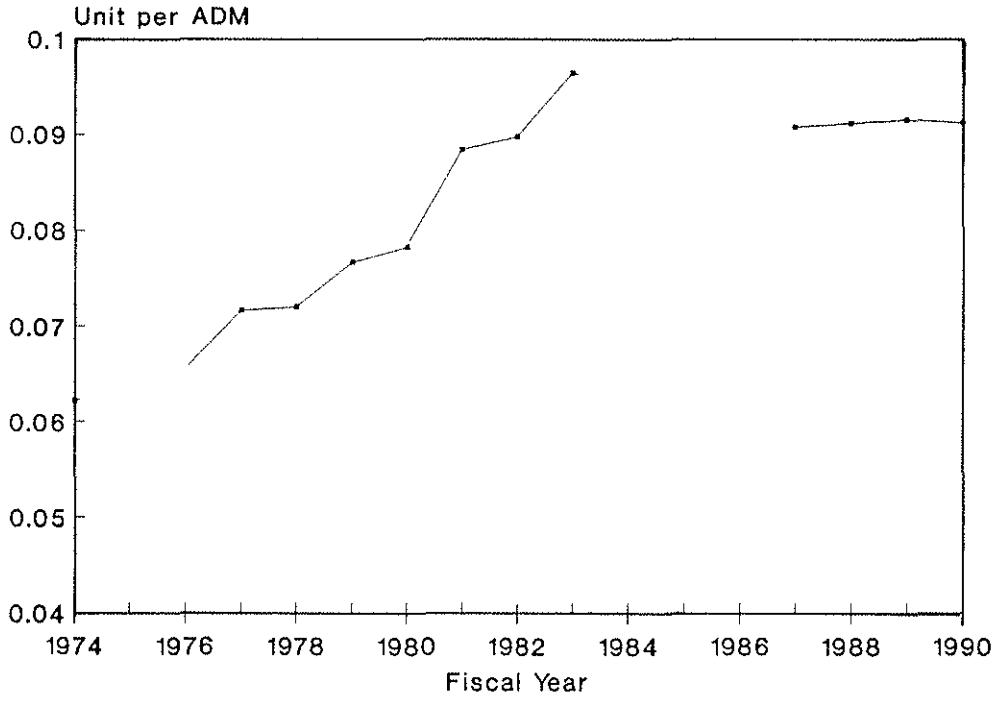
The formulas for calculating the number of instructional units specify how many instructional units are to be allocated to a district for each student in the district. On average the number of instructional units allocated for each student (in average daily membership -- ADM) has ranged from 0.06 units per ADM in FY 1971 to 0.09 units per ADM in FY 1990. This is a fifty percent increase in the average number of instructional units per student from FY 1974 to FY 1990. Figure 14 shows the changes in the average number of instructional units per ADM over time.

This increase in the average number of units per ADM is partially responsible for the increase in the total number of instructional units. In addition to this increase in the average number of units per ADM, the total average daily membership in all school districts has increased almost forty percent over the past twenty years. This increase in total ADM combined with the increase in the average number of units per ADM has led to approximately a one hundred percent increase in the total number of instructional units from 4000 in FY 1974 to 8000 in FY 1990). About half of this increase in instructional units can be attributed to the increase in total ADM and the other half can be attributed to modifications in the formula which increased the average number of units per ADM.

Base Instructional Unit Value

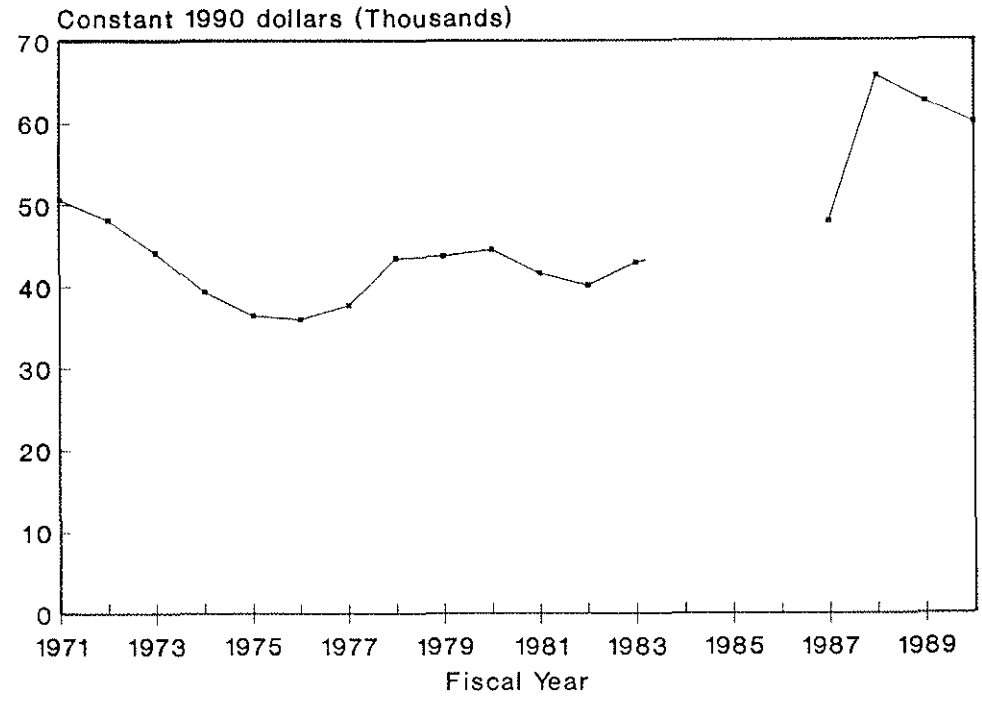
The base instructional unit value is the dollar amount the state says each instructional unit costs in Anchorage prices. The base instructional unit value is currently set at $60,000. In order to compare this amount to previous values, we must deflate the base value to constant dollars to account for the effects of inflation.[5] These changes in the base instructional unit value are shown in Figure 15. When measured in constant dollars, the base instructional unit value increased by eighteen percent from FY 1971 to FY 1990. This net change over twenty years obscures the fact that the base unit instructional value decreased thirty percent in the early 1970s and latter increased by over sixty percent in the late 70s and early 80s. From FY 1988 through FY 1991, the legally specified base unit instructional value has not been changed by the legislature. However, when measured in constant dollars the base unit instructional value has declined by about ten percent over the past three years.

Figure 14. Average Instructional Units per ADM



Source: Table A-2

Figure 15. Base Instructional Unit Value in 1990 Dollars



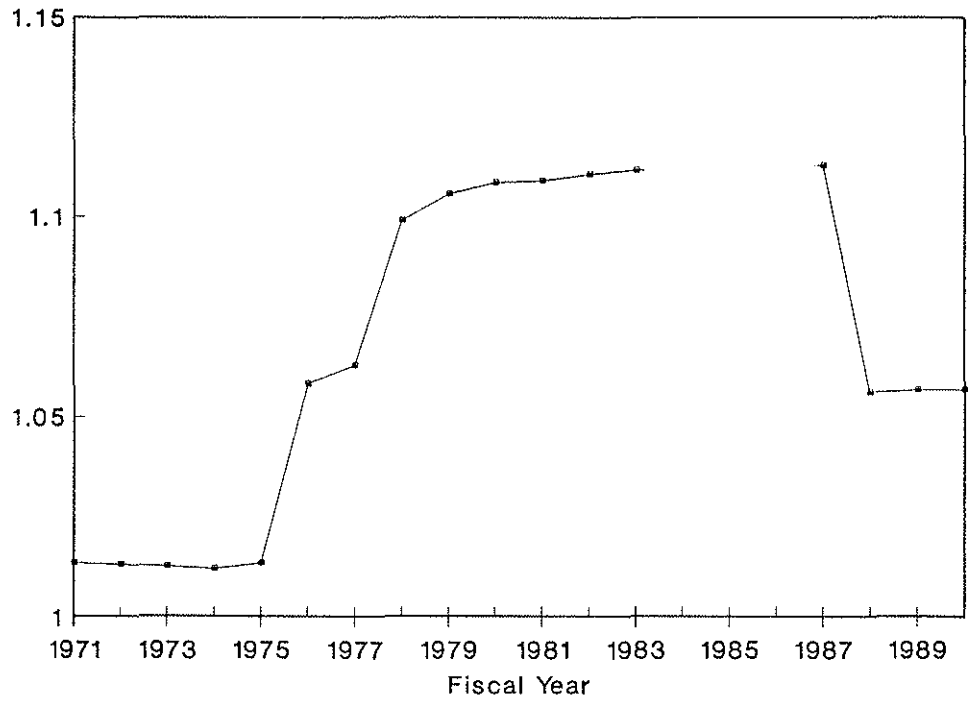
Source: Table A-3

Instructional Unit Allotment Multiplier

The instructional unit allotment multiplier has been set at 100 percent for Anchorage, and the multipliers for all other districts are specified as a percentage relative to Anchorage. Over the past twenty years, these relative percentages for some districts have been as high as 185 percent and as low as 95 percent. The percentages may have initially intended to reflect regional cost differences. However, based on separate estimates of the actual cost of living differences, these percentages have rarely, if ever, accurately reflected regional variations in the cost of buying education services in the districts.[6]

One way to compare instructional unit allotment multipliers over time is to calculate the weighted average multiplier for all districts.[7] As shown in Figure 16, the weighted average instructional unit multiplier has increased by about five percent from FY 1971 to FY 1990. This net change hides the ten percent increase from FY 1975 through FY 1979 and the five percent decrease from FY 1987 to FY 1988.

Figure 16. Weighted Average Instructional Unit Allotment Multiplier



Source: Table A-4

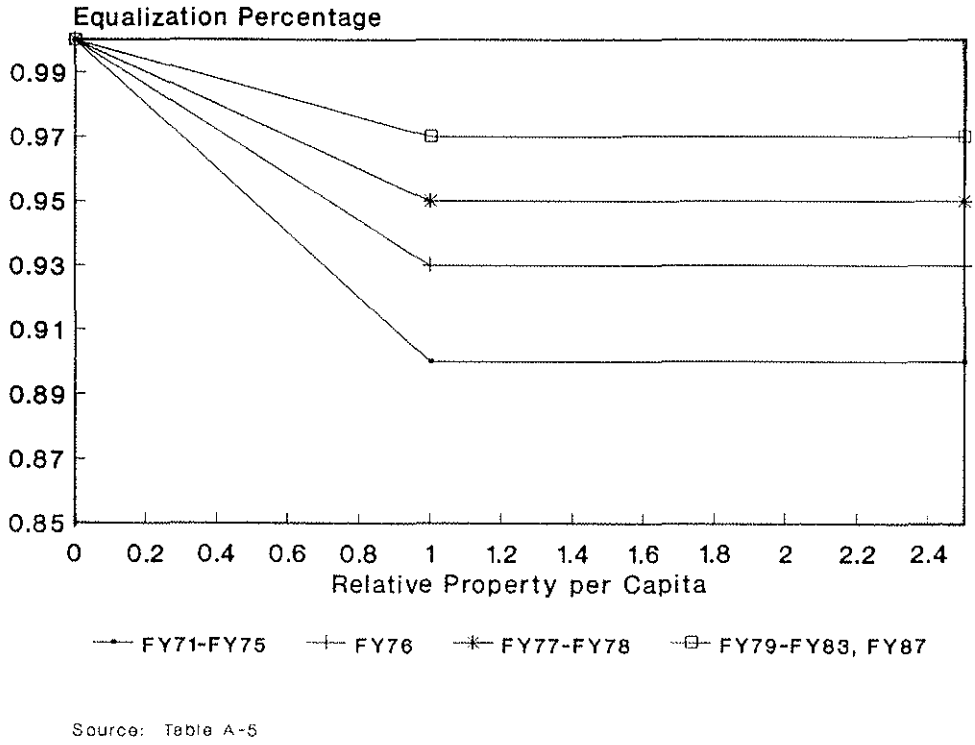
Equalization Percentage

Until recently, the equalization percentage had scaled the amount of state aid to reflect variations in property value across districts. Each district had been assigned a different equalization percentage depending on the full value of real and personal property per student of the district relative to the average property value per student for all districts. Districts with above-average property value per student had

been assigned the same minimum equalization percentage. Districts with below-average property values per student are assigned a higher equalization percentage, which could go up to 100 percent.

The minimum percentage was originally set at 90 percent, but was gradually increased in several steps to 93, then 95, and finally 97 percent. During the 1980s the equalization percentage ranged from 97 percent up to 100 percent across districts. For most districts, the equalization percentage increased by about three percent from FY 1971 through FY 1983. The most marked increases were for districts with property value per ADM above the state average. For these districts, the equalization percentage has increased by about seven percent. The changes in the equalization percentage are shown in Figure 17.

Figure 17. Equalization Percentage



Source: Table A-5

The equalization percentage was suspended in FY 1984 through FY 1986. In FY 1987 when the formula was reinstated, the equalization percentage was set at 97 percent. In FY 1988, the equalization percentage was dropped from the formula and has not been used since.

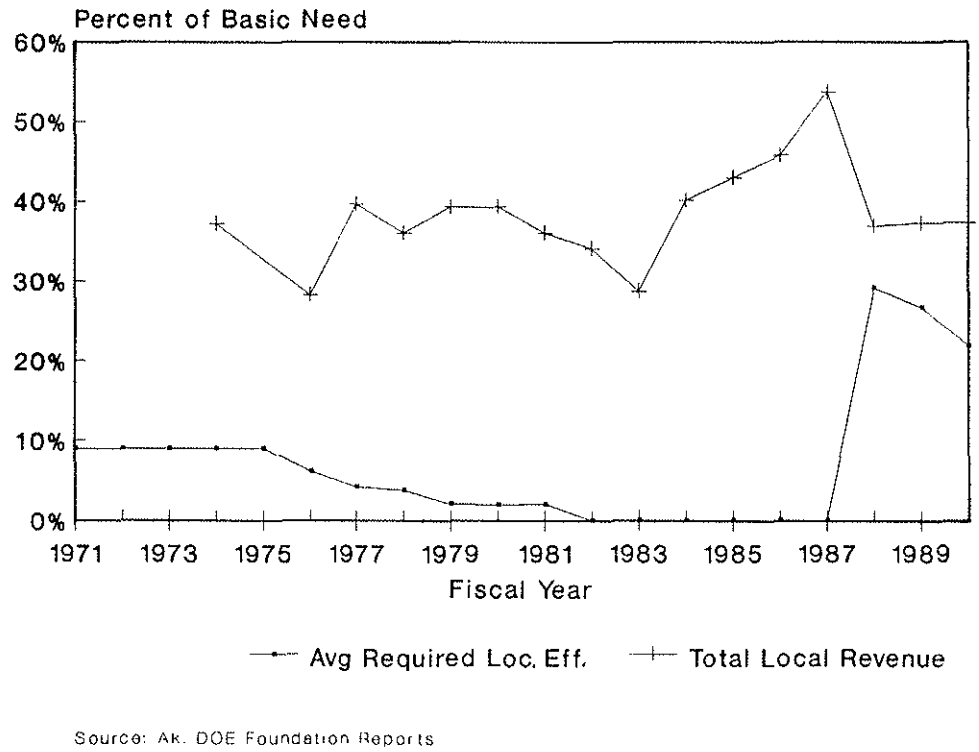
Required Local Effort

From FY 1971 through FY 1981, the required local effort for city and borough districts was set at the difference between the amount that the state would have provided if the equalization percentage were not applied to the foundation grant ("basic need") and the amount of state aid actually provided by the state after the equalization percentage is included in the calculation. These required local effort provisions effectively reduced the total state foundation grant by about three percent each year from FY 1971 through FY 1981.

From FY 1982 through FY 1987 these required local effort provisions were replaced in various years by "supplemental equalization," "80% distribution," and "secondary allocations." The effect was to allocate additional state funds to specific districts according to varying criteria. On average these additional grants added two to four percent to the total state aid to city and borough for most years from FY 1982 through FY 1987.[8]

From FY 1988 to the present, city and borough districts have been required to provide at least 35% of the basic need or the revenues from a four mill property tax on the full value of real and personal property in the district. This has effectively reduced the total state foundation grant by about 31% in FY 1988, about 28% in FY 1989, and about 22% in FY 1990. The changes in the average required local effort over time are displayed in Figure 18.

Figure 18. Average Required Local Effort as a Percentage of Basic Need



Source: Ak. DOE Foundation Reports

When the REAAs were first included within state foundation funding in FY 1976, they were not required to provide any local support. However, they were granted "In-lieu-of-local" support equal to the average local appropriation per student in city and borough districts. This "in-lieu-of-local" support was later replaced by "supplemental equalization" for a few years, but was eventually eliminated from the foundation grant.

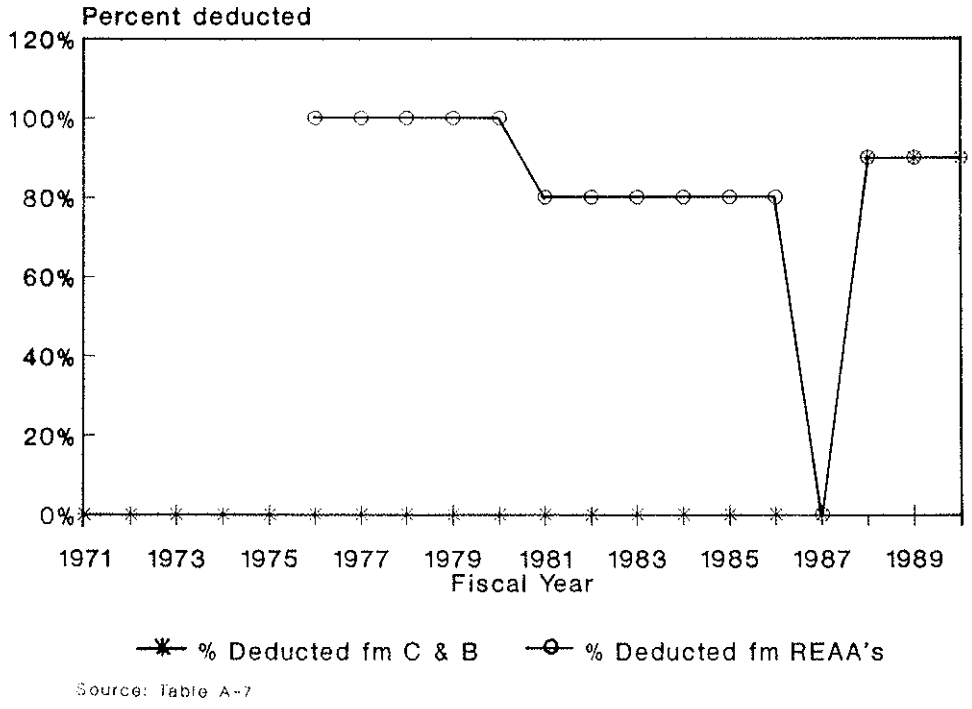
Deduction of Federal PL 81-874 Funds

Deductions of federal PL 81-874 funds have reduced state foundation grants to REAAs. From FY 1976 through FY 1980 100% of the PL 81-874 funds awarded by the federal government to REAA districts were effectively deducted from the state foundation grant. The total of these deductions amounted to three to seven percent of the total state foundation grant between FY 1977 and FY 1980.

Starting in FY 1981, only 80% of the PL 81-874 funds were deducted from the state grant; REAAs were said to be able to "recapture" 20% of the PL 81-874 funds. Even after the formula was suspended in FY 1984, the 80% deduction of PL 81-874 funds continued through FY 1986. On average, these deductions reduced the state foundation grant by three to six percent each year from FY 1981 through FY 1986.

When the formula was reinstated in FY 1987, the deduction of PL 81-874 funds was suspended. Starting in FY 1988, 90 percent of PL 81-874 funds were deducted from the state foundation grant to all districts -- not just REAAs. Between FY 1988 and FY 1990, the deduction of PL 81-874 funds has amounted to about a five to eight percent reduction of the total state foundation grant. These changes in the deductions of PL 81-874 funds are shown in Figure 19.

Figure 19. Percent of PL 81-874 Funds Deducted from State Aid



Source: Table A-7

Hold Harmless Provisions

Hold harmless provisions in the law effectively "slow down" any decreases that may occur in pieces of the formula or in the total foundation grant to the district. The most common hold harmless provisions state that if the number of instructional units calculated for a district decreases relative to the previous year, then the district can use the number of units calculated from the previous year. In some cases the district was allowed to phase in the reduction of units over several years.

By comparing the number of units a district would have received to the number of units actually used in calculating the foundation grant, we estimated the impact of these hold harmless provisions. From FY 1976 through FY 1983, the units used in calculating the foundation grant are higher than the

units that would have been generated without the hold harmless provision for roughly a quarter of all districts. In each of these years, the number of total instructional units that would have applied without the hold harmless provision was about one percent smaller than the total number of units actually used in the foundation grant calculations. These comparisons suggest that the hold harmless provisions increased the number of instructional units by about one percent from what they otherwise would be.

The Funding Formula and the Cost of Education

The relationship between school enrollment and the number of units per student shown in Figures 11 and 12 purports to represent the manner in which the cost per student of running a school varies with the size of the school. No generally accepted model of the cost of education services delivery was used as the basis for the formulas generating the number of units, however. This provision of the School Foundation statutes, as it has been amended over the years, is essentially a series of political compromises between rural and urban school districts over the division of state aid. The regional multipliers are likewise somewhat arbitrary. The McDowell (1988) cost of education data were considered when the legislature revised the area cost differentials in 1987, and the numbers adopted (shown in Table 3) are much closer to actual cost differentials than the numbers they replaced (see Appendix A). But the area cost differentials in Table 3 still depart significantly from the McDowell's estimated cost differentials. The "basic need" -- the number of units times the official "differentials" times the unit value -- cannot therefore be seen as a reliable indicator of costs.

Because the state puts itself in the position of financier of last resort, the definition of "need" based upon an assumed model of costs becomes the standard for deciding how much operating revenues each school district in Alaska will receive. The way in which the state pays for education consequently creates serious problems for trying to measure education costs. No one in a decision-making role in the state can compare the payoff of an extra dollar spent on providing educational services to the value of services if that dollar were spent on something else. When school districts rely upon the state for the bulk of the support for local education, the connection between the taxpayer and the services provided by any particular school district is very indirect. An increase in a school's budget might come in part from reallocation of existing funds among the school districts as well as from more money spent upon education overall. The connection between cost and spending is made even more tenuous in Alaska because households pay almost no state taxes.

The use of a "cost-based" formula for determining the amount of funds spent for education leads to three problems with measuring education's true cost. First, the trade-off between an extra dollar spent on education and the same dollar spent on other public services is obscured. Second, there is no direct way to measure and evaluate the best overall mix of public versus private spending. Finally, efficiency in the provision of services is not a high priority for school districts. The best strategy for school districts is often to try to *maximize* their costs. The end result is that perceived educational "need" for all practical purposes becomes unlimited. There will always be a need for more funds. Administrators can always find a worthy place to put additional money -- reduce class sizes, offer more school programs, hire better qualified personnel, etc. All of these uses of additional education funds are valid and have some benefits for school children. If funds are available to the district, they will be spent. Cost and expenditures are separate in theory but indistinguishable in practice.

Although proponents of the Resources Cost Model RCM approach (Associates for Education Finance and Planning 1984) might argue otherwise, even this complex method produces unreliable results in a situation like Alaska's. The relationships shown in Figures 11 and 12 -- derived from the formula which computes the number of units -- will actually determine how the cost of regular instruction

varies with enrollment. As we shall see in Chapter 6 for the Kenai Peninsula borough, it is difficult to distinguish empirically policy decisions to put more resources into a particular program instead of another from technical cost differences of running the programs. The RCM approach breaks down into an elaborate model to verify the status quo.

Even the most complex models may not allow us to say too much about the cost of education. Costs equal revenues, and the foundation formula largely determines revenues. It is really somewhat deceptive to say that one can definitively disentangle cost from the policy to fund. It is with these strong caveats that we turn now to examine issues of education equity and taxpayer equity.

IV. EFFECT OF RISING WAGES AND PRICES ON ALASKA EDUCATION COSTS

Over the past two decades, the average cost of providing public elementary and secondary education in Alaska has increased at an annual rate of 13 percent per year, from less than $100 million per year in FY70 to over a billion dollars in FY90. In this and the subsequent two chapters we address the major factors which have been driving the cost of education in Alaska. Our basic approach is to try to separate changes in costs into two components: changes in the quantity of education inputs and changes in the price of those inputs. These two components have very different implications for policy to contain education costs without reducing the quality of services delivered.

Price changes relevant to school costs might include wage and benefit rates per employee, fuel and electric rates, and construction wage rates. Relevant changes in quantities include the change in the number of pupils, change in the number of personnel or personnel per student, and the change in the number of education facilities and their physical characteristics. One can also examine changes over time in real expenditures -- expenditures subtracting the effects of inflation. Changes in real education costs control for the effects of general price inflation but do not adjust for changes in *relative* prices -- for example, changes in the prices of education inputs such as teachers' salaries relative to consumer prices.

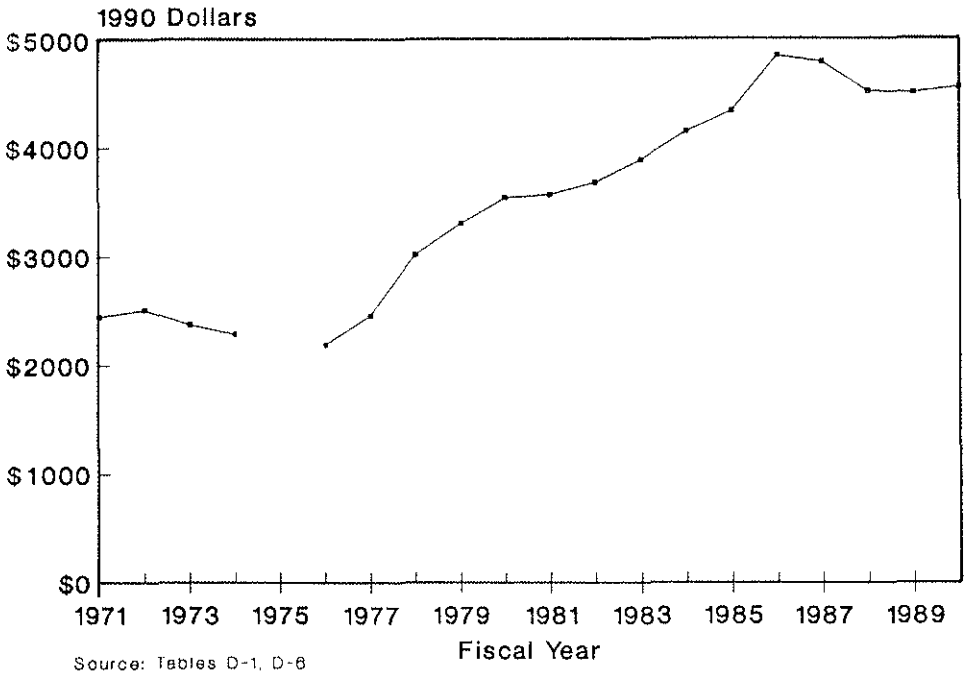
In this chapter, we first discuss changes in the quantity of education inputs over time and changes in real education expenditures. Then we examine changes in the prices of some of the main education inputs. We pay special attention to the salaries of certified teachers -- the single largest education input -- analyzing increases over time and trying to explain why salaries vary around the state as they do. In the subsequent two chapters we analyze the effects of two major education policy changes on the quantity of education inputs. Chapter 5 addresses the impact of changes in education programs, while Chapter 6 examines the effects of changes in the structure of education delivery.

Changes in Real Expenditures and the Quantity of Education Inputs

The first step in analyzing how Alaska education costs have changed over time is to examine the pattern of change in the various major components of education costs after removing the effects of inflation and growth in the number of students. In other words, we want to address the pattern of change over the past several decades in *real expenditures per pupil* for various types of education costs. We discuss only broad categories of expenditures in this section, saving detailed analyses for the next two chapters.

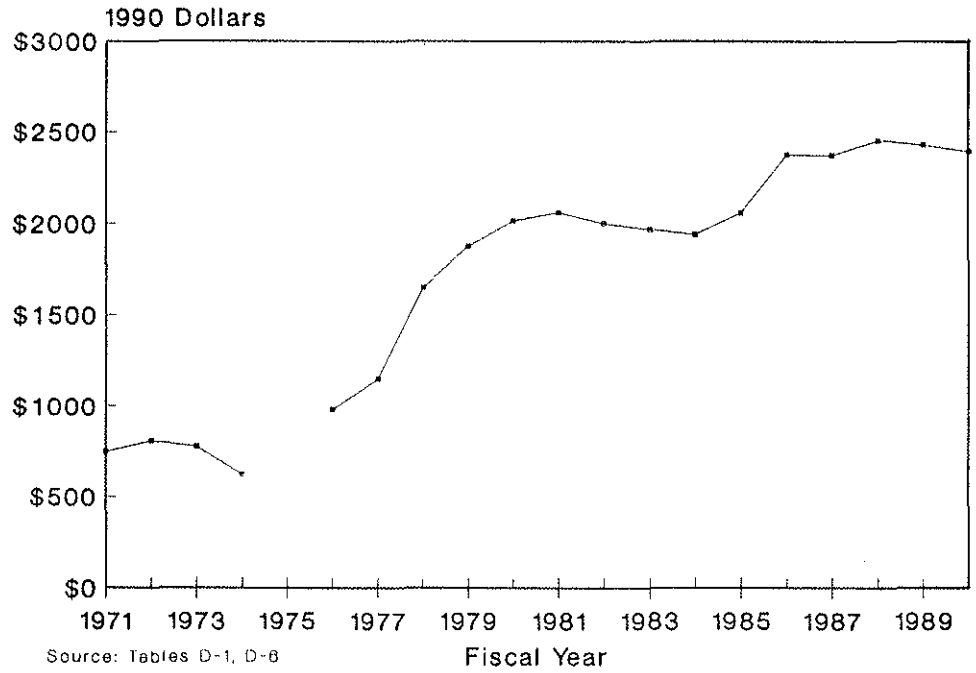
Figure 20 shows how the combined total of real instruction and pupil support expenditures per pupil has changed for Alaska school districts since the 1970-71 school year. We define pupil support to include all forms of pupil and instructional support (see Appendix B). Average real instruction and pupil support costs remained at around $2,500 per ADM (in 1990 dollars) until the late 1970s, then nearly doubled over the next decade, reaching a peak of $4,850 for the 1985-86 school year. Per pupil instruction and pupil support expenditures have not quite kept up with inflation since 1986. Average per pupil costs for noninstructional functions have increased even faster after adjusting for inflation. Figure 21 shows that real general support and operations and maintenance expenditures per ADM increased from around $750 per ADM (in 1990 dollars) in the early 1970s to $2,000 in the early 1980s, then jumping to $2,400 and remaining at that level since Fiscal Year 1986.

Figure 20. Total Instruction and Pupil Support Expenditure per ADM in all Districts in 1990 Dollars



Source: Tables D-1, D-6

Figure 21. Total General Support and Operations and Maintenance Expenditures per ADM in all Districts in 1990 Dollars

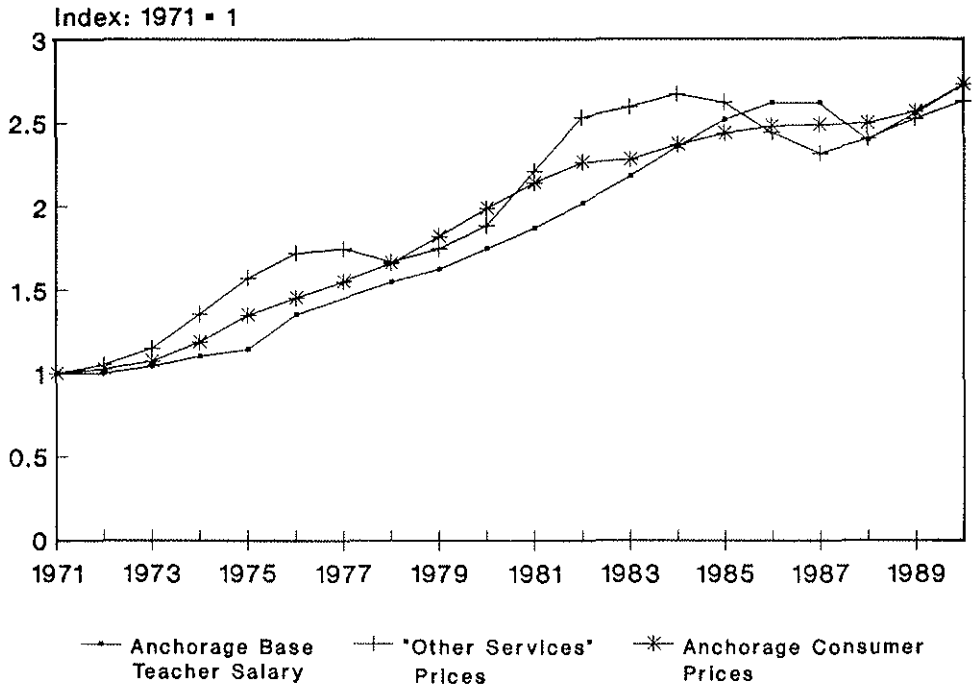


Source: Tables D-1, D-6

The numbers for Figures 20 and 21 are derived from summing the total expenditures for all school districts in Alaska and dividing by the total average daily membership. The resulting per pupil expenditures have been adjusted to remove the effects of inflation using the price index for Other Services from the Alaska Gross State Product estimates (Larson 1991). Education is a major component of the Other Services industry.

We could use other indicators of the price of education inputs in order to put school expenditures in various years into 1990 education dollars. Figure 22 shows the price deflator for Other Services along with two alternative price indexes: the Anchorage base teacher's salary and the Anchorage Consumer Price Index (CPI). The price deflator for Other Services grew more rapidly than the Anchorage CPI during the early and mid 1970s and in the early 1980s, and more slowly in the late 1970s and mid 1980s. The Anchorage base teacher's salary rose more slowly than the CPI in the early 1970s and more rapidly in the early 1980s. Overall, however, Figure 22 shows that the three indexes rose at the same rate on the average over the past 20 years, so using another price deflator would have little effect on the results. This should not be surprising since the price deflator for Other Services is largely the cost of labor, and the cost of labor is driven over the long run by the cost of living.

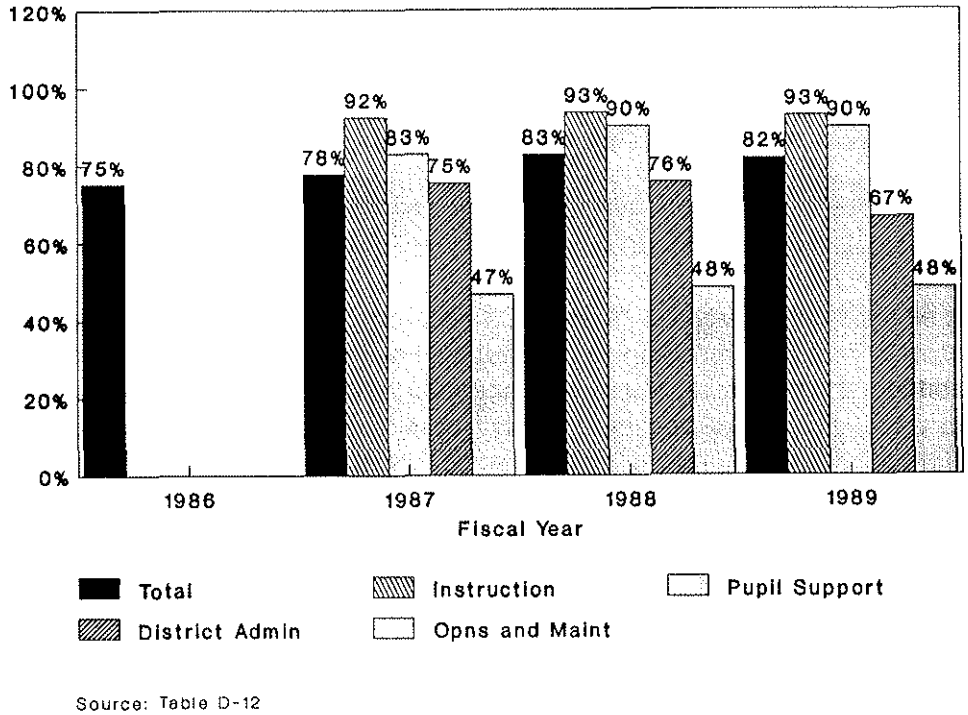
Figure 22. Alternative Price Indexes



Source: Table D-7

A price index reflecting the cost of labor is a good measure of the effects of inflation on education expenditure because personnel expenditures represent such a large share of school costs. Figure 23 shows how the share of personnel expenditures in total expenditures varies in recent years by type of expenditure. Comparable data unfortunately are not available for prior years. Personnel costs constitute about 80 percent of overall education costs and 93 percent of instruction costs. On the other hand, personnel takes up only half of operations and maintenance costs, with fuel and utilities costs accounting for much of the rest. We examine the extent to which variations in fuel prices and electricity rates can explain differences among school operations and maintenance costs in Chapter 6.

Figure 23. Share of Personnel Expenditures in School Expenditures in all Districts by Type of Expenditure



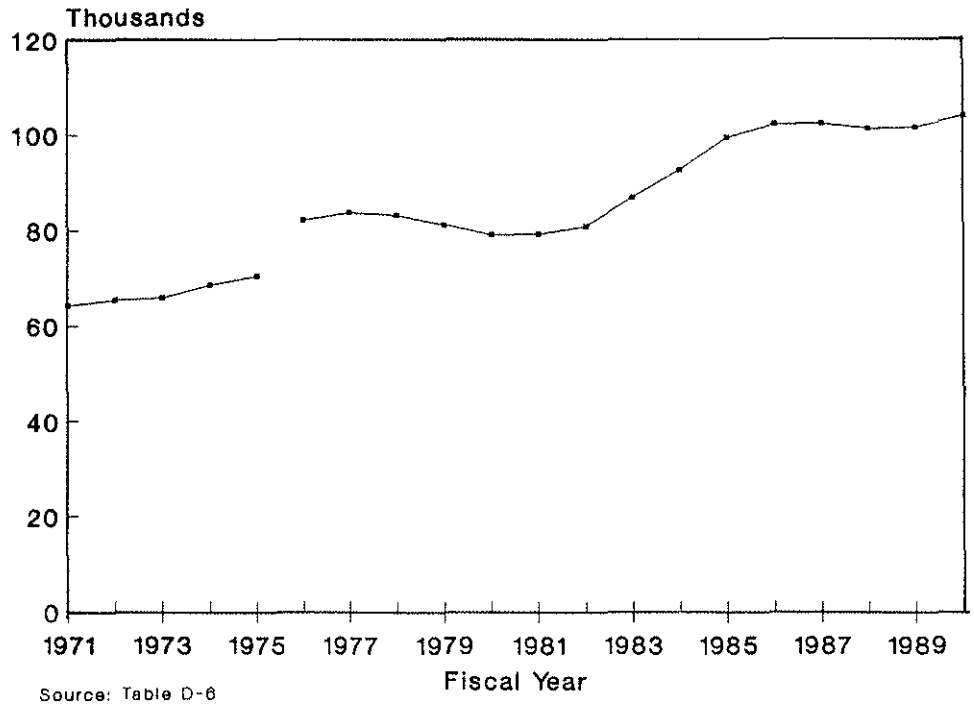
Source: Table D-12

Since the cost figures shown in Figures 20 and 21 have been adjusted both for inflation and for growth in enrollment, the changes shown represent changes in the quantity of education inputs per student over the past two decades. The changes are large enough, and classroom teaching is such a large component of the education enterprise, that increased real spending per pupil should show up as smaller pupil-teacher ratios. Figure 24 shows that average daily student membership of Alaska school districts grew from 64,000 in the 1970-71 school year to 104,000 in the 1989-90 school year, a 62 percent increase. Total certificated personnel increased from 3,400 to 7,500 over the same period, as shown in Figure 25, an increase of 120 percent. The gap in Figures 24 and 25 represents the discontinuity caused by the addition of the REAAs in 1976.

Figure 26 shows the pupil-teacher ratio as ADM divided by total certificated personnel employed by Alaska school districts, e.g., the ratio of the numbers in Figures 24 and 25. According to this measure, pupil-teacher ratios declined steadily from 1970-71 school year through 1983-84, but have been rising erratically since then. The large jump in ADM per certificated personnel in 1987-88 shows the effects of massive layoffs of teachers that year in many school districts. Enrollments declined only slightly from 1986-87, but many schools experienced a financial crisis triggered by a new state foundation funding system and a large decline in local property values induced by the economic recession. The effect on pupil-teacher ratios proved temporary, however, since school districts hired back almost as many teachers in the following year as they laid off.

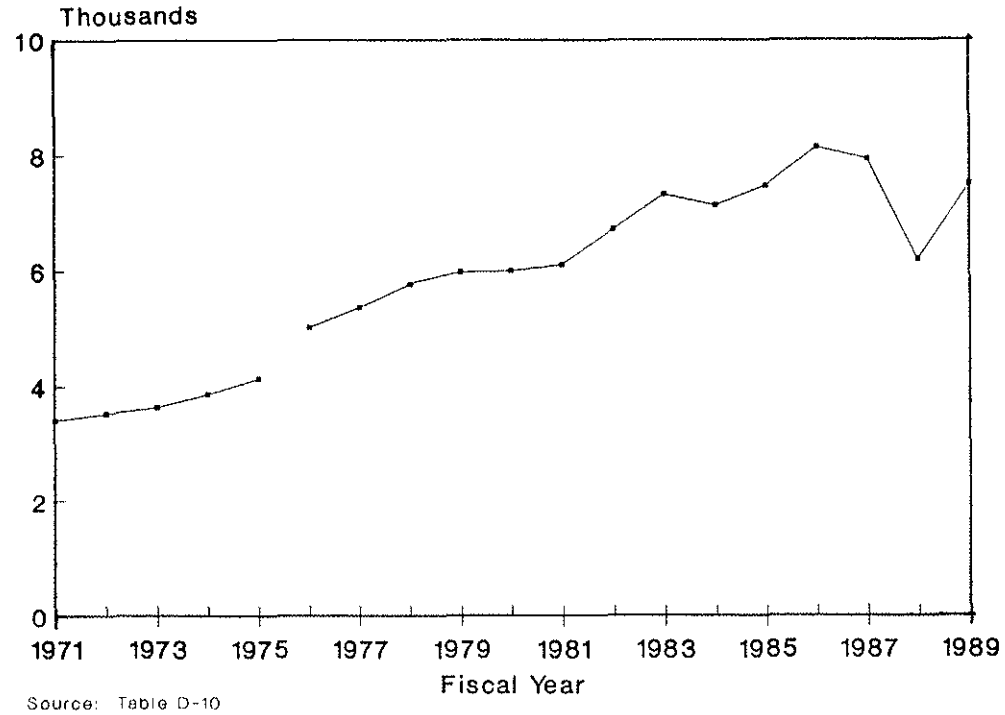
Figure 26 confirms the overall pattern we have seen of increasing real cost of education per pupil from 1970 through the mid 1980s. Education expenditures have not generally been keeping up with inflation in the past several years. In this case, changes in the real cost of instruction at least partly show up as changes in the quantity of education inputs -- i.e., in pupil-teacher ratios. We do not know if Alaska

Figure 24. Total Average Daily Membership in all Districts



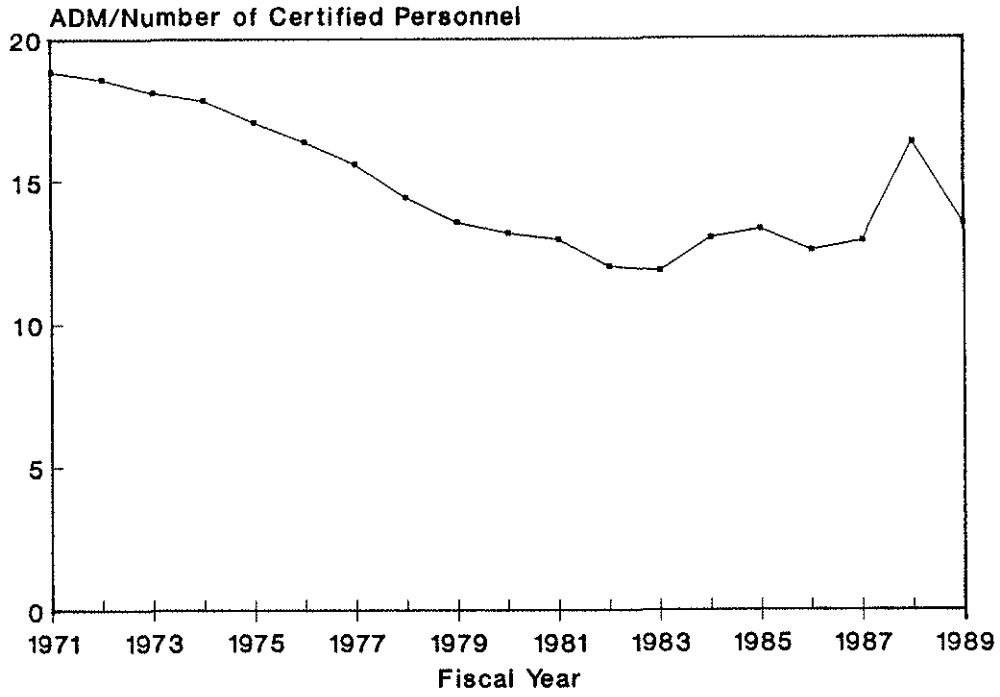
Source: Table D-6

Figure 25. Total Certificated Personnel



Source: Table D-10

Figure 26. Average Daily Membership per Certificated Personnel



Source: Table D-11

students receive a better education as a result of the increased amount spent to educate them, and that question is beyond the scope of this study. We do concern ourselves, however, with what drove up the cost. In the next two chapters, we address how changes in education programs and in the structure of education delivery have caused the quantity of education inputs per student to increase. Now, we examine the change in the price of the largest single input to education -- the certified teacher.

Alaska Teachers' Salaries

As we have seen, most education costs are personnel costs, and classroom teachers comprise the largest component of personnel. As Figure 22 shows, the Anchorage starting teacher's salary -- the market base against which all Alaska salaries may be compared -- has not risen faster than inflation, as measured by the Anchorage CPI. For the 1988-89 school year, the base salary plus benefits of a teacher in the Anchorage school district was about $28,600. This is 19 percent higher than the overall U.S. average, or not much different from the cost of living differential between Anchorage and other U.S. cities.[9]

For many reasons, however, the Anchorage base salary may not fairly represent the cost of hiring a teacher even in Anchorage, let alone in other parts of the state. First, the cost of living differs greatly from one Alaska community to the next, and teachers need to be compensated more in order to be willing to accept a job in a higher-cost community. It would be an oversimplification, however, to assume that differences in cost of living among communities are sufficient to determine differences in the cost of procuring teachers' services. The cost of living differential, for example, will overstate the amount a teacher is willing to accept if the teacher expects to save a portion of his or her salary while working in a high-cost community, in order to spend it later after moving to a lower-cost community.

Another factor is that teachers prefer to live in some communities over others, due to their particular mix of social, geographic, and climatic conditions.[10] Third, teachers with experience and advanced training can command higher salaries, and collective bargaining agreements in place throughout Alaska typically award large bonuses for longevity. Most teachers prefer living in more urban areas of Alaska, and average salaries in the districts with the largest population are significantly higher than the cost of living differential between these communities and the rest of the United States. The average Fiscal Year 1989 teacher's salary and benefits cost the school district $50,000 in Anchorage, $53,000 in Fairbanks, and $58,000 in Juneau. Using ISER Anchorage/U.S. and McDowell's (1988) within-Alaska differentials, these salaries are 22 percent, 24 percent, and 37 percent higher, respectively, than the U.S. average of $36,000.[11]

If teachers expect to stay a long time in these communities and earn the high experience bonuses, they may be willing to accept a lower starting salary. Teachers in bush schools, on the other hand, may not be able to be induced to stay for more than a few years no matter how high the premium paid for longevity or experience. Consequently, these districts often have to pay a lot more in starting salaries, but have average salaries which are not much higher, and sometimes lower, than those in urban areas.

Finally, collective bargaining agreements influence the terms of teachers' contracts throughout the state, but have a significant effect on the overall compensation level in only a few districts. Without knowing anything about the factors which might influence teachers to choose to work in one district instead of another, we know that districts which have long lists of qualified applicants for every teaching position which becomes available are paying more than the competitive market wage. Anchorage, and to a lesser extent the Mat-Su Borough, have long lists of applicants for teaching positions. The existence of a long queue in Anchorage suggests that the school district pays Anchorage teachers more (including expected future bonuses for experience and longevity) than it needs to in order to fill vacant positions. Districts which turn down relatively few qualified applicants for teaching positions, on the other hand, may be paying less than the market wage, not enough to keep experienced teachers in the district.

We formally investigated the factors which determine the amount school districts have to pay in order to hire teachers in Alaska schools by estimating equations explaining the base compensation offered in FY89 by each Alaska school district as a function of the cost of living and a variety of characteristics of the district. We define base compensation as the base teacher's salary plus benefits, including housing allowances. Benefit packages vary widely throughout the state, and some districts offer generous housing allowances. Consequently, total compensation is the most appropriate measure to compare the cost of hiring a teacher in various location around the state. We interpret the equations as projecting the amount a district needs to pay in order to hire a starting teacher. Base salaries work best for comparison among districts because the amount districts offer teachers when they are first hired best reflects labor market conditions. Actual costs of teachers' services are, of course, higher than the base salary. We also consider how average salaries of school districts depend on base salary and measure of training and experience.

The results of estimating the equation explaining variations around the state in the base teachers' compensation are shown in Appendix Table C-1. The independent variables in the equation includes, in addition to the McDowell (1988) cost of living differential, the average population per place in the district, estimated percent Native population, and whether the district lies on the interconnected road system. We hypothesize that teachers may prefer to live in larger communities and in places which have road access to major urban centers. We included the average percent Native population of communities in the district because most teachers are non-Native and may prefer to live in places with an established majority culture. Associates for Education Finance and Planning (1984) found that the racial composition of a community was highly significant in explaining teachers' salaries.

We also included in the equation dummy variables for the Anchorage, Mat-Su, Yakutat, Valdez, and Aleutian Islands School Districts. We included separate intercept terms for the first two districts because they both appear to have a long queue of teachers seeking jobs there. A queue such as this means that the district pays more than it needs to in order to obtain qualified teachers, so we would expect these variables to be positive, other things equal. The three smaller districts have base salaries which are far outside the norm, after taking into account the relevant factors. We estimated the equations in logarithmic form, so the coefficients represent elasticities -- that is, the percentage change in compensation associated with a given percentage change in the independent variable.

The full regression results, shown in Appendix Table C-1, show that our equation has explained about 80 percent of the variation around the state in base teachers' compensation. The equation suggests that Valdez and the Aleutian Islands have salaries 18 to 19 percent higher than expected, given the explanatory variables, and Yakutat pays 23 percent less than expected. The coefficients for Anchorage and the Mat-Su Borough are negative (but not significantly different from zero), when we expected them to be positive. Apparently, Anchorage has some desirable characteristics as a place for teachers to live -- perhaps more opportunities for family members -- relative to other communities in the state which are not captured by the other explanatory variables. This preference factor counteracts the effect signaled by the queue. The Mat-Su Borough may also be desirable because it is so accessible to Anchorage. The results suggest that Anchorage could pay its teachers significantly less than other communities in the state and still obtain qualified teachers.

The coefficients estimated for road access and population per place in the district were very small and statistically insignificant. The results say that teachers do not need to be paid more to live in smaller communities and in communities not connected to the road system, other things equal. On the other hand, the coefficient for cost of living was positive and highly significant, as expected, and the coefficient for percent Native population was also positive. Table 4 shows the estimated elasticities for the cost of living differential and for the percent Native population. The elasticities represent the percentage change in the base salary associated with a one percent increase in the relevant variable. The coefficient on the percent Native population is weakly significant; there is a 10 percent probability that the statistical association is due to random variation. It does suggest, however, that teachers need to be paid somewhat more to live and work in Native communities than in white communities. The coefficient of 0.065 implies that labor market places a salary premium of 6.5 percent for a community with a 100 percent Native population over one with no Natives.

Table 4. Percentage Change in Base Salary Plus Benefit Associated with a One Percent Increase in Cost of Living and Native Population

	Area Cost Differential	Percent Native Population
Elasticity	0.503	0.065
t Statistic	(6.95)	(1.69)

Source: Table C-1

The elasticity estimated for the cost of living shown in Table 4 is 0.5, implying that teachers require only a 5 percent salary increase for a community with a 10 percent higher cost of living differential. While it would be indeed surprising to observe a coefficient of much less than 1.0 for the cost of living differential in an analysis of salary increases over time, an elasticity of less than one should not be surprising for explaining variation in salaries across communities. A cost of living index is computed from comparing prices of a fixed market basket of consumer goods, and not all items are equally more expensive in a higher-cost community than in a lower-cost one. Consumers typically are able to find less expensive substitutes for expensive items, so they do not need to be compensated exactly in proportion to variations in area cost differentials.

An elasticity on the area cost differential as low as the 0.5 estimate for Alaska teachers, however, is an unusual and interesting result which has direct relevance to the question of the cost of teachers in Alaska education. Two factors likely explain why the market behaves as it does. First, as we mentioned above, most teachers working in high-cost (small rural) communities do not expect to remain there for many years, and they save a significant portion of their salaries which they plan to spend later in a lower-cost community, perhaps even after retirement. The area cost differential could be reduced by the portion of salaries put aside as savings. Second, the market basket consumed by residents of rural Alaska is much different from that consumed in urban Alaska; rural residents do take advantage of important opportunities to substitute items which are no more expensive, or even cheaper, for items which are very expensive. For example, teachers in rural communities decide not to live in as large or comfortable a home as teachers in urban areas live in, and they take more vacations outside the state. They purchase less meat and eat more wild fish and game. The end result is that teachers in rural areas do not need nearly as much extra income as the area cost differential implies, in order to feel equally well compensated as teachers in urban areas.

The equation estimating the average teacher salary in the district in FY88 as a function of the base salary and a training and experience index is shown in Appendix Table C-2.[12] The coefficients estimated in the equation are reasonable and statistically significant, but we are able to explain about two-thirds of variations in average salaries around the state with this simple equation. The equation explains less of the variation in average salaries than the equation for base compensation because districts use different mechanisms for the way they adjust salaries based on training and experience. The difference reflects to some extent different attitudes about encouraging teachers to remain and make a commitment to the community. The Aleutian Islands and the Yupiit School Districts represent two such extreme opposing cases that we put separate intercept terms for them in the average salary equation. The coefficients shown in Appendix Table C-2 estimate that the Aleutian Islands district pays its teachers 24 percent more on the average, given its base salary and the teacher's training and experience, than expected for the average Alaska district. This district apparently is willing to pay a premium in order to encourage teachers to remain in the district. The Yupiit district, in contrast, paid its teachers 22 percent less than expected, given its base salary and the teacher's training and experience. Yupiit appears quite happy to see its teachers move on after a few years.

In summary, we have noted that total expenditures per pupil for instruction and pupil support have nearly doubled over the past two decades, even after taking out the effects of inflation. Real costs per pupil of administration and operations and maintenance have tripled. These findings are essentially the same regardless of whether one represents inflation by an industry gross product price deflator, an index of teachers' salaries, or the Anchorage Consumer Price Index. The increasing level of real expenditures per pupil is partly reflected in pupil-teacher ratios, which declined until the 1983-84 school year but have risen slightly since then.

While the base salary of the certified teacher has not been rising faster than inflation, the evidence suggests that salaries for many Alaska teachers remain substantially higher than national averages. This is particularly the case for teachers in urban districts such as Juneau, Anchorage, and Fairbanks, which educate the majority of Alaska's students. Average salaries in rural districts may fall below the national average salary after adjusting for the higher cost of living. But our analysis of salary variations across the state suggests that teachers do not need to be compensated fully for the higher local cost of living in a community where consumer expenditure patterns differ as they do in rural Alaska. In addition, teachers in rural districts earn less than the area cost differential because they are less experienced on the average than teachers in urban districts.

The national data suggest that urban Alaska teachers' salaries could probably fall by 10 to 20 percent -- i.e., by not keeping up with inflation for several years -- without affecting educational standards. While this would represent a significant cost savings for urban school districts, it does not go far in comparison to the problem we have noted of the doubling and tripling of real education costs per pupil over the past 20 years. It also probably could not be implemented in smaller city and rural districts without affecting the ability of these districts to recruit and retain qualified teachers. So we conclude that changes in prices and wages and higher Alaska teacher's salary levels have had only a very modest effect on the cost of education around the state. Instead, nearly all the cost increase can be attributed to increases in the quantity of education inputs -- summarized by the pupil-teacher ratio. In the next two chapters we address how changing education programs and changing structure of education delivery -- factors which might increase the quantity of education inputs -- have contributed to the increase in costs.

V. PROGRAM CHANGES AND THE COST OF EDUCATION

Over the past 25 years, a series of federal laws and regulations designed to ensure equal education opportunity have had far-reaching effects on the type of educational programs offered by the nation's schools. These policy changes have placed increasing demand on school districts in Alaska just as they have in other states, but have also led to targeting of federal grant funds to specific programs which have benefitted Alaska schools. Among the most significant changes followed from a number of provisions of the Elementary and Secondary Education Act of 1972 promoting bilingual and multicultural as well as vocational education. Also important was the Equal Education for All Handicapped Children Act (PL 94-192), which guaranteed physically, mentally, and emotionally handicapped children equal access to free education.

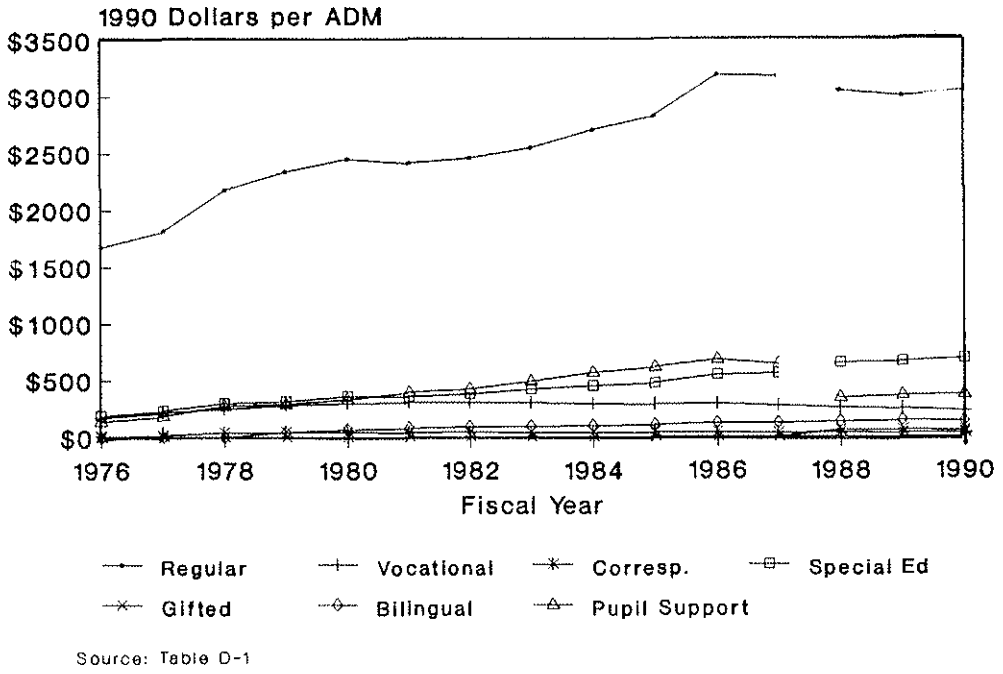
In this chapter we assess how changes in educational programs brought about by these national policy initiatives have affected the cost of education in Alaska. We address two primary issues. First, to what extent does the increase in real spending per pupil which we noted in the last chapter consist of added costs of offering new educational programs in Alaska. Second, has the public school foundation provided an amount of additional funds for these alternative education programs commensurate with their true cost? In order to investigate the first issue, we look at how the pattern of real spending on instructional programs and administration has changed since complete data became available in the mid 1970s. Which programs have taken up biggest share of growth in spending? To investigate the second issue, we compare how the foundation formula has funded school districts to how much schools have actually spent on various types of instruction in Fiscal Years 1983 and 1990.

Changes in Real Per Pupil Spending by Program

Figure 27 shows how real instruction and pupil support expenditures per ADM have grown in each educational program for all Alaska school districts combined. Figure 28 shows the share of expenditures for each program in the total expenditures for instruction and pupil support. The definition of "program" follows the protocols for "functions" which the Alaska Department of Education has required for accounting for school operating fund expenditures since Fiscal Year 1988. The specific expenditure items included in each off the functions has changed several times over the years, and we have attempted to reconstruct historical accounts of spending by program as well as possible, based on the available information.

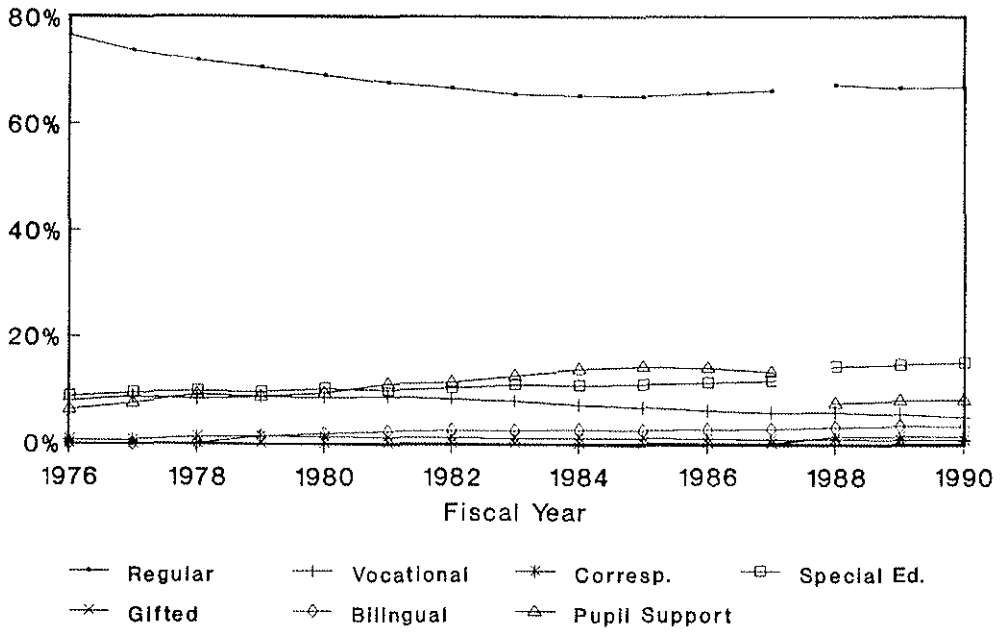
Between Fiscal Years 1987 and 1988, however, the Alaska Department of Education implemented a number of changes in the accounting for school district operating expenditures which make it difficult to reconcile the data series completely for some items. In particular, certain expenditures which had been included in the pupil support category prior to FY88 were reallocated to regular instruction and special education. Because we are unable to account precisely for the dollar amounts involved, we have placed a break in the lines for these three items in Figure 27, to show that the series are not strictly comparable.[13] We believe, however, that numbers shown in Figures 27 and 28 still provide a useful summary of changes over time in expenditures for different instructional functions. Appendix B describes how we have defined the various types of expenditures over time for our analyses, and contains a synopsis of the changes in the definition of these accounting functions since Fiscal Year 1971. The numbers begin in 1976, the year the state formed the Regional Education Attendance Areas (REAAs) for rural areas of Alaska.

Figure 27. Total Instruction and Pupil Support Expenditure per ADM by Function in all Districts in 1990 Dollars



Source: Table D-1

Figure 28. Percent of Total Instruction and Pupil Support Expenditure per ADM by Function in all Districts in 1990 Dollars



Source: Table D-1

Figures 27 and 28 show that regular instruction, as expected, remains by far the largest expenditure item. It has cost about $3,000 per pupil (in 1990 dollars) since 1986 and accounts for about two-thirds of all expenditures on instruction and pupil support. The amount spent on regular instruction per pupil nearly doubled, after taking out the effects of inflation, between the 1975-76 school year and the 1985-86 school year. Since 1986, however, the cost of regular instruction has changed little relative to inflation.

During the same period -- Fiscal Years 1976 to 1986 – in which regular instruction expenditures were rising so rapidly, expenditures for other instructional programs were rising even more rapidly. Figure 27 shows that the share of regular instruction in total instruction and pupil support expenditures fell from 77 percent to 66 percent over that period. Rapidly increasing spending on special education and bilingual-bicultural education was the cause of the declining share for regular instruction. Gifted and talented instruction appears as a new expenditure item for the 1987-88 school year. Prior to that time, gifted and talented expenditures -- totalling slightly over one percent of total instruction and pupil support expenditures -- were included in the special education category.

In Chapter 4, we noted that overall pupil-teacher ratios declined steadily from the 1970-71 school year before leveling out and beginning to increase slightly since the mid 1980s. Has the rising level of real expenditures per student on regular education reduced pupil-teacher ratios? Has the increasing share of special education expenditures in total expenditures shown up in increasing pupil-teacher ratios for special education? Unfortunately, statewide data on ADM and the number of teachers participating in each program are not available, so it is not possible to make this comparison. Information which we were able to obtain from the Kenai Peninsula School District, however, suggests that most students have not actually benefitted from smaller classes as a result of higher real expenditures per pupil.

Figure 29a shows the average number of students per teacher by type of teacher for schools in the Kenai Peninsula Borough. Figure 29b shows indexes for the changes since Fiscal Year 1979 student-teacher ratios for different types of teachers. The Kenai Peninsula figures indicate that pupil-teacher ratios for regular instruction have remained virtually constant. The district averaged 13 to 14 students (measured by ADM) per total certificated personnel since the 1978-79 school year. The ratio of ADM to all certified classroom teachers also remained between 18 and 19.

On the other hand, the ratio of total district ADM to certified special education teachers fell from 117 in Fiscal 1979 to 83 in Fiscal Year 1990. Even more striking, ADM per certificated personnel not assigned to classroom instruction fell from 128 to 100. The temporarily higher figures for the 1987-88 school year reflect actual personnel layoffs due to budget cuts which affected many school districts that year, as we mentioned before. We do not have actual enrollments in special education programs, so we do not know whether the nearly 30 percent drop in the average number of pupils per special education teacher reflects a larger amount of resources made available for each special education student or simply more students enrolled in special education programs. However, the increasing number of certificated non-classroom personnel certainly reflects greater expenditures on activities such as program administration and counseling.

Another set of information from the Anchorage School District tends to confirm the general picture suggested by the Kenai Peninsula data. Figure 30 contains indexes of instructional expenditures per ADM for the Anchorage School District, along with an index for the base teacher's salary. The salary index represents the contribution of the rise in labor costs to the cost of education per pupil. The base salary is a better price index than average salaries, since the latter includes compensation for education and experience which should -- in theory, at least -- lead to better quality instruction. In any case, there is little difference in the way base and average salaries change over time.

Figure 29a. Average Number of Students per Teacher in Kenai Peninsula Borough School District

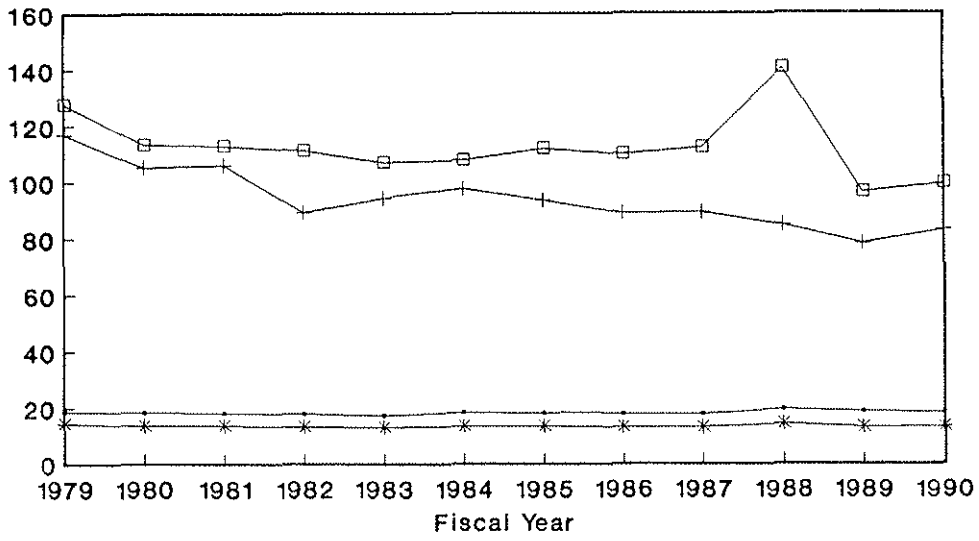
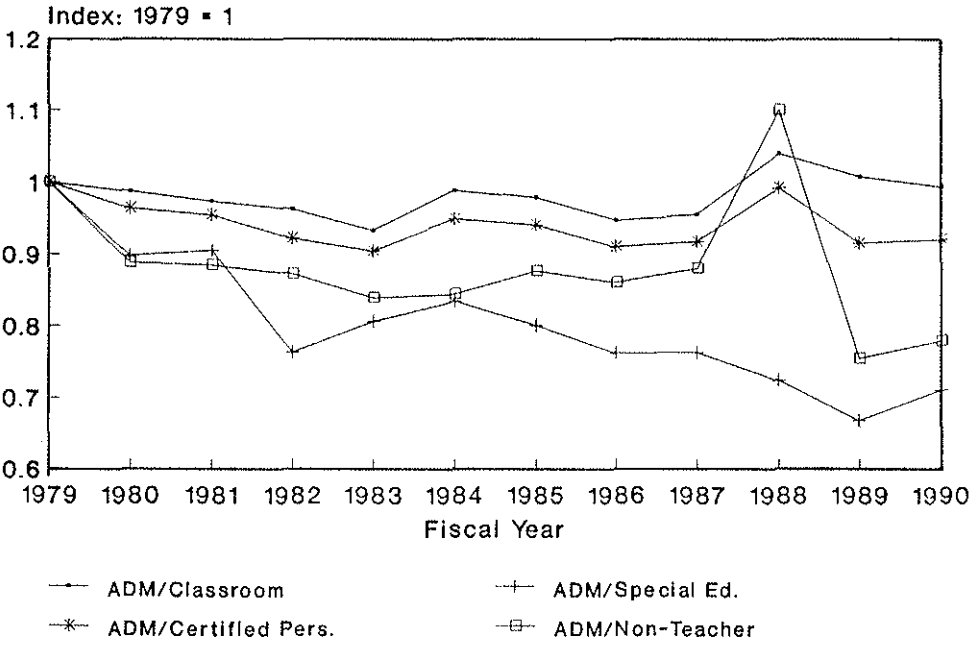
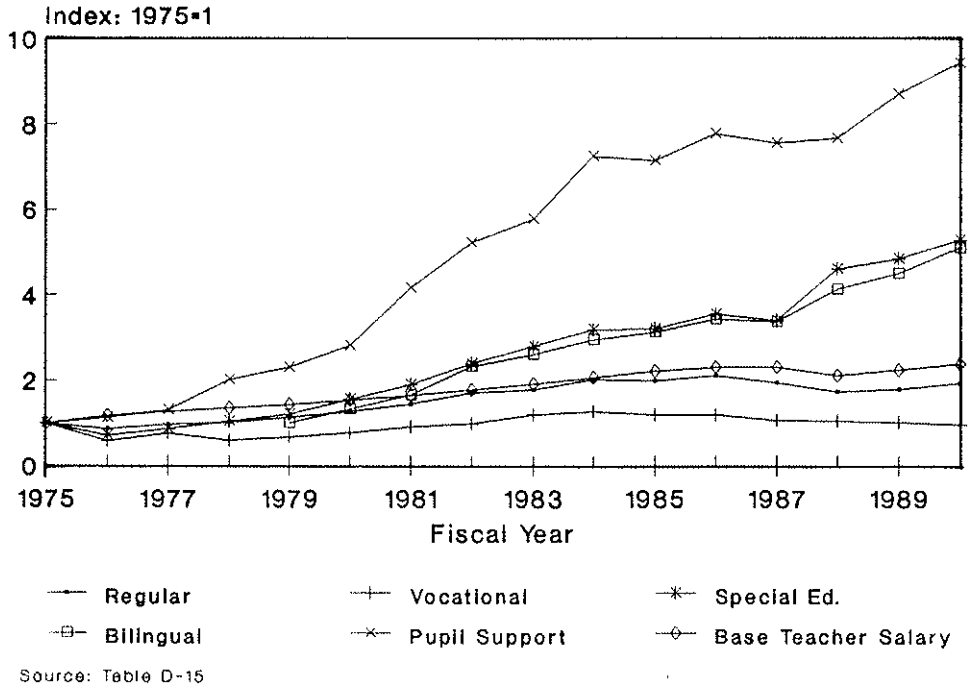


Figure 29b. Index of Average Number of Students per Teacher in Kenai Peninsula Borough School District



Source: Table D-16

Figure 30. Index of Instruction Expenditures per ADM in Anchorage School District

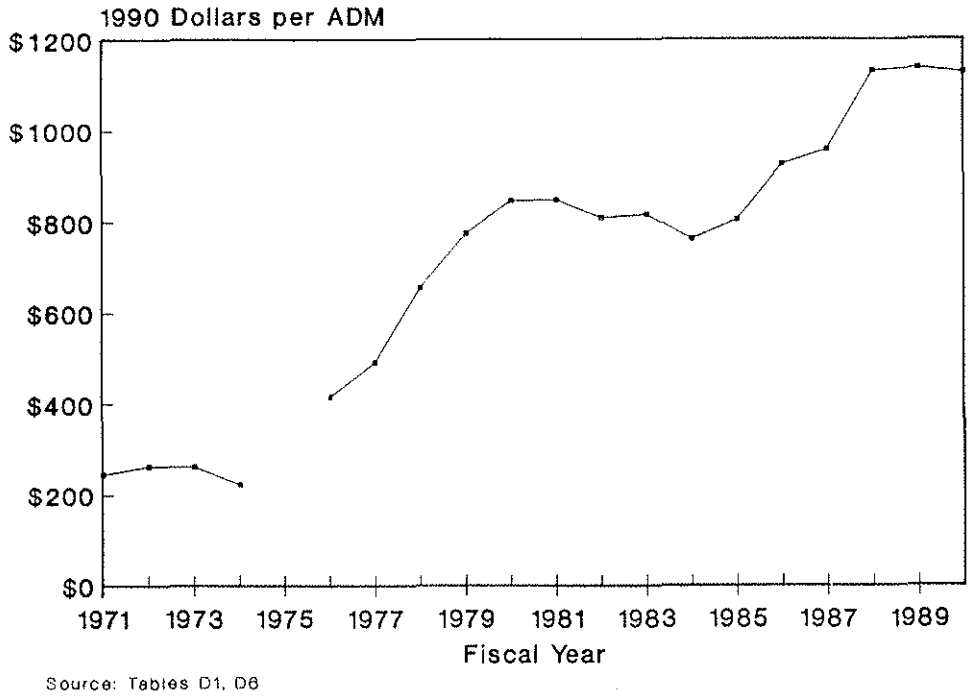


Source: Table D-15

The base salary index in Figure 30 rises by 139 percent from 1975 to 1990. The index for the cost of regular instruction rises by only 93 percent over the same period. In Anchorage, the cost of hiring a teacher has been rising at a faster rate than the total cost of regular instruction. This is not true, however, for other categories of expenditures. Although vocational education expenditures have remained virtually constant per ADM, expenditures for special education and for bilingual education are more than five times as large per ADM in 1990 as in 1975. In addition, pupil support per ADM is over 9 times as large. The Anchorage data provide additional evidence that the federal initiatives promoting special education and bilingual education in public schools have not only played a big role in driving up education costs for urban school districts like Anchorage and Kenai Peninsula. They have probably contributed in a significant way to the enormous increase in pupil support costs, and may have actually drawn resources away from regular instruction.

Instruction costs are not the only component of school expenditures which have been increasing over the past two decades. In fact, the fastest growing component of education costs in Alaska seems to be the cost of administration. Figure 31 displays real general support expenditures per ADM for all Alaska school districts between the 1970-71 school year and the 1989-90 school year. General support activities of school districts include school administration (basically, the principal's office) and district administration (activities of the district headquarters, school board, etc.). General support expenditures rose from a level of around $200 per ADM (in 1990 dollars) in the early 1970s to level off at around $800 per ADM in 1980 before rising again at the end of the decade. The sharp rise between Fiscal Years 1987 and 1988 may in part be due to the change in accounting methods implemented in that year for all school expenditures, although no specific accounting activities were transferred into or out of either the school administration or district administration accounts.

Figure 31. Total General Support Expenditures per ADM in all Districts in 1990 Dollars



Source: Tables D1, D6

Even after adjusting for inflation and for changes in the number of students, general support expenditures have increased at an average rate of 8.4 percent per year, exceeding $1,100 per pupil (in 1990 dollars) in recent years. Although increased special instruction responsibilities in the schools undoubtedly involves a higher administrative cost, including applying for and administering federal grants, than regular instruction, it is not possible for us to tell how much of the five-fold increase in general support expenditures comes as a direct result of the change in the mix of instructional programs. We expect that administrative costs have also been rising rapidly in other states for the same reasons, but do not have comparable data to make such an analysis.

Foundation Awards and the Cost of Instructional Programs

The public school foundation formula was suspended for Fiscal Years 1984-86, reinstated partially in Fiscal Year 1987, and then revised substantially in Fiscal Year 1988. Up through Fiscal Year 1983, each school district received a foundation award consisting of separate entitlements for regular education, special education, vocational education, bilingual-bicultural education, and correspondence study. The grant for each category was determined by the number of instructional units computed for the district for each type of instruction. Since FY88, the foundation grant consists of a single lump sum. However, as explained in Chapter 2, the total grant is still proportional to the number of instructional units calculated for the district. Except for correspondence, which has been merged into the regular instruction category, the educational programs are the same as in FY83. This makes it possible to compare the shares of educational units calculated by the foundation formula for the various programs to school districts' actual expenditures for the same programs.

We can use this analysis to address two questions about how the changing cost of certain specific programs is driving up the overall cost of education. First, do foundation awards fairly compensate for the cost of special, vocational, and bilingual instruction? Second, have the reforms in the foundation formula improved or worsened the discrepancy between program cost and foundation support?

Figure 32 compares the shares of total instructional units computed by the foundation formula for each educational program in FY90 to the shares of total expenditures on instruction for the three types of Alaska school districts. Instructional units are multiplied by the area cost differentials for each district relative to Anchorage before summing to the totals for the three types of school districts. In other words, the shares represent the weighted average share of instructional units for each program where the weights are the district's state-defined basic need.

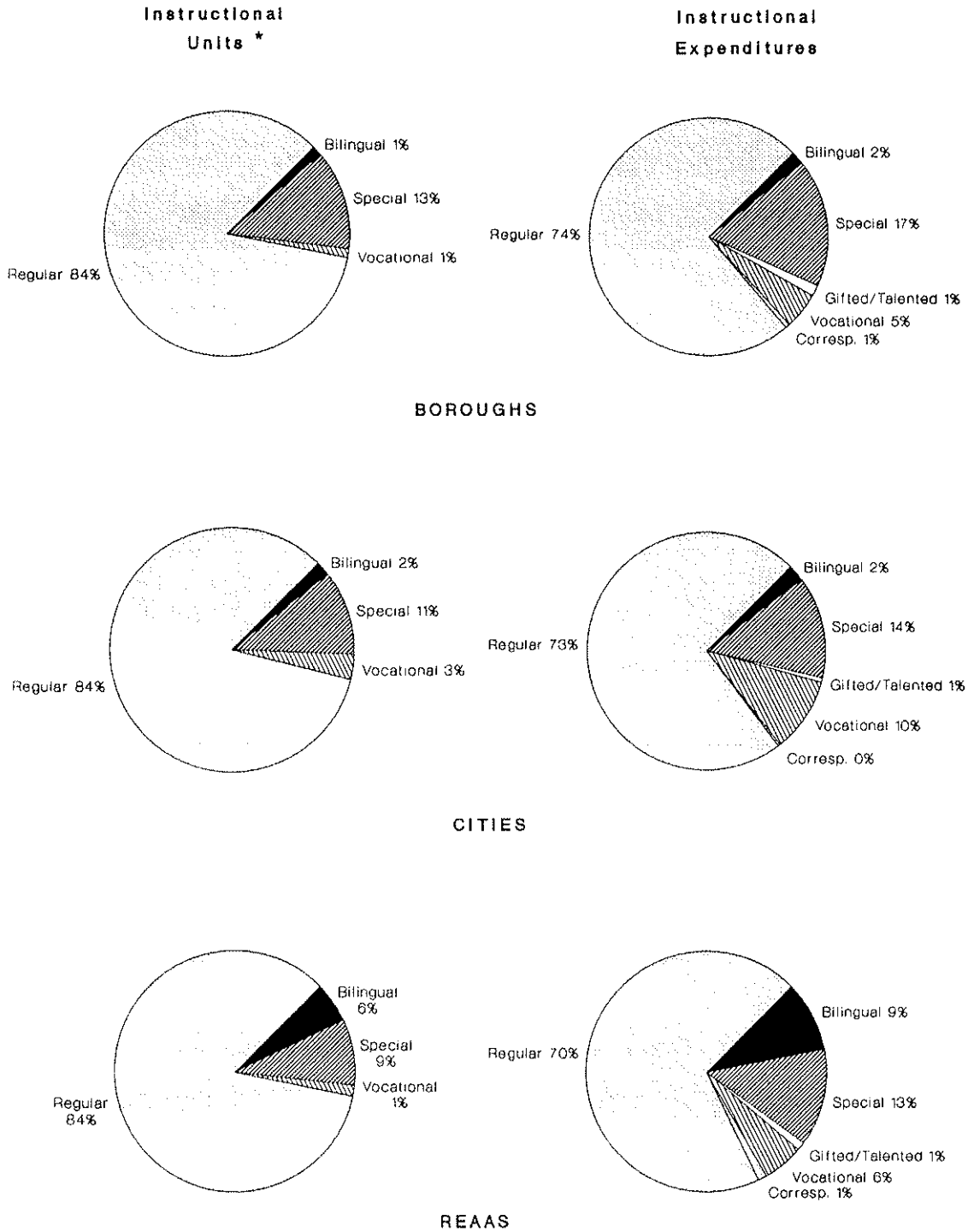
In Fiscal Year 1990, regular instruction accounted on the average for 84 percent of all instructional units for all three types of districts. One might say that if the foundation formula correctly anticipates relative program costs, regular instruction by implication should account for 84 percent of instructional expenditures. In fact, regular instruction and correspondence study combined takes up only 74 percent of borough district, 73 percent of city district, and 70 percent of REAA expenditures on instruction. Adding in expenditures on correspondence study (correspondence ADM was merged into regular instruction in the unit formulas in 1988) makes practically no difference in these figures. In contrast, bilingual, special (including gifted/talented), and vocational education together account for a roughly 50 percent greater share of expenditures than their share of instructional units. The foundation awards for vocational education in particular seem to cover only a fraction of the cost of those programs.

The implication of the shares in Figure 32 is that some of the funds received for regular instruction are being used by school districts to subsidize the cost of other types of instruction. The foundation does not specifically award units for support or operations and maintenance costs, so one could argue that the intent of the foundation is to pay these overhead expenses out of the entitlement for regular instruction. It seems unreasonable to assume, however, that special types of education require a lesser share of administrative support and facilities than their share of instructional expenditures. In fact, the opposite is likely to be true. School districts which face higher demands for bilingual, special, and vocational education programs are likely to have to reduce their effort in regular instruction relative to districts with lesser demands for alternative education, or else raise additional local revenues to fund their schools above the level of basic need.

Surprisingly, one of the effects of the 1987-88 reforms to the foundation formula was to increase the discrepancy between the share of foundation entitlements for special instructional programs and expenditures on these items. Figure 33 shows the same comparison of the share of foundation entitlements and share of instruction expenditures for FY83 as Figure 32 did for FY90. In 1983, the districts actually received line item amounts for each category of instruction shown in the figure. In Fiscal Year 1983, like FY90, city districts and REAAs received more funds for regular instruction than they spent, but the discrepancies are much smaller than they were in Fiscal Year 1990.

To summarize, the cost per student of bilingual and special education has been increasing much faster than inflation. The cost per pupil of regular instruction has also increased in real terms, but not nearly as fast. Pupil support and general support expenditures have been growing even faster than any component of instruction, and part of the increase is likely due to the additional administrative burden placed on school districts in order to supervise expanded bilingual and special

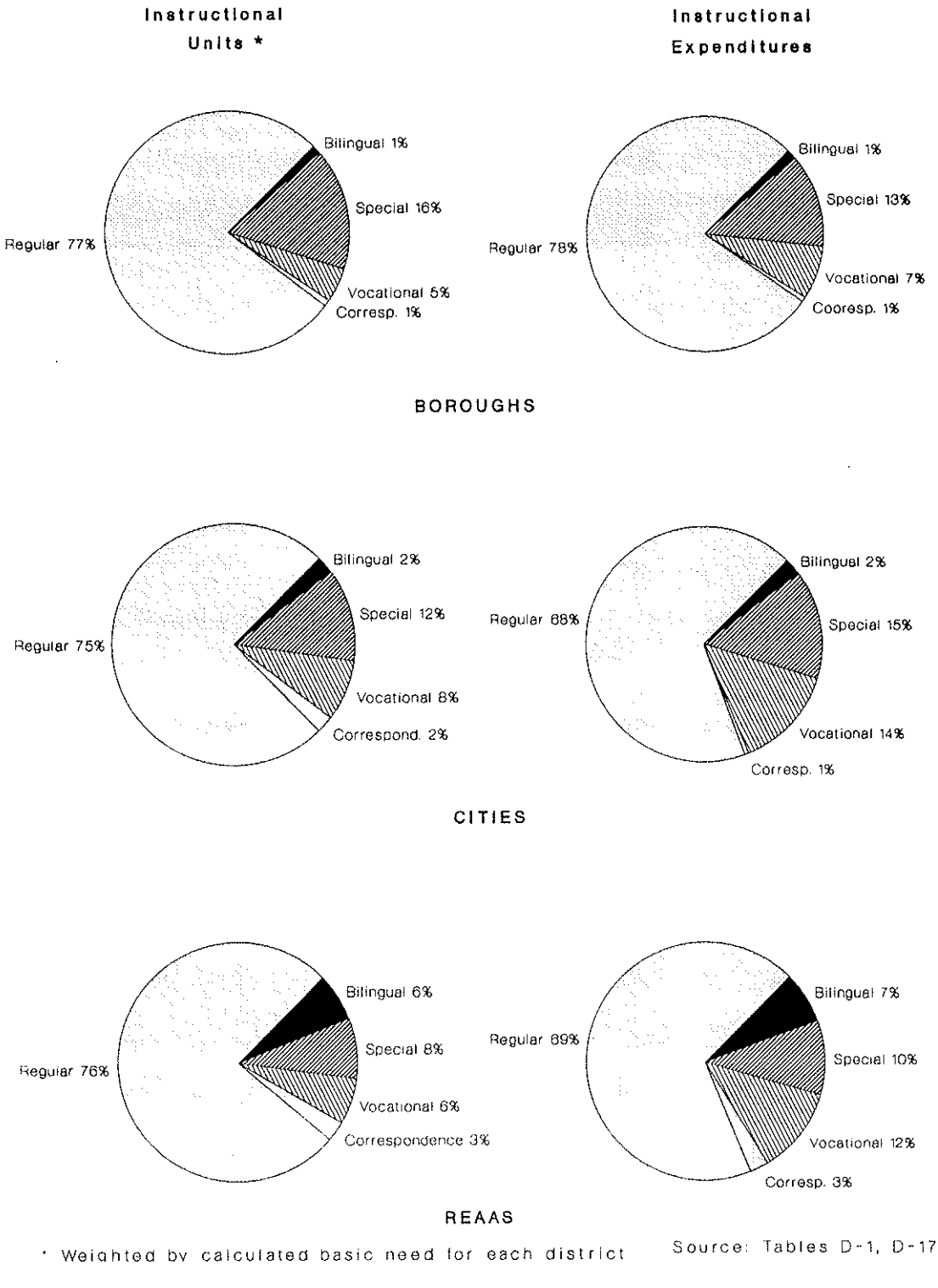
Figure 32. Distribution of Instructional Units and Expenditures by Type of Instruction, FY90



* Weighted by calculated basic need for each district

Source: Tables D-1, D-17

Figure 33. Distribution of Instructional Units and Expenditures by Type of Instruction, FY83



* Weighted by calculated basic need for each district

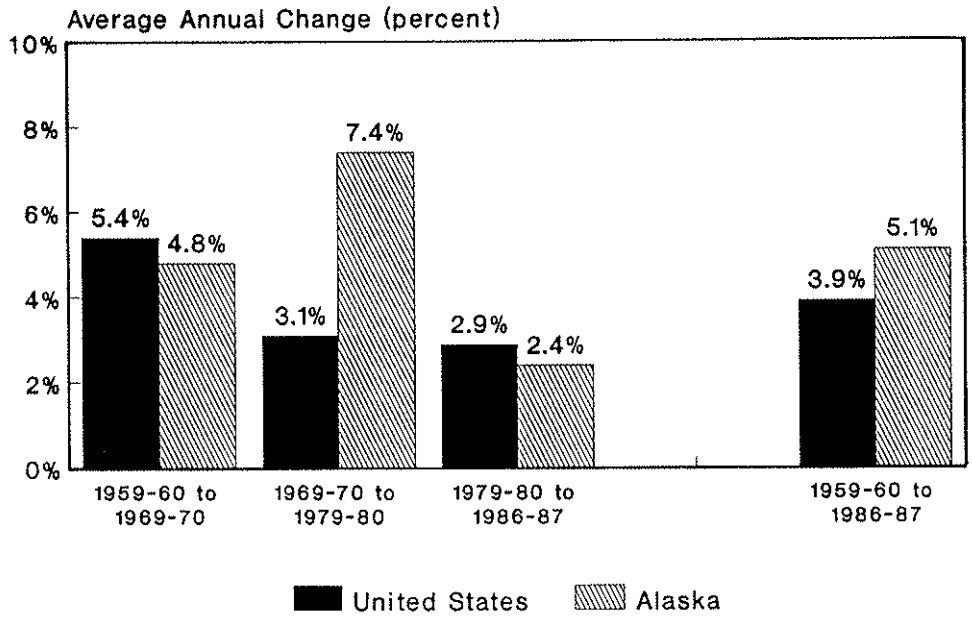
Source: Tables D-1, D-17

education programs. The Alaska school foundation, in the way it calculates and funds a level of expenditures defined as basic need, does not currently compensate districts fully on the average for the high cost of bilingual, special, and vocational education programs. On the other hand, the basic level of expenditures for regular instruction which the state computes as adequate may exceed the necessary amount. As a result, the foundation program may not achieve education equity between districts with relative high and low bilingual, special, and vocational education requirements.

VI. THE COST OF CHANGES IN THE STRUCTURE OF EDUCATION DELIVERY

As we noted in Chapter 2, the cost per pupil of education in Alaska has been growing at an annual rate of over 5 percent faster than inflation. This places Alaska among the four states with the fastest growing education costs in the nation. The pattern of growth has not been even, however. Figure 34 compares the rates of growth of real per pupil expenditures by public elementary and secondary schools in Alaska and in the United States as a whole for three periods. As noted in Chapter 2, these data from the National Center for Education Statistics include school construction costs as well as operating expenditures. The overall annual rate of growth from the 1959-60 school year to the 1986-87 school year -- the most recent year for which the national data are available -- was 5.1 percent for Alaska as compared to 3.9 percent for the U.S. Figure 34 shows, however, that Alaska education costs actually grew more slowly than the national average during the 1960s and the 1980s. During the past three years, for which the national data are not yet available, Alaska costs actually failed to keep up with inflation. It was only during the 1970s -- when Alaska per-pupil education costs grew by 7.4 percent faster than inflation -- that Alaska costs grew faster than those of the other states.

Figure 34. Growth Rates of Total Education Expenditures per Pupil Constant Dollars

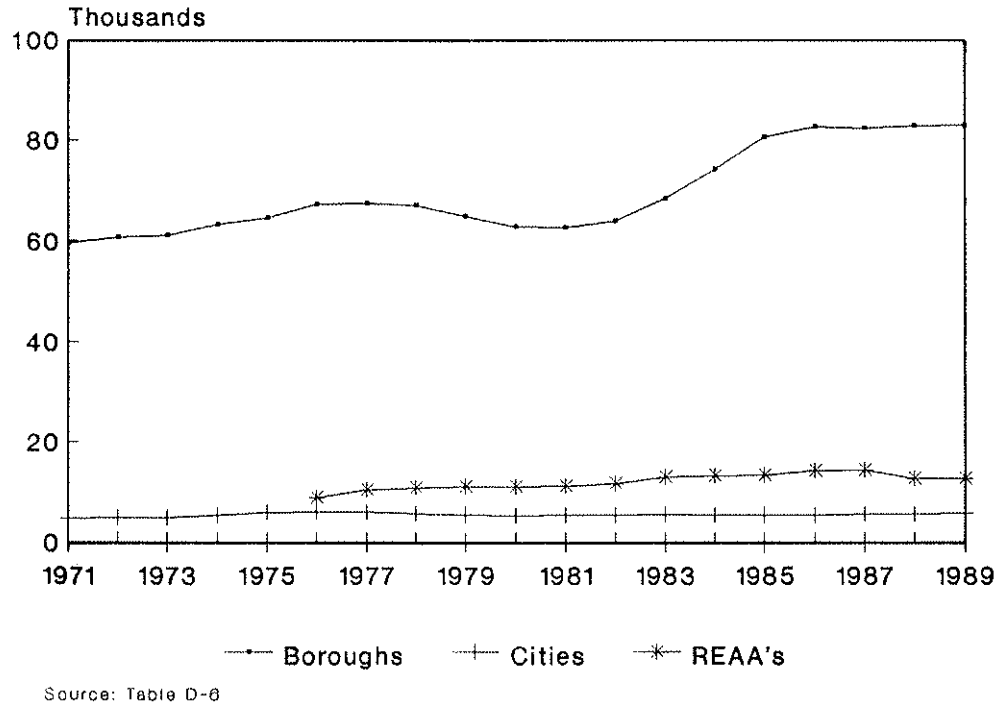


Source: Advisory Commission for Intergovernmental Relations (1990)

Two primary factors drove up the cost of education during the 1970s. In 1975 the state created the Regional Education Attendance Areas (REAAs) -- rural school districts without a local tax base -- and turned over control of the state-operated school system to locally elected school boards.[14] A year later, in the consent decree for the so-called "Molly Hootch" case, the state agreed to build high schools in over 100 small rural communities, substituting for most rural students secondary education in the village for boarding school or boarding home programs.[15] Figure 35 shows Average Daily Membership

(ADM) for the three types of school districts -- borough districts, city districts, and the REAAs -- since the 1970-71 school year. Total ADM of Alaska school districts jumped by around 10,000 students when the state created the REAAs in 1976 and 1977. REAA enrollment grew steadily to 14,000 students before dipping slightly in Fiscal Year 1988 as the creation of the Northwest Arctic Borough shifted their enrollments from the REAA category into the Borough category.

Figure 35. Total Average Daily Membership for Borough, City and REAA Districts

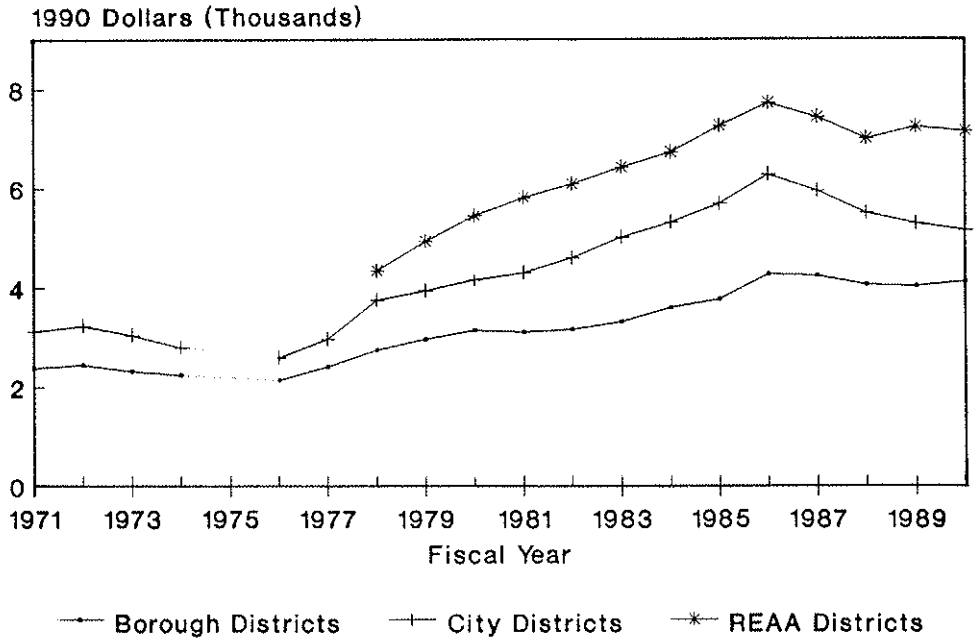


Source: Table D-6

Figure 35 shows, however, that most of the enrollment growth after 1977 occurred in the borough districts in the first half of the 1980s. Borough school enrollment increased by 20,000 -- almost one-third -- between the 1980-81 and the 1985-86 school years. Two events -- creation of the REAAs in rural areas in the 1970s, and the economic boom of the 1980s which mainly affected urban areas -- strongly suggest that any analysis of changes in Alaska education costs will be misleading if it does not break out cost changes by the three types of school districts. The addition of REAAs artificially inflates the statewide average cost of education in the 1970s, while the enormous growth rate of urban enrollments, with their much lower education costs per pupil, tends to hide the rapid increase in education costs the typical school district encountered during the early 1980s.

Figure 36 compares real instruction and pupil support expenditures per ADM for borough and city districts since Fiscal Year 1971, and for REAAs since Fiscal Year 1978. In FY80, borough districts spent $3,100 per pupil in 1990 dollars, city districts spent $4,200, and REAAs $5,500. In FY90, spending per pupil on instruction and pupil support had increased to $4,100 for borough districts, compared to $5,200 for city districts and $7,200 for REAAs. The average annual growth rate of real instruction and pupil support expenditures between the 1979-80 and the 1989-90 school years was in fact 2.8 percent for both borough districts and REAAs, compared to 2.2 percent for city districts. As Figure 34 shows, the national average growth in total real expenditures was 2.9 percent for the period 1979-80 to 1986-87.

Figure 36. Total Instruction and Pupil Support Expenditures per ADM, 1990 Dollars



Source: Tables D-1, D-6

The Cost of Regional Education

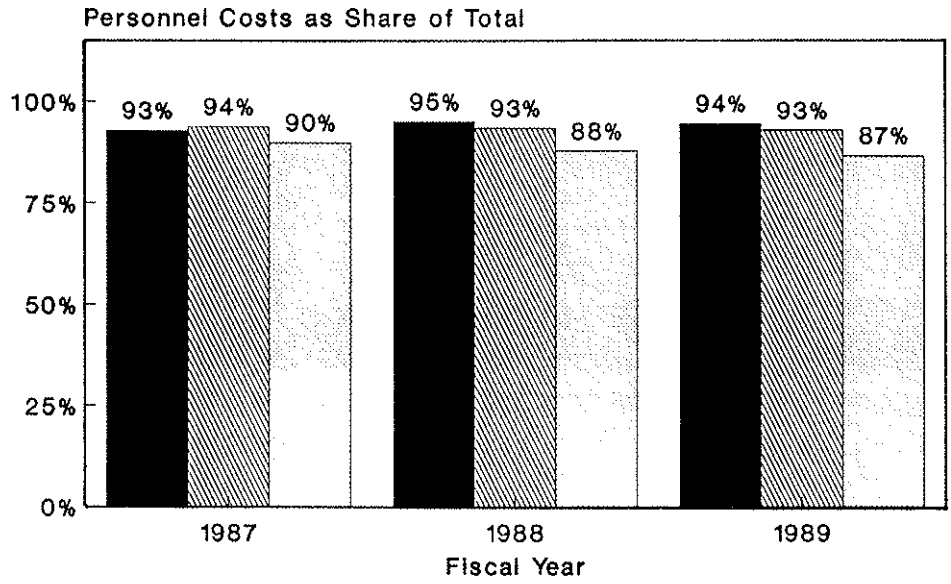
The cost of education has always been much higher in the REAAs than in the borough districts. Because REAA districts serve areas which do not contain enough economic activity to sustain organized local government, the entire structure of education delivery differs from that prevailing in the more urban areas. Figures 37a and 37b compare the share of personnel costs in instructional and in total expenditures, respectively, for the three types of districts. We show comparisons for the last several years in order to demonstrate that the differences in these ratios are quite stable over time. The share of personnel in instruction expenditures ranges from 93 to 95 percent for borough and city districts in Figure 37a, but is only 87 to 90 percent for the REAAs. The contrast in the share of personnel in total operating expenditures shown in Figure 37b is even more striking: 85 percent for borough districts, 80 percent for city districts, and only 73 percent for REAAs.

Cost of Instruction

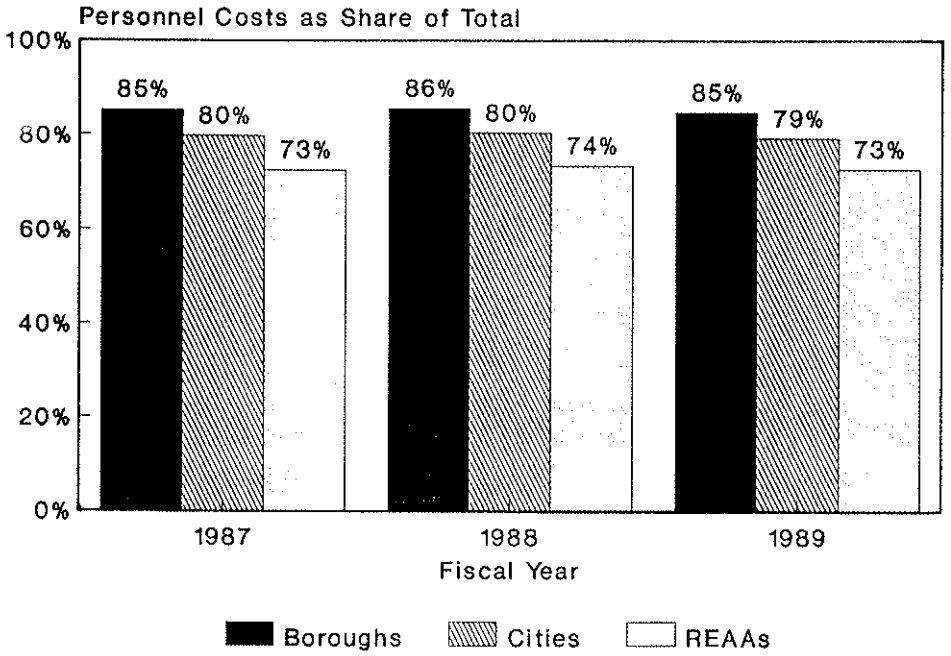
Although instructional expenditures per pupil are much larger for REAAs than even for the city districts, surprisingly little of this difference is reflected in pupil-teacher ratios. Figure 38 compares total certificated personnel for the three types of school districts, showing clearly the temporary dip in Fiscal Year 1988 when declining funding and enrollments forced districts across the state to lay off teachers. Figure 39 shows that pupil-teacher ratios -- in the form of ADM per total certificated personnel -- have remained virtually identical for city districts and REAAs, and are only about 30 percent lower than in borough schools. Pupil-teacher ratios declined by roughly one-third for all types of school districts during the 1970s, but except for the 1987-88 school year, the ratios have stabilized since the late 1970s at around 14 for borough schools and 10 for REAAs and city districts.

Figure 37. Personnel Expenditures as a Percentage of Total Expenditures and of Total Instructional Expenditures

A. Share of Instruction Expenditures

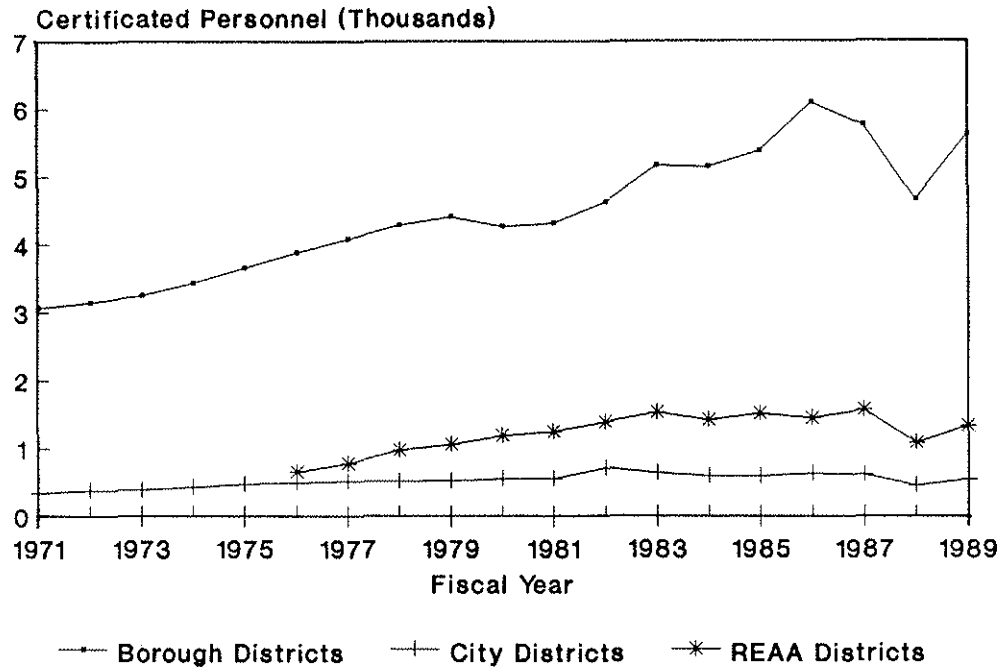


B. Share of Total Expenditures



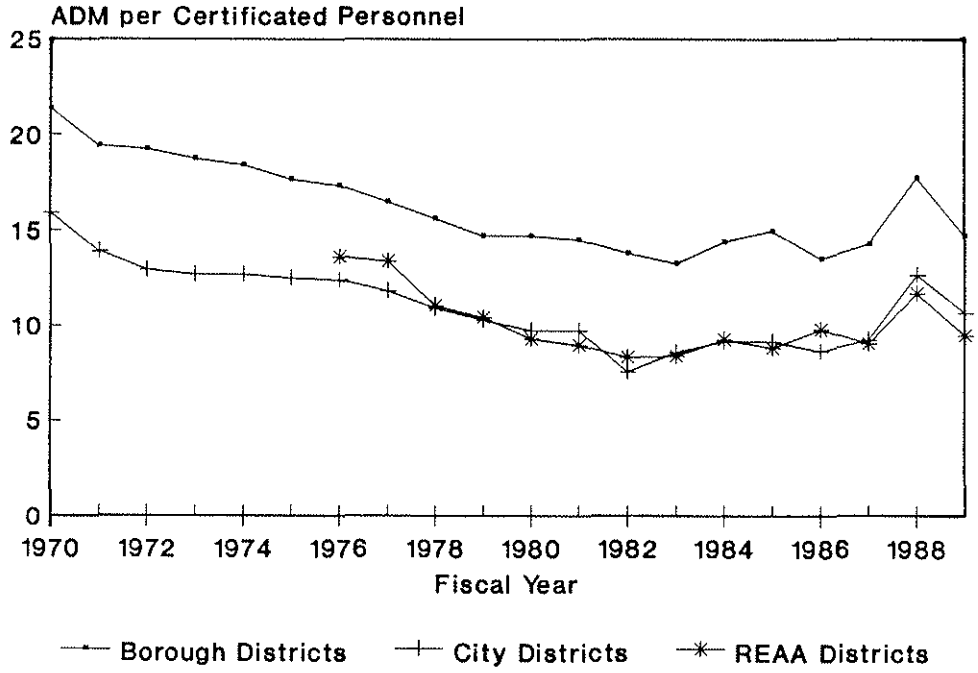
Source: Table D-12

Figure 38. Total Certificated Personnel for Borough, City and REAA Districts



Source: Table D-10

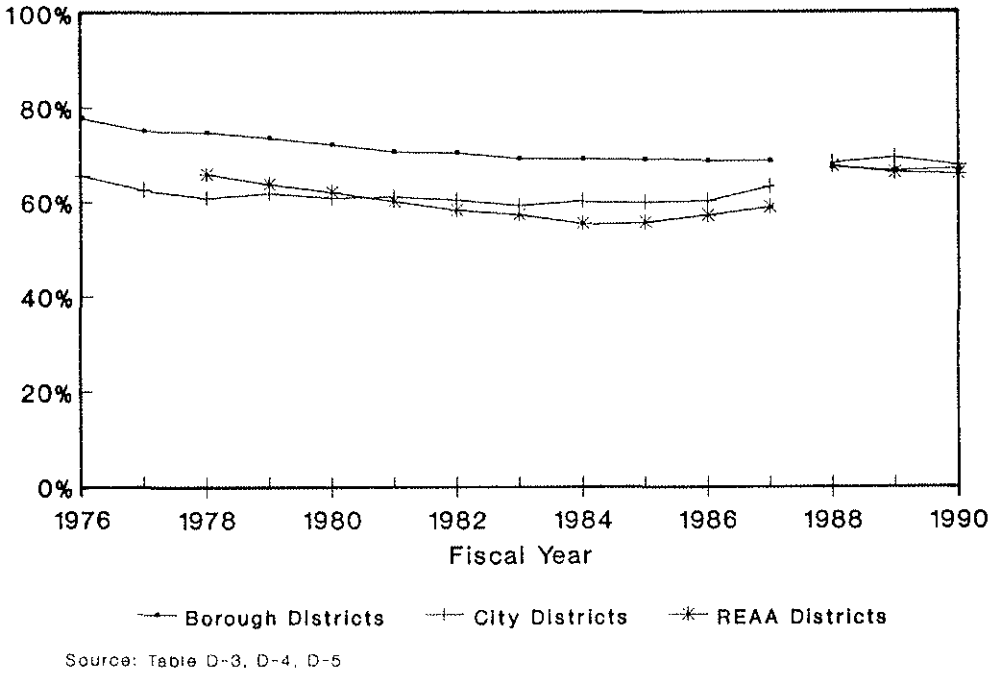
Figure 39. Average Daily Membership per Certificated Personnel for Borough, City and REAA Districts



Source: Table D-11

Regular instruction accounts for about two-thirds of all instruction and pupil support expenditures for all three types of districts, as shown in Figure 40. The smaller share of regular instruction for cities and REAAs in earlier years reflects a different set of accounting procedures (see Appendix B) which placed certain expenditure items under the pupil support category which are now included in instruction. The change in Fiscal Year 1988 makes it impossible to compare accurately percentages from before FY88 to shares after FY88. Figure 41 shows, however, that REAA districts have always had a higher share of other instruction costs than boroughs (29 percent of instruction and pupil support expenditures in FY90 for example, compared to 24 percent). After the accounting change, REAAs also had a higher share of other instruction than city districts.

Figure 40. Regular Instruction Expenditures as a Percent of Total Instruction and Pupil Support Expenditures

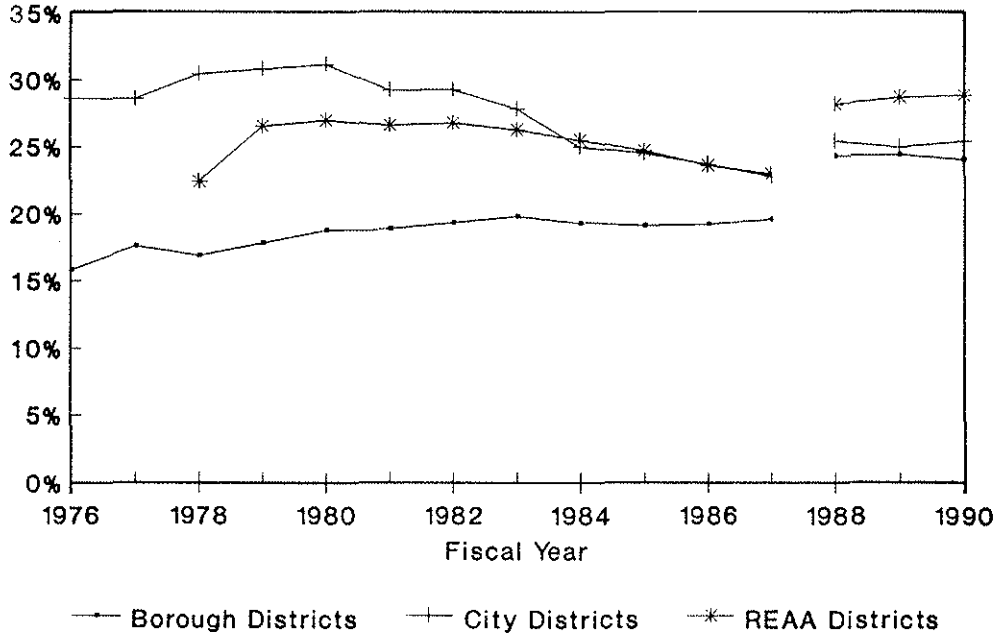


Source: Table D-3, D-4, D-5

Figures 42a through 42e show that the shares of various types of other instruction are quite different for borough districts, city districts, and REAAs. Special education, in Figure 42a, has grown steadily in importance in the borough districts, reaching 16 percent of instruction and pupil support expenditures in FY90, compared to 13 and 12 percent for cities and REAAs, respectively. REAAS spend much more for bilingual and bicultural education. Figure 42b shows that bilingual instruction has increased from 4 percent to 9 percent of REAA instruction and pupil support costs, while increasing only from one to two percent for borough and city districts. City districts, on the other hand, have spent the most on vocational instruction. Figure 42c shows that vocational instruction has declined in importance in all three types of districts, but retains twice as high a share in city districts -- 9-10 percent of instruction and pupil support expenditures -- as in borough districts and REAAs.

Expenditures on gifted and talented instruction, compared in Figure 42d, have only been separated from special education in school district accounts since Fiscal Year 1988. They represent only one percent of total expenditures, but are highest in borough districts. Figure 42e shows how correspondence study has declined by two-thirds in the REAAs since Fiscal Year 1978, as village high schools

Figure 41. Other Instruction Expenditures as a Percent of Total Instruction and Pupil Support Expenditures



Source: Table D-3, D-4, D-5

opened throughout rural Alaska. Correspondence no longer accounts for a much larger share of instructional expenditures than it does for cities and boroughs. The remaining category of instruction and pupil support expenditures, pupil support, shifted from highest among REAAs to lowest after the accounting change, as shown in Figure 43. As described in Appendix B, the items reallocated into instructional categories from pupil support include boarding home services, psychological services, speech pathology, and in-service training. Unfortunately, we do not have detailed enough expenditure data in order to determine which of these costs are so much larger for the REAAs.

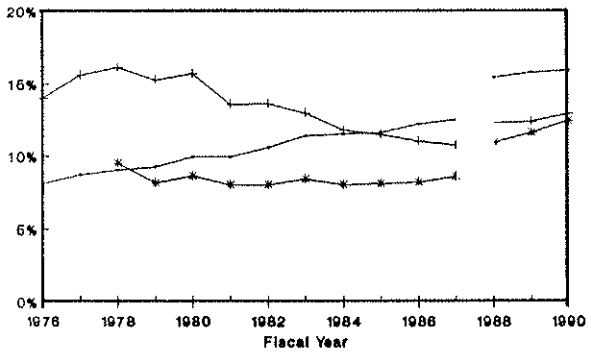
Other Costs

Since their inception, the REAA schools and districts have cost more to administer. Figure 44 compares real general support expenditures per pupil for boroughs, cities, and REAAs. General support costs -- school administration and district administration -- have grown rapidly for all types of districts. The large jump in Fiscal Year 1988 for REAAs, and, to a lesser extent, for city districts, coincides with the timing of accounting changes in instruction and pupil support expenditures. The expenditures included in our general support category did not officially change with the new accounting system, but it is possible that some costs formerly counted as pupil support were reallocated to the principal's office in FY88 rather than to types of instruction. So it is not clear if the data are strictly comparable over time. Nevertheless, Figure 44 shows that REAAs spend an incredible $2,300 per pupil on general support, compared to $1,500 for city districts, and a more modest $900 for borough districts.

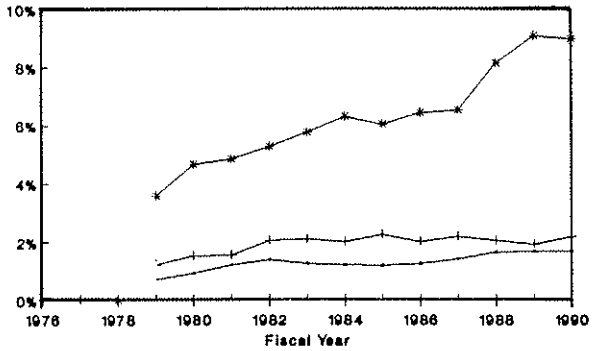
Does the enormous cost of administering REAA districts result from the small size of schools, or the large number of dispersed sites? Or is it just a case of the high cost of operating any program in

Figure 42. Other Instruction Expenditures as a Percent of Total Instruction and Pupil Support Expenditures by Type of Instruction

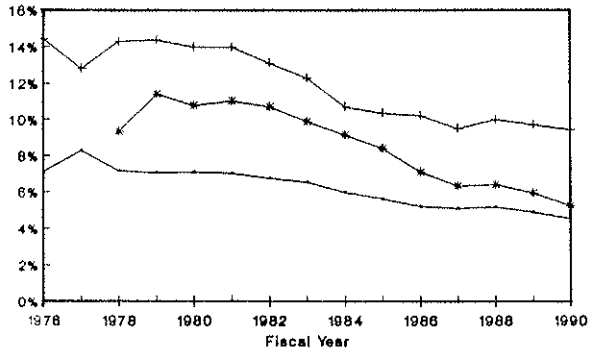
A. Special Education



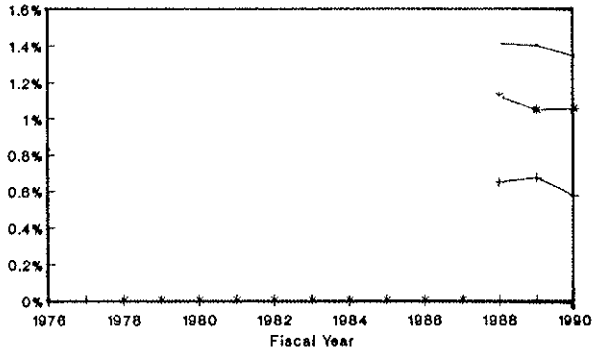
B. Bilingual and Bicultural



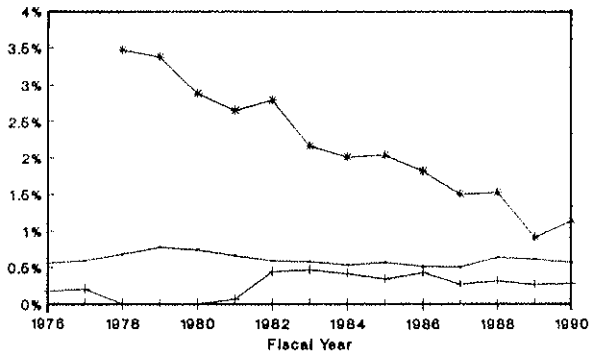
C. Vocational Education

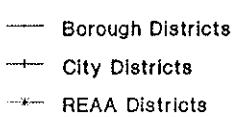


D. Gifted and Talented



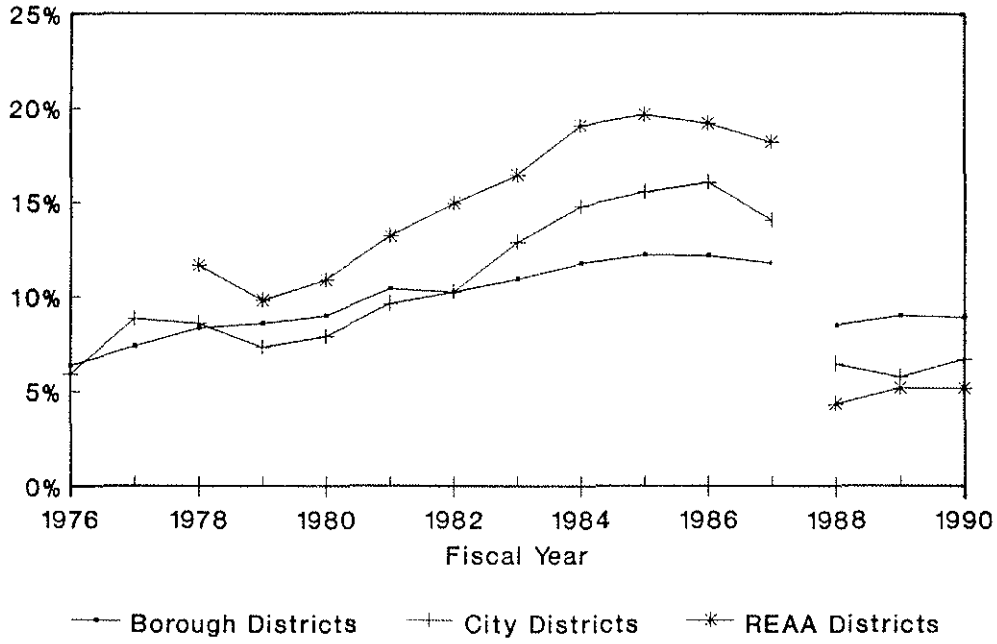
E. Correspondence Study





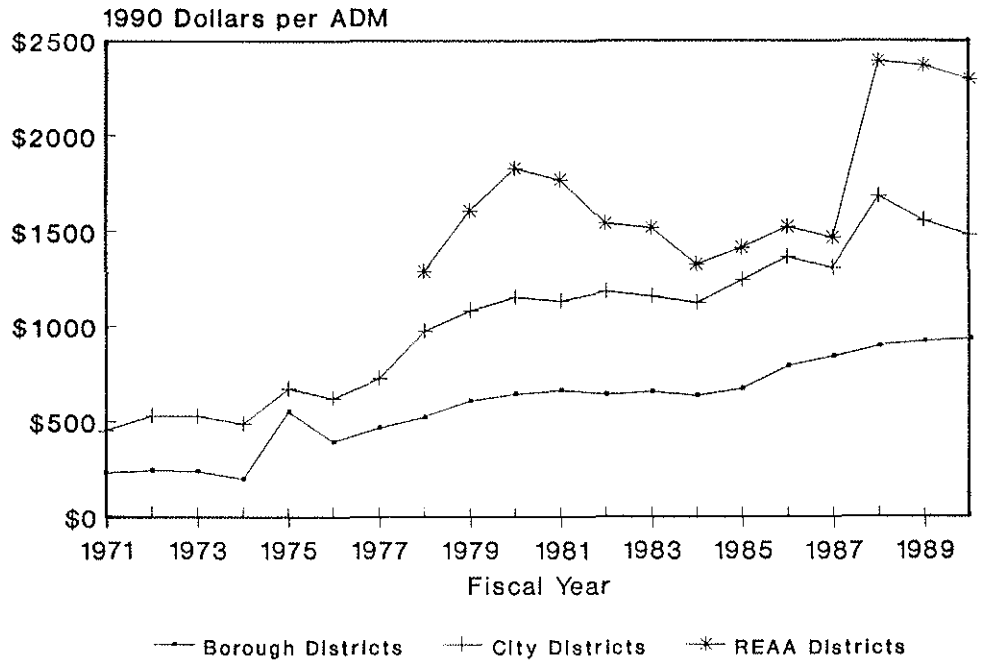
Source: Table D-3, D-4, D-5

Figure 43. Pupil Support Expenditures as a Percent of Total Instruction and Pupil Support Expenditures



Source: Tables D-3, D-4, D-5

Figure 44. Real General Support Expenditures per Pupil



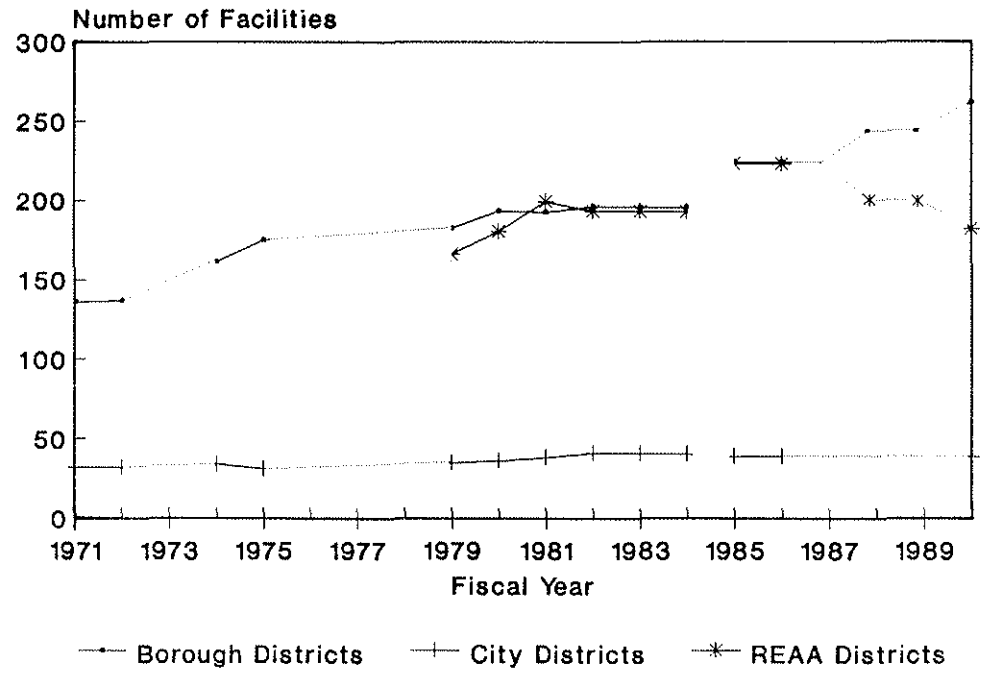
Source: Tables D-3, D-4, D-5, D-6

rural Alaska? We address this question first by examining trends in operations and maintenance costs for the three types of school districts. Then we examine more closely how the number of school sites, the size of enrollment, and other factors affect various indicators of the cost of education.

Construction of New High Schools in Rural and Urban Areas

During the 1970s and early 1980s, Alaska school districts constructed hundreds of new school buildings. Although many of these new facilities replaced older buildings which were converted to other uses or demolished, Figure 45 shows that the total number of educational facilities increased by over 100. The facilities counts in Figure 45 are compiled from the Alaska Department of Education Directory. The increment for cities and REAAs shown for Fiscal Year 1985 apparently reflects a change in the way facilities were counted, so later figures are not exactly comparable with the earlier ones. One can see from Figure 45, however, that REAAs currently contain about three quarters as many facilities as borough districts, although they contain less than one-fourth as large an enrollment. From FY88 to FY90, the decline in the number of facilities in REAAs and the accompanying increase in facilities in boroughs is caused by the incorporation of three REAAs (Northwest, Lake and Peninsula, and Aleutians East) into boroughs.

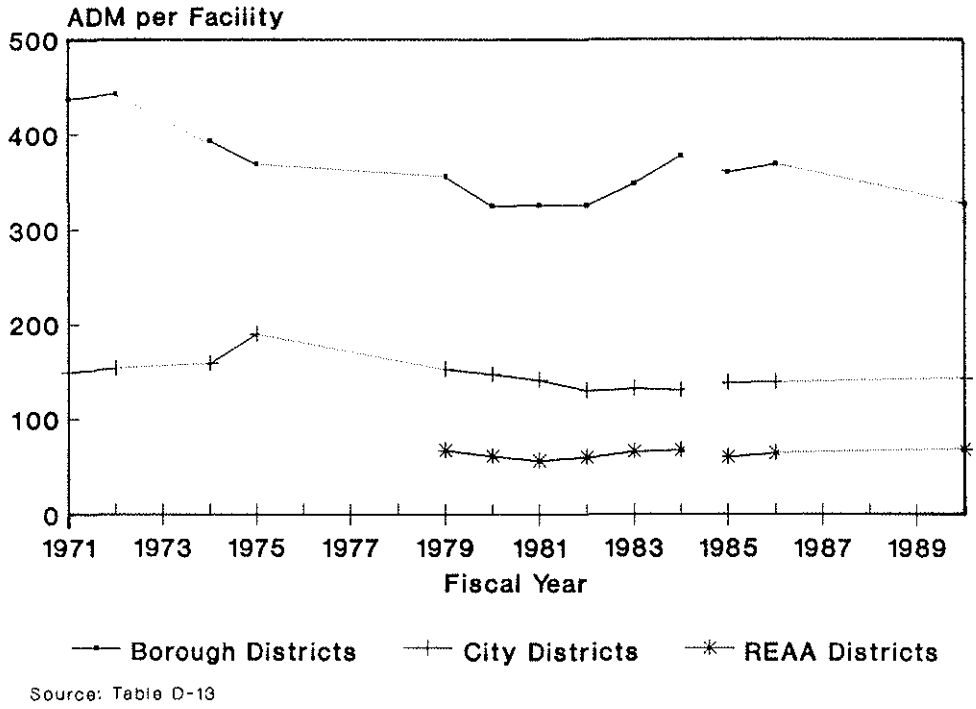
Figure 45. Total Number of Facilities



Source: Table D-13

With increasing suburbanization of Alaska and construction of schools in newly settled neighborhoods, the number of pupils per facility declined during the 1970s for borough districts. Figure 46 compares ADM per facility, for borough, city, and REAA districts. Despite construction of dozens of new rural high schools, ADM per facility for REAAs remained practically unchanged, averaging around 60 to 70 pupils per school. REAAs have the same pupil-teacher ratio as the city districts, (see Figure 39), but have a far smaller number of pupils (and teachers) on the average in each facility.

Figure 46. Average Daily Membership per Facility

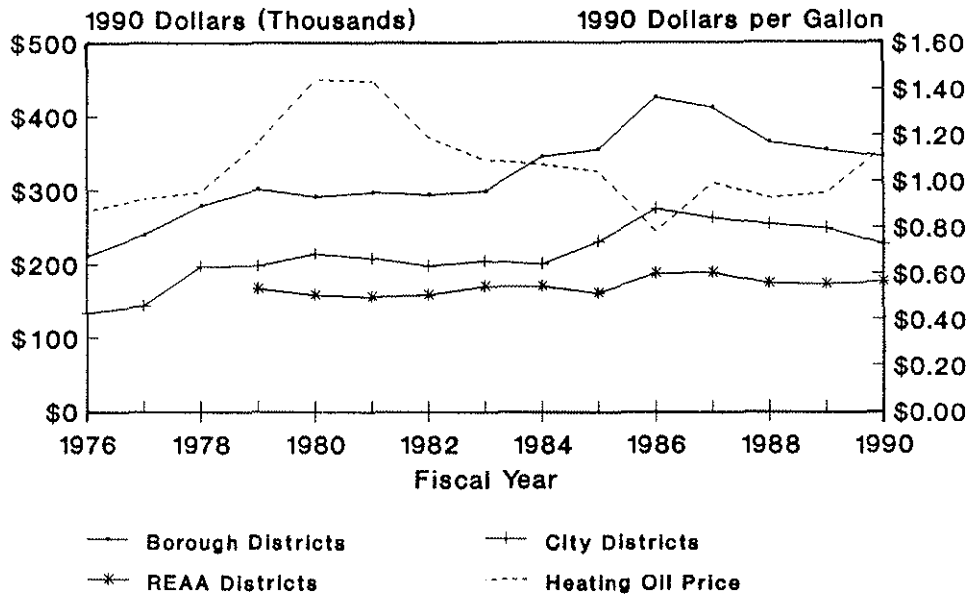


Source: Table D-13

Operations and maintenance costs per ADM are much higher for REAAs -- $2,600 in FY90, compared to $1,600 for city districts and about $1,000 for borough districts -- but they are less per facility and not growing as fast. Figure 47 shows that operations and maintenance expenditures per facility have grown since Fiscal Year 1976 at an annual rate of 3.9 percent more than inflation for city districts, and 3.5 percent more than inflation for borough districts. Even ignoring the rapid growth in costs during the pipeline era, real operating and maintenance costs per facility grew at an annual rate of 1.3 percent for borough districts, and 1.3 percent for city districts between Fiscal Years 1979 and 1990. In contrast, real operating and maintenance costs per facility remained nearly constant for REAAs during this period.

One possible explanation of the rising real operations and maintenance costs is that the price deflator used to subtract the effects of inflation does not capture changes in prices of inputs needed for this function. The price deflator used for the numbers shown in Figure 47 is the same as we have been using for all education expenditures: the implicit price deflator for Other Services in the Alaska Gross Product series. The implicit price deflator for Other Services is mostly an index of labor costs, so it corrects mainly for changes in salaries and benefits per employee. The reader may recall from Figure 23, however, that personnel expenditures constitute only about one-half of operations and maintenance costs. Other major expenditures on operations and maintenance include costs for electricity and space heating. In most areas of Alaska, electricity is generated from oil or natural gas, and oil is the main boiler fuel for space heating. We have added a real fuel cost index -- the retail price in Fairbanks of number 2 diesel oil deflated by the same price deflator for Other Services -- in Figure 47 for comparison to the series for real operations and maintenance costs per facility. One can readily see from the figure that changes in fuel prices do not explain changes in operations and maintenance costs for Alaska school districts.

Figure 47. Operations and Maintenance Expenditures per Facility and Price of Heating Oil, 1990 Dollars



Note: Number of facilities is interpolated for some years

Source: Table D-14 and Fairbanks North Star Borough

If one looks closely at the pattern of costs displayed in Figure 47, one can see that nearly the entire increase in real borough and city operations and maintenance costs per facility took place in two brief periods. The first period -- 1974 through 1978 -- was the period of construction of the Trans-Alaska Pipeline, while during the second period -- 1983 through 1986 -- many state-funded new urban schools were completed. In the 1980s, operations and maintenance costs for borough schools increased by more -- $34 million in 1990 dollars -- than the entire REAA operations and maintenance budget in FY90 -- $32 million. While Alaska boroughs districts contain some schools in high-cost rural areas, notably in the North Slope Borough, these schools make up a small fraction of the total operations and maintenance expenditures. We conclude that state-funded construction of larger, more elaborate school facilities in the 1980s in the more urban areas of Alaska has contributed as much to the increase in operations and maintenance costs as the entire rural school system.

How Much More Does a Small School Cost?

The conclusion that construction of new facilities in city and borough school districts has been a significant factor explaining the increase in operating expenditures of Alaska school districts is not to deny that it costs more per pupil to run a small school than it does to run a larger school. How much more? In the remainder of this chapter, we address the issues of the effect of size of the school and the number of school sites on the cost of education. A problem we have noted above is that the state foundation formula, which awards more funds per pupil for smaller schools, is so important in determining overall school budgets that it may drive the apparent cost more than any other factor. We must, therefore, interpret the results of our analyses with caution. We take a twofold approach. First we isolate certain components of school costs, and try to explain variations in the components. For this analysis we estimate a series of equations explaining variations in the number of instructional

personnel per pupil in a district, and variations in district-wide average costs for non-instructional expenditures and for operations and maintenance expenditures. Second, we examine average revenues and expenditures per pupil for individual schools in the Kenai Peninsula Borough School District and compare them to schools in the Matanuska-Susitna Borough.

Number of Teachers

We estimated equations for the number of instructional personnel per ADM as a function of the number of schools in the district, average enrollment per school, and other variables likely to affect pupil-teacher ratios that we could measure for all school districts. These other factors include district enrollment per ADM, the ratio of total FTE personnel to total certificated personnel, whether district headquarters is accessible by road from an urban center (includes Juneau and Ketchikan School Districts), and whether most schools in the district are accessible by road from the district headquarters. We estimated equations for the total number of certificated personnel and for the number of teachers certified for various types of instruction, using data from the 1987-88 school year (FY88). We used Alaska Education Directory data for the number of schools, the number of teachers by certificate type, and enrollment, while ADM and total FTE personnel came from the Fiscal Year 1988 Department of Education annual report, *Education in Alaska.*

The complete results of estimating the equations for total certificated personnel and teachers in six categories of instruction are shown in Appendix Table C-3. We could not estimate equations for teachers in gifted-talented programs because not enough school districts have separate programs of this type. Table 5 shows elasticities drawn from the coefficients in Table C-3. The elasticities estimate the percentage change in the number of teachers per pupil associated with a one hundred percent change in the number of schools or the average enrollment per school. We do not include estimated effects in Table 5 when the estimated coefficients are not statistically significant from zero, i.e., when the effect may be due to chance rather than to a change in the number or size of schools.

The estimated effects in Table 5 show that a one hundred percent increase in the number of schools in the district (a district with twice as many sites) is associated on the average with a 4 percent decrease in the total number of certified teachers per pupil. On the other hand, a district with twice as many pupils per school has on the average 19 percent fewer teachers per pupil, after we control for other factors which might affect pupil-teacher ratios. The estimates are too imprecise to say for certain whether there is any effect of the number of schools in the district on the number of regular classroom teachers per pupil, but a doubling of enrollment per school is associated with 20 percent fewer teachers per pupil in regular classroom instruction. We likewise cannot say whether the per pupil number of resource teachers (teachers assigned to the district rather than to a particular school) and special education teachers are related to the number of schools in the district, but we do estimate that they decline by 33 and 24 percent, respectively, with a doubling of enrollment per school.

Estimated effects for bilingual and vocational education in Table 5 show a large personnel savings associated with increases in both school enrollment and the number of schools. It is likely that part of the reason for this result is that these two types of instruction take up only a portion of the curriculum. A district can realize large savings from using its bilingual and vocational education teachers to teach a larger number of students for part of the time. Table 5 also shows that districts with more schools have fewer correspondence teachers, other things equal. Although these results generally suggest that small schools need more teachers per pupil than large ones, we interpret them with caution. Rural districts have more bilingual and correspondence teachers per pupil, and also enroll fewer pupils per school. The effects noted in Table 5 may not necessarily be describing cause and effect. The percentage

Table 5. Estimated Percentage Change in the Number of Teachers per Pupil with a One Hundred Percent Change in the Number of Schools and Average Enrollment per School

(standard errors in parentheses)

Type of Teacher	Number of Schools	Average Enrollment per School
Total Certificated Personnel per ADM	-3.9% (1.9%)	-19.0% (2.9%)
Regular Classroom Teachers per ADM	—	-20.1% (2.9%)
District Resource Teachers per ADM	—	-33.4% (14.4%)
Special Education Teachers per ADM	—	-24.1% (12.8%)
Bilingual/bicultural Teachers per ADM	-70.8% (13.5%)	-52.7% (22.5%)
Vocational Education Teachers per ADM	-43.0% (9.6%)	-55.3% (15.2%)
Correspondence Teachers per ADM	-59.8% (18.2%)	—

Source: Appendix Table C-3.

change in total teachers with a change in school enrollments is smaller than it is for the various types of teachers, because districts emphasizing less of one type of program are likely to have a larger commitment to another instructional program.

Administration and Miscellaneous Costs

In Appendix Tables C-4 and C-5 we show the results of estimating equations for several types of support expenditures and miscellaneous operating fund expenditures as functions of the number of schools and the average enrollment per school in the district. We also controlled -- in a similar manner as we did in the equations for teaching personnel -- for district ADM per enrollment, total full-time-equivalent personnel per ADM, the ratio of total certificated personnel to total FTE personnel, whether the district headquarters is accessible by road from an urban center, and whether most schools in the district are road-accessible. Table 6 contains the effects of the number of schools and average enrollment per school on several categories of support and miscellaneous expenditures. We estimated elasticities for pupil support, school administration, district administration, and total support expenditures. School administration and district administration are the two components of the general support measure analyzed in Chapters 4 and 5.

Table 6. Percentage Change in School District Support and Miscellaneous Expenditures with a One Hundred Percent Change in the Number of Schools and in the Average Enrollment per School

(standard errors in parentheses)

Type of Expenditure	All Costs		Personnel Costs		Nonpersonnel Costs	
	Number of Schools	Average Enrollment per School	Number of Schools	Average Enrollment per School	Number of Schools	Average Enrollment per School
Total Support	103% (4%)	85% (9%)	95% (5%)	98% (10%)	85% (7%)	88% (15%)
Pupil Support plus Admin. Support	118% (8%)	107% (16%)	128% (16%)	120% (32%)	109% (11%)	96% (22%)
Pupil Support	127% (18%)	132% (37%)				
Admin. Support	187% (35%)	103% (71%)				
District Support	79% (6%)	84% (12%)	79% (7%)	84% (13%)	81% (9%)	88% (18%)
Fund Transfers	106% (23%)	90% (47%)				
Pupil Activities	74% (8%)	64% (17%)				

Source: Appendix Tables C-4, C-5.

Table 6 suggests that total support expenditures are nearly exactly proportional to the number of schools in the district, but increase by only 85 percent when enrollment per school increases by 100 percent, given the other factors affecting support expenditures. A standard error of 9 percent for the estimated elasticity of 85 percent for the effect of enrollment per school on total support costs indicates that the effect was between 76 percent and 94 percent for about 60 percent of the districts. We could also say that an increase in enrollment per school would appear to have reduced support expenditures by at least a little for about 95 percent of the districts. Table 6 suggests that districts are not likely on the average to be able to save any pupil support or school administration costs per pupil in larger schools. The equation results show a much better fit (lower standard errors) for the sum of pupil support and school administration expenditures than for each item estimated separately, suggesting that different districts may substitute these two expenditure items for each other.

District administration, rather than pupil or school administration, appears to be the component of support costs which districts with larger schools can save on a per pupil basis. Table 6 suggests that doubling the size of schools in a district increases district administration costs by 84 percent on the average, given the other factors affecting support expenditures. Table 6 also contains separately estimated effects for personnel and nonpersonnel components of total support, school administration plus pupil support, and district administration expenditures. Although the estimated elasticities differ somewhat for the two components of expenditures, the standard errors are large enough so that one

cannot say that the effects of school size on nonpersonnel expenditures differs significantly from the effects on the personnel component for any category of support costs.

Table 6 also shows the effects of the number of schools and average enrollment per school on fund transfers and pupil activities expenditures in the school operating fund. The standard error is large enough on the elasticity for the effect of enrollment per school on fund transfers that we cannot say that districts with larger schools subsidize other activities such as school lunches more or less per pupil than districts with smaller schools. Pupil activities expenditures, on the other hand, are much smaller per pupil in districts with larger schools. Doubling enrollment per school only increases pupil activities expenditures on the average by about two-thirds, given other factors affecting these costs. We do not show elasticities for community services expenditures because our equation was unable to explain the variation from district to district in this type of expenditure.

Operations and Maintenance Costs

We estimated equations for the effects of the total square feet of building space in the district and the average square feet per building on the nonpersonnel component of operations and maintenance expenditures. In these equations, we also controlled for fuel prices and electric prices in communities in the district, and geographic regions representing climate zones. We obtained data for fuel and electric prices from the Alaska Energy Authority (1990). Table 7 shows elasticities estimated for the effects of total square feet of facilities and average square feet per facility on nonpersonnel operations and maintenance expenditures. The elasticity for average square feet suggests that a district with the same total square feet but half as many buildings (so average square feet was 100 percent larger) would save 47 percent of nonpersonnel operations and maintenance costs. The results of our analysis leave little doubt that small schools face a significant disadvantage for this component of education costs.

Table 7. Percentage Change in Non-Personnel Operations and Maintenance Costs With a One Hundred Percent Change in the Total Area of School Buildings and in Average Square Feet per School
(standard errors in parentheses)

Total Area of School Buildings in District	Average Square Feet per Building in District
88% (7%)	-47% (12%)

Source: Appendix Table C-6

Kenai Peninsula and Mat-Su Schools

We were not able to obtain data from all school districts about the actual expenditures of individual schools. However, the Kenai Peninsula and Mat-Su School Districts did provide us with data on total expenditures and ADM for each school in their districts. Both districts include a number of diverse communities ranging from towns and suburban areas located along the highway system to small rural villages without road access. Using information from these districts, we can compare the amount of foundation revenues each school generates, based on computed instructional units, to actual

expenditures. This comparison enables us to examine directly how much it costs each district to run its small schools and whether the foundation formula appears to compensate these districts adequately for their remote sites.

Figures 48a, 48b, and 48c compare foundation revenue entitlements in Fiscal Year 1990 with actual expenditures for schools in the Kenai Peninsula Borough School District. Figure 48a compares revenues and expenditures for schools with different enrollments, Figure 48b compares schools by grade level, and 47c compares schools on the road system with schools off the road system. Figures 49a, 49b, and 49c show the respective comparisons for schools in the Mat-Su Borough School District. The difference between foundation entitlements and expenditures for any selected group of schools represents the amount of funds to supplement foundation revenues required from local and federal sources. The expenditure numbers shown in Figures 48 and 49 do not include the cost of district administration and other district-wide costs which cannot be allocated to individual schools. These costs totaled about $1,500 per ADM for both districts in FY90.

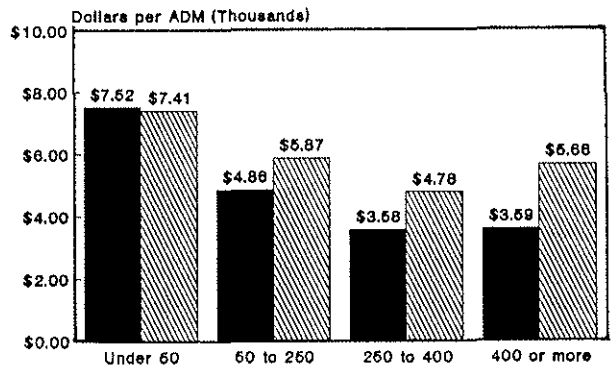
Figure 48a shows that for Kenai Peninsula Schools, foundation revenues closely match expenditures -- about $7,500 per pupil -- for schools with ADM of fewer than 50. For larger schools, foundation revenues fall short of expenditures, so other sources of funds are required. The larger the size of the school, the more local and federal funds are required, with the gap growing to $2,000 per ADM for schools with more than 400 students. For schools on the Kenai Peninsula, the foundation unit formula increases funding for smaller schools by more than extra amount the district says they cost. Surprisingly, the Mat-Su Borough School District shows a completely different pattern in Figure 49a. Foundation revenues generated from the smallest schools averaged $9,000 per ADM, while expenditures actually totaled $12,600. The larger the number of students per facility, the less local and federal funds were required to run the schools. For the largest Mat-Su Schools, foundation revenues and expenditures evened out at $3,900 per ADM.

Figure 48b shows that while foundation support for Kenai Peninsula's combined elementary-secondary facilities (all are small schools) closely matches revenues, the district spends more per ADM on secondary schools, compared to foundation entitlements, than it does on elementary schools. For the Mat-Su district, the difference is much smaller. The Kenai Peninsula School District high schools spend about $2,800 per ADM more than the foundation provides the district with revenues, junior high schools spend $1,200 more, and elementary schools $1,000 more. The Mat-Su School District, in contrast, spends $700 more per ADM on its high schools than the foundation entitlement, $600 more on junior high schools, and $900 more on elementary schools. Actual spending on secondary schools in the Kenai Peninsula district is much larger than spending on secondary schools in the Mat-Su district. Apparently, the policy of the Kenai Peninsula school board is to spend more of the available tax revenues on secondary school buildings and programs. Since Kenai Peninsula high schools are large, it is difficult to distinguish the effects of pursuing this policy objective from the effects of the higher intrinsic cost of operating small schools.

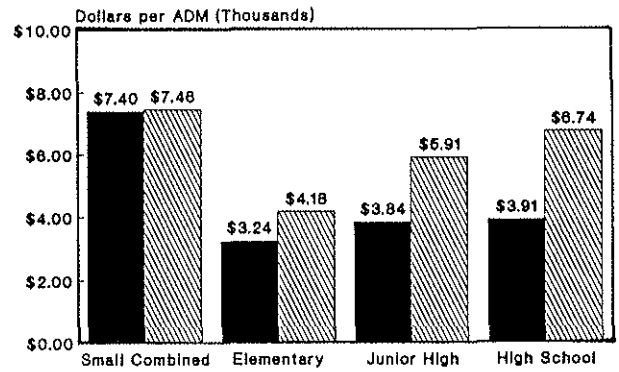
Figure 48c shows that Kenai Peninsula spending for road-accessible schools averages $5,800 per ADM, only about $700 per ADM more than foundation entitlements. Spending for schools which are not accessible by road, on the other hand, averaged nearly $10,000 per ADM, while generating only $7,100 in foundation revenues. In the Mat-Su School District, Figure 49c shows that road-accessible schools cost about $4,900, about $900 per ADM more than the amount generated by foundation entitlements. Spending for non-road-accessible schools averaged over $12,000 per ADM, while generating $9,000 in foundation revenues. Both districts seemed to agree that schools which are not accessible by road cost more than the foundation recognizes, at least for basically road-accessible suburban districts like the Kenai Peninsula and Mat-Su.

Figure 48. Average Revenues and Expenditures per ADM in the Kenai Peninsula Borough School District, FY90

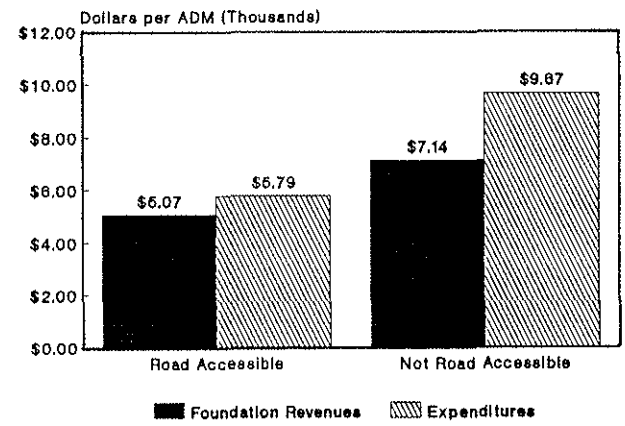
A. By Size of School



B. By Grade



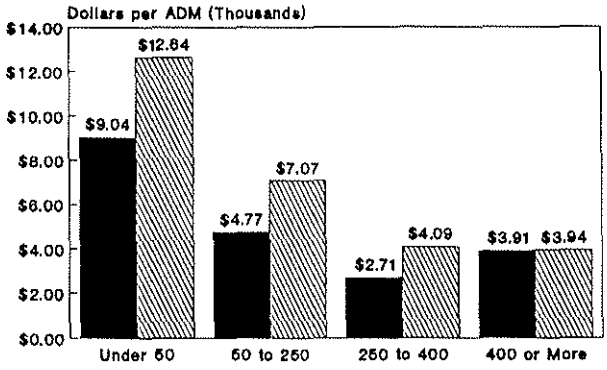
C. By Road Accessibility



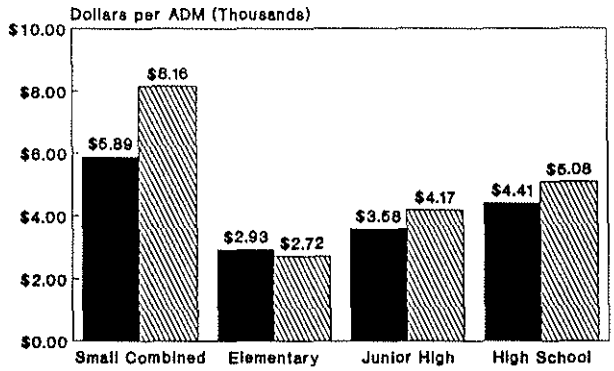
Source: Table D-8

Figure 49. Average Revenues and Expenditures per ADM in the Mat-Su School District

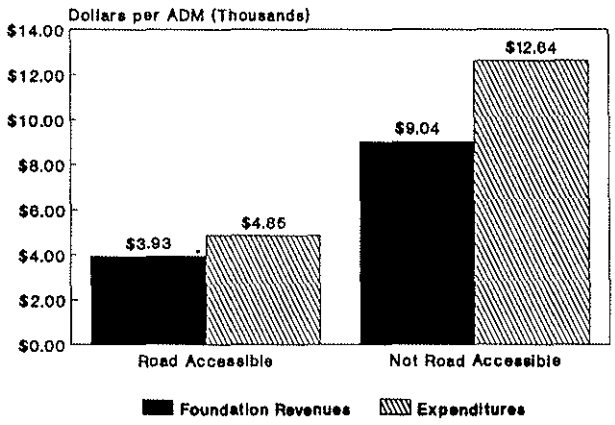
A. By Size of School



B. By Grade



C. By Road Accessibility



Source: Table D-9

The Cost of Small Districts

Alaska school districts vary greatly in size, ranging from the Anchorage School District, with over 80 different facilities and 40,000 students, to a number of small city and REAA districts with only one or two sites and as few as a hundred students. Together with the problem of assessing the effect of small schools on the spiralling cost of education comes the question of the added cost, measured on a per pupil basis, of running school districts containing only a handful of schools. We address this issue from two separate directions. First, we review what our equations estimating the effects of different factors on various components of education costs say about how the number of schools in the district affects costs. Then we compare these results to the way the public school foundation formula awards funds to multiple-site and single-site school districts.

Effect of Number of Schools on Types of Costs

The first column of numbers in Table 5 shows the estimated effects of a 100 percent increase in the number of schools in the district on the average number of various types of teachers per pupil, given average enrollment per school and a number of other factors. We calculated these numbers from the equations shown in Appendix Table C-3. The figures in Table 5 suggest that a district "A" with twice as many schools as district "B" but with the same average enrollment per school can save on the average about 4 percent of its total certificated teaching staff per ADM relative the district "B." The savings apparently come entirely from bilingual/bicultural teachers, vocational education teachers, and correspondence teachers. The results suggest that districts with few schools must hire more of these teachers per ADM relative to districts with a larger number of school sites, but relatively few teachers in most districts are involved in these programs.

Table 6 shows estimates for the effect of the number of schools on the total cost of various support and miscellaneous items. Total support costs actually increase approximately in proportion to the number of schools in a district. The estimated elasticity shows a 103 percent increase in total support costs with a 100 percent increase in the number of schools in the district, given average enrollment per school and the other factors shown in the equation in Appendix Table C-4. However, the standard error of 4 percent indicates that we cannot say with reasonable certainty that the effect differs from a 100 percent, or exactly proportional increase in costs.

The numbers shown in Table 6 show that on the average, both pupil support costs and the cost of school administration increase more than in proportion to the number of schools in the district. District administration costs, on the other hand, increase far less than in proportion to the number of schools in the district, given average enrollment per school. Since pupil support and school administration together add up to a somewhat greater dollar amount than district administration for the average district, the net effect of increasing the number of sites in the district is that total support expenditures increase slightly more than in proportion to the number of schools in the district. Table 6 shows that the same conclusions apply to the personnel components of the various types of support expenditures as apply to the total. This should not be surprising, since personnel costs represent the bulk of support costs (see Figure 24). For the nonpersonnel component of support costs, however, Table 6 suggests that the savings per school in district administration exceed the added cost per school for pupil support plus school administration. On the average, a school district "A" with twice as many school sites but the same average enrollment per school as district "B" needs to spend only 85 percent more on nonpersonnel items in support costs.

Table 6 also shows statistical evidence for the effects of the number of schools on miscellaneous costs. These results suggest that amount of transfers from the operating fund to special funds may increase slightly per school in districts with more schools. However, the standard error is high enough that we cannot say with confidence that the effect of the number of schools is other than proportional to the number of schools, given the other factors. On the other hand, districts with fewer schools do spend more per school for pupil activities. The figure in Table 6 suggests that a school district "A" with twice as many school sites but the same average enrollment per school as district "B" needs to spend only 74 percent more on pupil activities.

The findings for the effects of total area and area per building on the nonpersonnel component of operations and maintenance costs -- about one-half of all operations and maintenance costs -- can also be applied to the question of the effect of small districts on the cost of education. According to the numbers in Table 7, a school district "A" with twice as large a total square footage of building space but the same average square feet per facility as district "B" needs to spend only 88 percent more on nonpersonnel operations and maintenance costs. That result implies that the larger district can save about 12 percent of these costs per school relative to the smaller district.

Summary

Regional Education

The state takeover of Native education from the U.S. Bureau of Indian Affairs, and creation of Regional Education Attendance Areas (REAAs) has had a large impact on the total cost of education in Alaska despite their relatively small ADM. In Fiscal Year 1990, REAAs spent over $12,000 per pupil on instruction, support, and operations and maintenance. This was about twice as much as the average per pupil spending for borough districts and nearly 50 percent more than the amount spent by city districts. We have noted that REAAs spend nearly 40 percent more on instruction and pupil support than city districts do, but do not have lower pupil-teacher ratios. One reason we noted for the higher REAA spending on instruction is that REAAs spend more proportionately on special and bilingual education.

We have also noted that REAAs spend more by far -- 160 percent more per pupil than borough districts and 60 percent more per pupil than city districts -- on general support and operations and maintenance. Although most Alaska city districts serve small communities with a population of less than 1,000, REAAs serve even smaller communities which can only support very small schools. We have noted that non-teaching costs are higher in small schools. On the other hand, we found that operations and maintenance costs increased more rapidly in the 1980s in borough districts than in city districts, and more rapidly in city districts than in REAAs. Operations and Maintenance costs for REAAs have actually declined relative to inflation during the past decade. We concluded that state construction spending for new and more elaborate school buildings -- the main force driving up urban school district operations and maintenance costs -- has had as large an effect on the amount spent by all school districts on operations and maintenance costs as the REAAs.

Small Schools

Our investigation of the structure of education costs found that the following comparisons apply on the average when the enrollment of the average school in a district is twice as large but nothing else differs:

1. Pupil-teacher ratios are 16 percent larger.[16]

2. Total support costs are 15 percent lower per ADM.

3. Pupil support and school administration are, if anything, larger, so savings in support costs are all derived from district administration.

4. Pupil activities costs are one-third less per ADM. In addition, we found that non-personnel operations and maintenance costs are almost 50 percent lower per square foot of school area when the size of the school building is twice as large.

It is more difficult to translate these results into conclusions about education equity for the state's school foundation program. In trying to determine whether the foundation formula adequately compensates districts with small schools, our analysis is inherently limited. The formula awards substantially more grant funds for smaller schools. Since districts will spend this money whether or not they really "need" it, we can't easily disentangle actual cost from the availability of revenues. We tried to correct for this problem as much as possible by estimating effects on individual components of the cost of education, but we can't pretend to have solved it completely.

Another way around this problem is to examine the relationship between foundation revenues and expenditures for districts with both small and large schools such as the Kenai Peninsula and Mat-Su School Districts, since these districts have the option of reallocating funds awarded for one school to pay for the cost of another school. We found that both districts spent much more than the foundation compensated them for schools which were not served by road, implying really that the formula would provide greater education equity if it could apply a higher area cost differential for non-road accessible areas of a basically roaded district. But we found conflicting results from these two districts about the adequacy of foundation support for small versus large schools. One cannot separate technical issues of the cost of education any more easily from local school board policy to fund certain types of schools than from state policy embedded in the foundation formula. In the same sense, the different instructional mix in REAAs than in urban districts -- in particular a greater emphasis on bilingual and vocational education -- is a local policy choice which has implications for the cost of instruction and administration in these districts.

The Single-Site Issue

Throughout most of its history, the school foundation formula calculated a larger basic need, with an associated larger grant award, to districts with a total ADM of less than 1,000. Beginning with the 1987-88 school year, the formula now calculates a larger basic need for schools in small communities but not specifically for small districts. A group of districts with one or two school sites protested that they were being unfairly treated under the new formula, alleging that their actual cost of administering districts with few sites is higher than those costs for districts with multiple sites (Anonymous, 1989). Our investigation of the structure of education costs found that the following effects occurred on the

average when the number of schools in a district doubles but total ADM in the district remains the same and nothing else changes:

1. About 4 percent fewer teachers are required (pupil-teacher ratios increase by 4 percent).

2. The savings in instructional costs comes entirely from bilingual, vocational, and correspondence education programs.

3. District administration cost falls by 21 percent.

4. But pupil support plus school administration increases by 18 percent for the district, completely offsetting the savings in district administration.

5. Pupil activities costs decline by 26 percent.

6. Nonpersonnel portion of operations and maintenance costs declines by 12 percent for the district.

These results imply that small districts spend more per pupil than larger districts for certain items, but the overall savings is slight. Total instruction costs increase little, since there are no apparent savings for regular instruction or special education. The pattern of spending on administration changes -- small districts centralize more administrative support in the district headquarters rather than in individual schools -- but there is no net change in costs. Districts with fewer sites do end up spending more per student on pupil activities, but this represents only 0.4% of operating fund expenditures for the typical school district. Overall, our analysis suggests that if two districts merge to create a new larger district, the combined school district can expect a savings of no more than about 5 percent of operating costs. On the basis of the data reviewed here, it is difficult to justify a significant increment to basic need for districts with a small number of sites.

VII. TAXPAYER EQUITY

The basic concept of taxpayer equity is that a taxpayer should pay taxes based on "ability to pay." Taxpayer equity is equity for taxpayers. It is related to but should not be confused with the issue of what is a fair contribution of tax support to expect from a taxing jurisdiction. In this study we concern ourselves only with ability of households to pay taxes to support education in the public schools. Equity for corporations is irrelevant to our study. In a private enterprise economy like the U.S., households own businesses and receive income from them, so looking at taxpayer equity for households indirectly addresses taxes paid by businesses as well.

In Alaska, most industrial and a large amount of commercial property is owned by households who do not reside in the state. We do not concern ourselves with equity issues for nonresidents beyond the extent to which fair treatment is required by interstate agreements or the U.S. constitution. We attempt no comparisons of how much Alaska households pay in local taxes relative to the amount similar households would pay in other states. Rather, we discuss ways of measuring what households who live in one part of the state pay compared to what these households would pay if they lived in other parts of the state.

In the remainder of this chapter we first review how the foundation formula treats the issue of taxpayer equity. Then we discuss how one would measure ability to pay for a household, and how to translate household ability to pay into measures of taxpayer equity for a community or borough. Third, we compare how much households in Alaska communities actually pay in local taxes compared to what we say is their ability to pay. Finally, we discuss how two potential adjustments in ability to pay -- for cost of living differences and demographic characteristics -- might affect our conclusions about taxpayer equity.

Taxpayer Equity in the Alaska School Foundation Formula

Prior to Fiscal Year 1988, the Alaska school foundation program addressed the issue of taxpayer equity with the concept of "equalization" in the level of state support. School districts in boroughs and cities had their foundation grant reduced by an amount which depended on their property tax base relative to the state average. From Fiscal Year 1979 through 1987, however, the largest amount which any district had to raise in local revenues amounted to only three percent of basic need. Furthermore, from Fiscal Years 1982 through 1987, the legislature enacted annual "supplemental equalization" bills which provided enough extra funds to local districts so that no local effort was really required (see Appendix A). The fact that the school foundation program did not require any local tax effort never meant that local governments stopped levying taxes for education. Rather, it meant that the entire amount of local taxes paid for education was applied to fund schools at a level above what the state defined as basic need.

When the legislature changed the local effort provision in 1987 to require local taxes again, it also raised the level defined as basic need so that most districts which had funded their schools far above basic need in the past did not lose a lot of foundation revenue. Under the new system, the state deducts an amount equivalent to the revenues which would be received by a tax of 4 mills on the full value of property in each city and borough district (there is still no local effort required for REAAs). But the legislature also placed a limit on the deduction from foundation support of 35 percent of the district's calculated basic need. In arguing that it has met the 35 percent limit a district may include not only its

revenues raised from property taxes but all other local revenues, state tuition grants, and the 10 percent of PL 81-874 funds which the state does not deduct from the foundation entitlement.[17]

The enormous petroleum property tax bases of the North Slope Borough and the city of Valdez have placed their school districts far above the limit in every year since the required local effort provision took effect in FY88. While the North Slope and Valdez School Districts have been able to meet 35 percent of basic need with a one or two mill tax levy, no other school district can consistently reach 35 percent with a 4 mill tax and all other applicable revenues. However, the Kenai Peninsula and Anchorage School Districts have approached the limit recently (see Figure 13).[18]

We have said that taxpayer equity means that taxpayers should pay taxes based on their ability to pay. Taxpayer equity does not coincide with a concept of equity based on equal per-capita or per-pupil local tax contributions. As we shall see, taxpayers' ability to pay is quite different from the ability of governments -- cities, boroughs, or school districts -- to raise revenues. For one thing, local governments differ greatly in the amount of economic activity which is carried out within their jurisdictions. For another, it is much easier to collect taxes from some forms of economic activity than from others. If one just looks at the oil industry, for example, it is easier for the city of Valdez to collect taxes with its huge, visible Alyeska pipeline terminal than it is for Anchorage, where many corporate decisions are made and many more oil industry employees live, but where there are no large pipelines, terminals, or production facilities, or refineries. Taxpayer equity means that despite enormous variations among communities in the amount of easily-taxed business activity which may take place within their borders, households with equal ability to pay should pay the same amount in taxes regardless of whether they live in a rich or a poor community. Achieving taxpayer equity, then, necessarily means that one should expect some school districts to be able to raise far more local revenues per pupil than others.

Taxpayer equity based on households' ability to pay can be measured across regions of the state -- say urban vs. rural -- or across groups within an area. However, we are interested in this study in taxpayer equity across local jurisdictions. Consequently, we limit our comparisons to average ability to pay and tax payments of households in one Alaska school district relative to average tax payments and ability to pay in another.

Measuring Ability to Pay

If taxpayer equity refers to households paying taxes based on ability to pay, how does one measure ability to pay? One could measure it in a variety of ways, based, for example, on income, wealth, or consumer spending. One usually associates ability to pay with some measure of income. An income-based measure, however, ignores assets such as shares of stock, limited entry permits, or even an education which may potentially produce income in the future. The most comprehensive definition of ability to pay then would be total household wealth, including potential future income as well as investments which have the potential to produce income. Unfortunately, it is utterly impractical to try to measure such a comprehensive definition of wealth, much less try to tax it. Governments do try to tax a subset of wealth: real and personal property, but this concept of wealth is not nearly broad enough to represent ability to pay fairly. In particular, it includes only tangible property, ignoring items such as stocks and bonds, bank accounts, oil leases, etc., which definitely produce income and should count in a wealth-based measure of ability to pay.

Personal Income is an estimate of ability to pay which is not quite as complete as total household wealth but is much easier to measure. Personal Income is defined carefully and measured for all households by the U.S. Bureau of Economic Analysis. It differs from cash income in that it includes items

not received in cash which add to a household's purchasing power. Examples of noncash items included in Personal Income but not in money income are employee benefits, food stamps and other welfare benefits not paid in cash, and imputed rent (the estimated return on the equity investment in an owner-occupied home). Personal Income is a broader category of income than cash income, and much broader than income for tax purposes, with its various adjustments, deductions and exemptions. This makes it a good compromise to use for assessing how local education taxes might diverge from taxpayer equity.

Although Personal Income is the best practical measure of a household's ability to pay, local governments cannot levy taxes on income and wealth, only on property and sales. The required local effort in the school foundation formula is based entirely on the real and personal property tax base. If the per-capita average taxable property is a constant multiple of per-capita Personal Income for all school districts in Alaska, then one can achieve a high degree of taxpayer equity simply by equalizing local education mill rates. How does variation in per-capita Personal Income compare to variation in per-capita property tax bases among Alaska school districts?

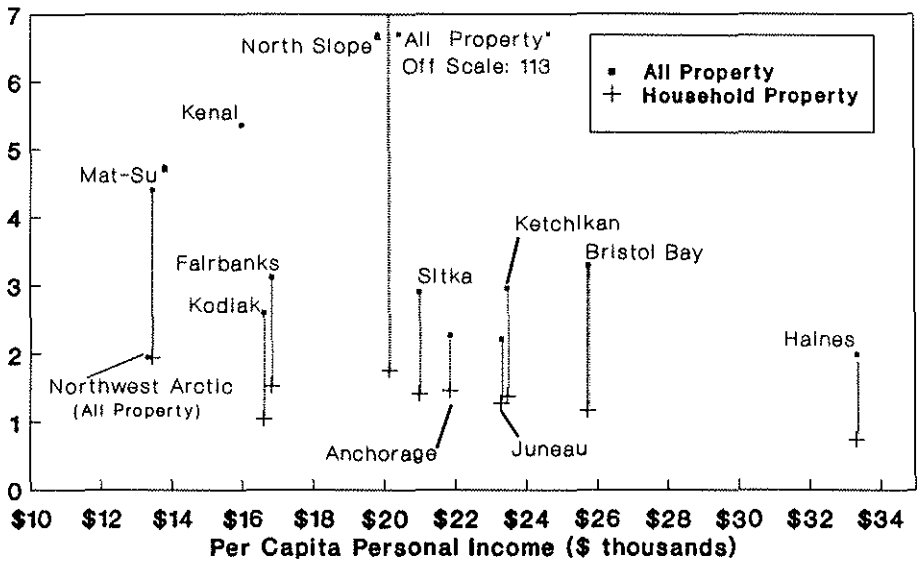
Figures 50a and 50b compare the ratio of the taxable property value to Personal Income estimated for borough and city school districts, respectively, in 1988. The figures show how property value per dollar of income varies with per-capita income, in order to illustrate whether the property tax base rises in proportion to increases in ability to pay. The higher of the two points shown in the graphs represents the full value of real and personal property for the district as a multiple of Personal Income. Total property, of course, includes industrial property such as petroleum pipelines and refineries, fish processing plants, pulp mills, and other businesses which are very unevenly distributed around the state. The lower point shown for each district estimates the ratio of household property to Personal Income. We measure household taxpayer equity in terms of taxes paid by households, so what we call household property reflects the base for property taxes actually paid by households.

The estimates of household property are based on the available information on full value from Alaska Taxable and assessed value of different types of property provided by the Alaska Department of Community and Regional Affairs and the cities and boroughs. Since complete data are not available, these figures are necessarily somewhat imprecise, so we cite them for illustrative purposes only. We computed the household tax base based on the rationale that property taxes paid by businesses constitute a business expense, not a household expense. Businesses deduct property taxes from their revenues before they calculate net earnings. Likewise, self-employed individuals deduct property taxes on business property of their proprietorship before calculating net income. As a result, property taxes on business property are never included in anyone's Personal Income. Property taxes on homes, vehicles, and recreational property are considered as an expenditure out of Personal Income as defined by the BEA, however.

Following this methodology, our definition of household property in Figures 50a and 50b includes all residential real property, as well as mobile homes, vehicles, and recreational equipment components of personal property. In coastal areas with large commercial fishing industries like the Bristol Bay Borough and the city of Cordova, most boats are business property. Consequently, we included boats as household property only in Anchorage, Fairbanks, Mat-Su, and Juneau. We make an exception to the rule of excluding business property in the household tax base by including rental housing. Although the landlords write the checks for property taxes on rental units, renters actually pay the tax (out of their Personal Income) to the landlords as part of the rent.[19] We would like to be able to net out household taxes paid by nonresident households, since the figures for Personal Income count only the incomes of residents, but as a practical matter this is impossible. We do consider vacant land as primarily business property, so the problem is limited to the share of second homes in the tax base. Some boroughs and cities show only a figure for total property divided by

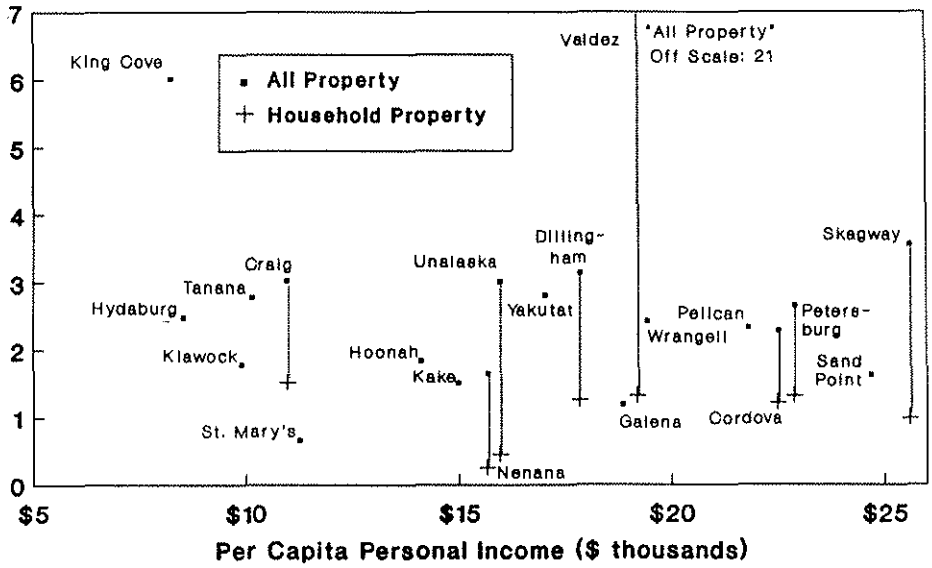
Figure 50. Ratio of Property Value to Personal Income, Alaska School Districts, 1988*

A. Borough Districts



a) Adjustments for North Slope and Mat-Su Borough properties do not completely exclude all commercial property.

B. City Districts[b]



b) 1985 values for personal income and per capita personal income are used as proxies for 1988.

*Property Value defined as the full value of real and personal property. Household property values are missing for districts for which insufficient data on components of property could be obtained.

Source: Table D-18

Personal Income in Figures 50a and 50b because we did not have enough information on components of property to be able to make a valid estimate of the household portion of their tax bases.

Figure 50a shows that there is a wide dispersion in the ratio of the total property tax base per Personal Income for Alaska boroughs. The North Slope Borough is off the chart at over $100 of taxable property per dollar of Personal Income because of its enormous portfolio of petroleum production facilities and pipelines and a relatively small population base. The Northwest Arctic Borough and Haines Boroughs, at the other extreme, have less than two dollars of total property per dollar of Personal Income. In the Northwest Arctic case, the problem is that the borough has very little private property it can tax. The Haines Borough, on the other hand, had a very high income in 1988. The ratios for each borough are graphed with Personal Income per capita along the horizontal axis so that one can see if there is a systematic relationship between the average ability to pay of households in a borough and the ratio of property to income.

The ratio of household property to Personal Income is much less dispersed than that of total property; most boroughs show between $1.25 and $1.75 of taxable household property per dollar of Personal Income. But there is still a substantial degree of variation. Haines is still the "poorest" in property relative to income in 1988, meaning that a 4 mill tax on property would have collected a smaller fraction of Personal Income there than the same tax would have collected in a place such as Anchorage which has more property per dollar of income. Taxpayer equity would require that Haines residents pay a higher tax rate than Anchorage residents in order to match the local contribution to education with households' ability to pay. A constant statewide property tax rate would achieve taxpayer equity if the ratio of household property to Personal Income were the same for all boroughs, say at $1.50 per $1.00 of Personal Income. A 4 mill tax in this case would collect 0.6 percent of Personal Income from the average household in every borough.

The graph shows that there is a weak relationship between the ability to pay of households in a borough -- measured by per-capita Personal Income -- and the ratio of household wealth to Personal Income. Our measure of household property is principally residential property, and research on Alaska households has shown that a household with twice as high an income typically spends more, but less than twice as much, on housing.[20] So it is somewhat surprising that there is not more of a visible relationship between the value of property divided by income and income per capita. Funding education with local property taxes in Alaska does not achieve taxpayer equity, but the inequity does not appear to be systematically related to the income level of the district. Rather, the variation in household tax bases appears related more to local preferences about spending on housing and local housing market conditions.

Figure 50b shows the same ratio of the total property tax base per Personal Income for cities that Figure 50a shows for boroughs. Valdez, with the billion dollar Alyeska pipeline terminal, is off the chart at about $25 of taxable property per dollar of Personal Income. A number of city districts, however, have less than two dollars of total property per dollar of Personal Income. The Personal Income measures we used in Figure 50b are for 1985, since this is the most recent year for which reliable income estimates are available for the city districts. When property values are adjusted to reflect only household property, Figure 50b shows a greater variation among city districts in the ratio of property value to Personal Income than shown for boroughs in Figure 50a. Some communities, such as Nenana and Unalaska, have much less than one dollar of property per dollar of income. Although not enough information is available to estimate household property for many of the city districts, cities as a rule have less property value per dollar of Personal Income than boroughs. This means that a constant property tax rate -- say 4 mills -- would not achieve equity between cities and boroughs; residents of city districts would pay a smaller fraction of Personal Income in school taxes than would borough residents, on the average.

Because REAAs are amalgamations of communities which do not follow census area boundaries, no reliable Personal Income estimates exist for them. This means we can't compare ability to pay for REAAs to that of cities and boroughs. But taxpayers living in REAAs do not pay any property taxes, so no estimates of their potential tax bases are available, either.

Local Tax Contributions Compared to Ability to Pay

We can use our estimates of the proportion of the total tax base within a school district which is household property to estimate household local tax contributions to education. Figures 51a and 51b show the local appropriation estimated to be contributed directly by households in 1988 per dollar of Personal Income, for borough and city districts, respectively. Figures 50a and 50b show that most borough and city districts have between $1 and $2 of household property per $1 of Personal Income, so one would expect that the 4 mill local appropriation required by Alaska law should tax between 4 and 8 mills (0.4 to 0.8 percent) of Personal Income.[21] For boroughs, Figure 50a shows this to be true in general, but households in some districts -- Mat-Su and Fairbanks, for example -- pay more than 8 mills, because their borough governments fund education above basic need.

On the other hand, taxpayers in the North Slope Borough and Valdez pay less than 0.4 percent of Personal Income because they do not have to contribute at least 4 mills on their household property to finance local schools. Figure 51a shows that North Slope taxpayers paid about 0.2 percent of Personal Income in 1988, and Figure 51b shows that Valdez taxpayers paid about 0.3 percent. These are the only school districts in the state for which a 4 mill property tax far exceeds basic need. Since households in these districts do not have lower incomes than the average household in Alaska, the 35 percent limit on required local effort clearly violates the principal of taxpayer equity.

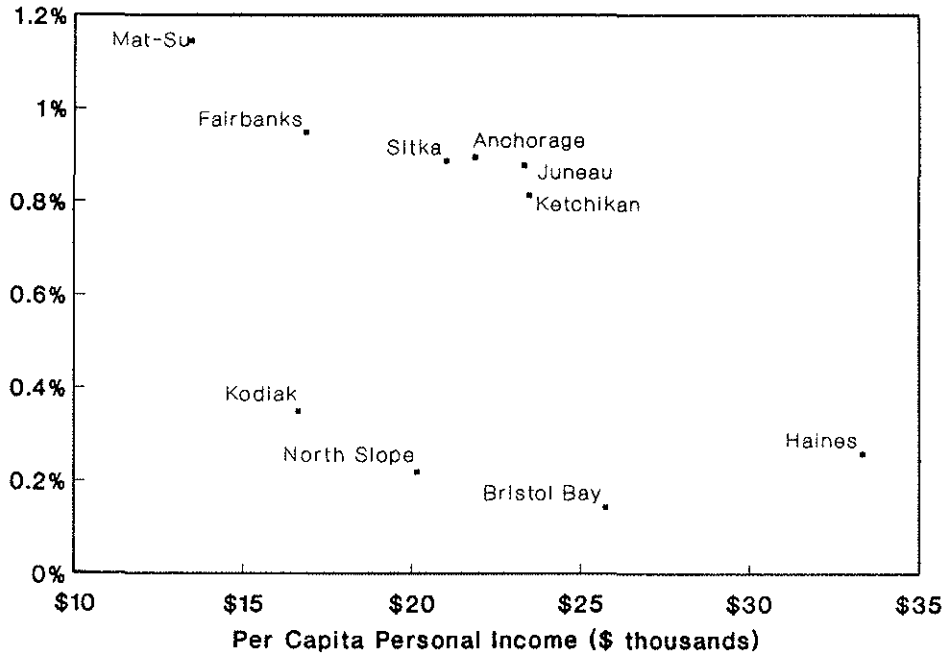
Figure 51a shows that residents of borough school districts with a greater ability to pay (measured by per-capita Personal Income) do on the average pay a smaller proportion of their income in education taxes. Mat-Su residents, with a Personal Income of about $13,000 per capita pay 1.2 percent of income to fund their school district operations, while Haines residents, with a per-capita Personal Income of around $33,000 contribute only 0.3 percent of income. For residents of city school districts, Figure 51b shows that the situation is more complex. Although Cordova and Petersburg residents pay 0.5 and 0.6 percent of Personal Income in school taxes, households living in many city districts (and the Kodiak and Bristol Bay Boroughs) paid far less in 1988. The reason for this discrepancy is that the legislation passed in 1987 phased in the required local effort over a three year period. If data were available for 1990, they would undoubtedly show that only Valdez and the North Slope Borough residents pay less than 0.5 percent of Personal Income in local education taxes.

Potential Adjustments to Ability to Pay

We have concentrated on a systematic measure of ability to pay -- per-capita Personal Income -- to analyze the issue of taxpayer equity. Now we consider two potential adjustments to our notion of ability to pay. First we examine how differences in the regional cost of living might affect ability to pay of taxpayers in Alaska school districts. Second, we look at how ability to pay might be affected by differences in demographic characteristics of the population.

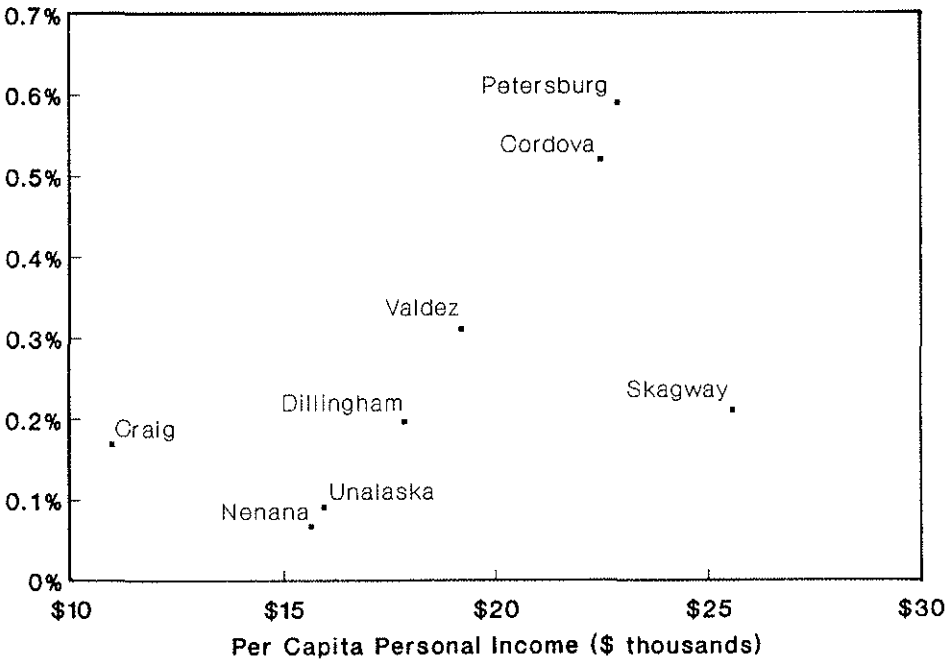
Figure 51. Estimated Household Appropriation as a Percent of Personal Income, Alaska School Districts, 1988*

A. Borough Districts



a) Household appropriations for North Slope and Mat-Su Boroughs do not completely exclude all taxes on commercial property.

B. City Districts[b]



b) 1985 values for personal income and per capita personal income are used as proxies for 1988.

*Household appropriation is defined as the amount of local tax revenues appropriated to the school district that is paid by households.

Source: Tables D-18 and D-19

Ability to Pay Adjusted for Cost of Living

Districts with a relatively high cost of living appear to have a higher ability to pay than they really do, since the purchasing power of their local contribution to education does not go as far as that of the tax contributions of districts with lower living costs. Figures 52a and 52b show the area cost differentials estimated by McDowell (1988) and Personal Income per capita for borough and city school districts, respectively. We use 1985 incomes instead of 1988 incomes for the city district comparisons because this is the latest year for which reliable per-capita income estimates are available for Alaska cities. Figures 52a and 52b show the relationship between the area cost differential and per-capita Personal Income in order to see how nominal ability to pay in places which appear relatively richer or poorer would change if differences in cost of living were taken into account.

Figure 52a shows that only two borough districts, North Slope and Bristol Bay, have a cost of living which differs enough from that of Anchorage to be concerned about using nominal per-capita income to measure ability to pay. If we were to adjust these two boroughs for differences in cost of living, Bristol Bay's ability to pay per capita would be close to Fairbanks, and the North Slope Borough's close to Sitka. The adjustment would take the two districts with the highest incomes in 1985 and make their ability to pay close to the state average. For Alaska borough school districts, adjusting ability to pay for cost of living reduces the differences among districts in household ability to pay for education.

In Figure 52b, the comparison of per-capita Personal Income and area cost differentials shows that there are basically two types of city districts. High-cost districts all have a cost of living more than 25 percent higher than Anchorage. None is located either on the road system or has regularly scheduled ferry service. Lower-cost city districts are all located on the road or ferry system. The highest area costs in the lower-cost group -- those for Valdez and Cordova -- are only 11 percent higher than Anchorage. Many city districts have a nominal ability to pay which is already well below that of the poorest borough district in 1988, and adjusting ability to pay for area cost differentials would make cities such as King Cove and Tanana much poorer than any other city district. There does not appear, however, to be any systematic relationship between per-capita Personal Income and cost of living among city districts in Figure 52b.

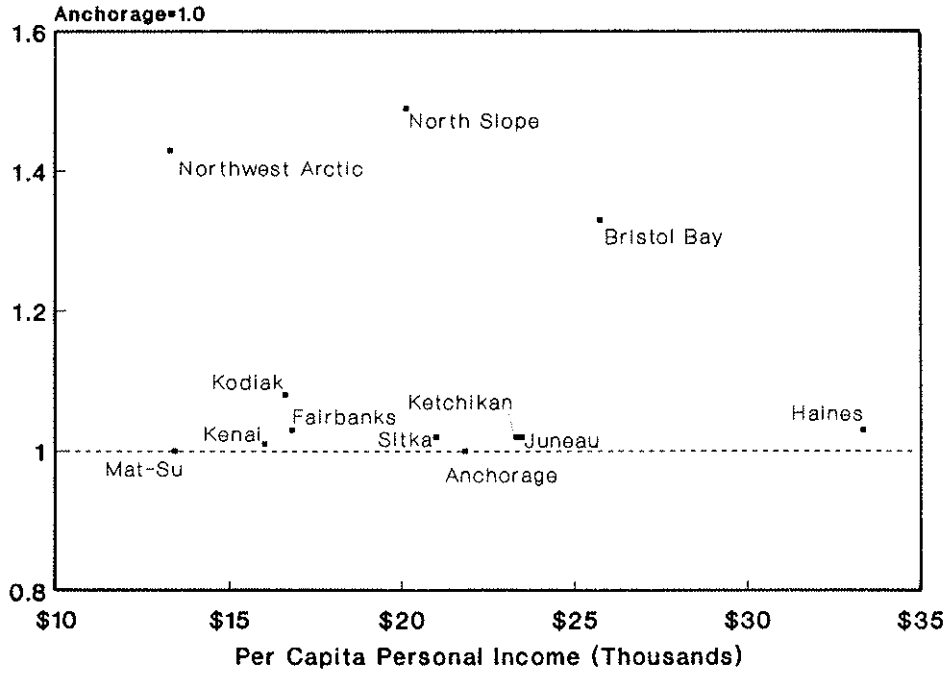
Demographic Considerations

We have defined taxpayer equity as ability of taxpayers to pay taxes for education. When we talk about taxpayers we refer to households. However, our best measure of ability to pay -- per-capita Personal Income -- refers to average income of individuals in a city or borough. Comparison of places using per-capita incomes will make a place with a larger average family size appear to have a lower relative ability to pay than if we made the same comparison using household incomes.

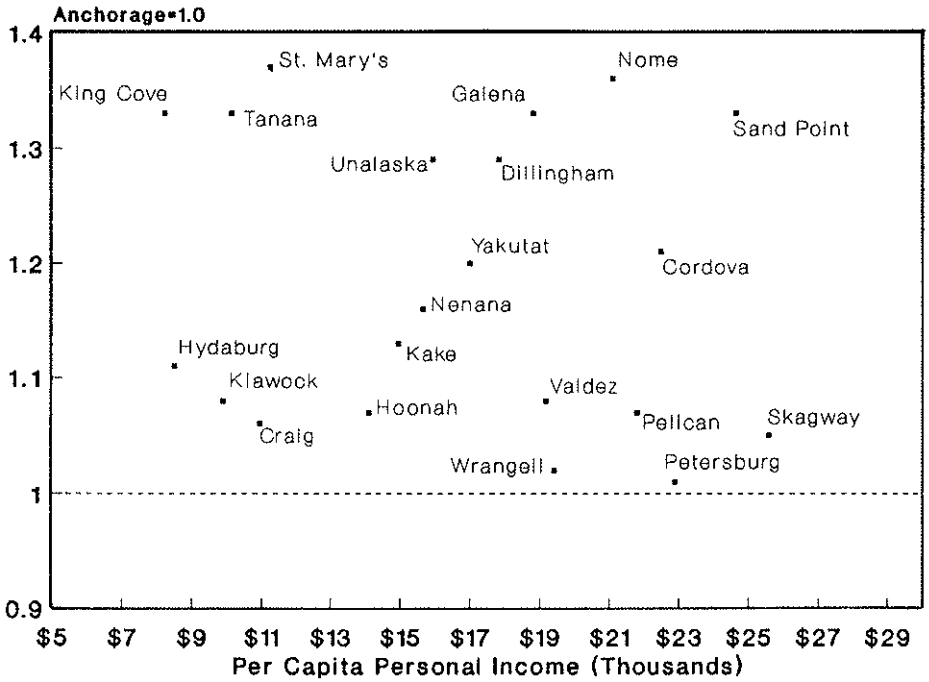
At the same time, a school district in which households on the average have relatively few school-age children can afford a larger local contribution per pupil than can a district which has the same per-capita income but more children to finance in school. Figures 53a and 53b graphs the ratio of average daily membership to the total population against per-capita Personal Income for borough districts and city districts in 1985. Again, we use 1985 incomes for the comparisons because this is the latest year for which per-capita income estimates are available for the city districts. Comparison of children per capita and per-capita income allows us to see how nominal ability to pay in places which appear relatively richer or poorer would change if differences in school enrollments per person were taken into account.

Figure 52. McDowell Area Cost Differential in 1988

A. Borough Districts



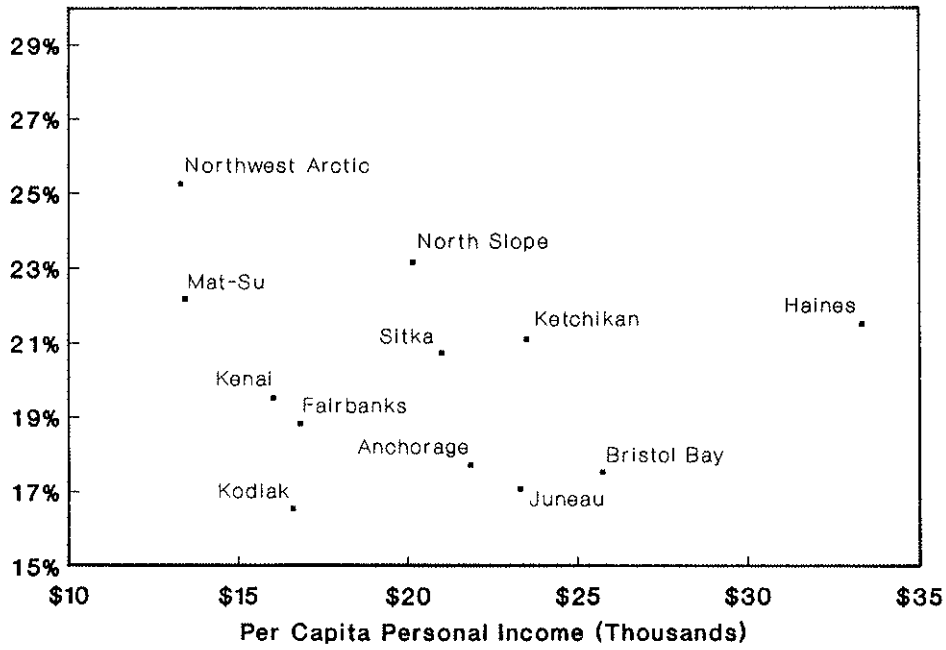
B. City Districts



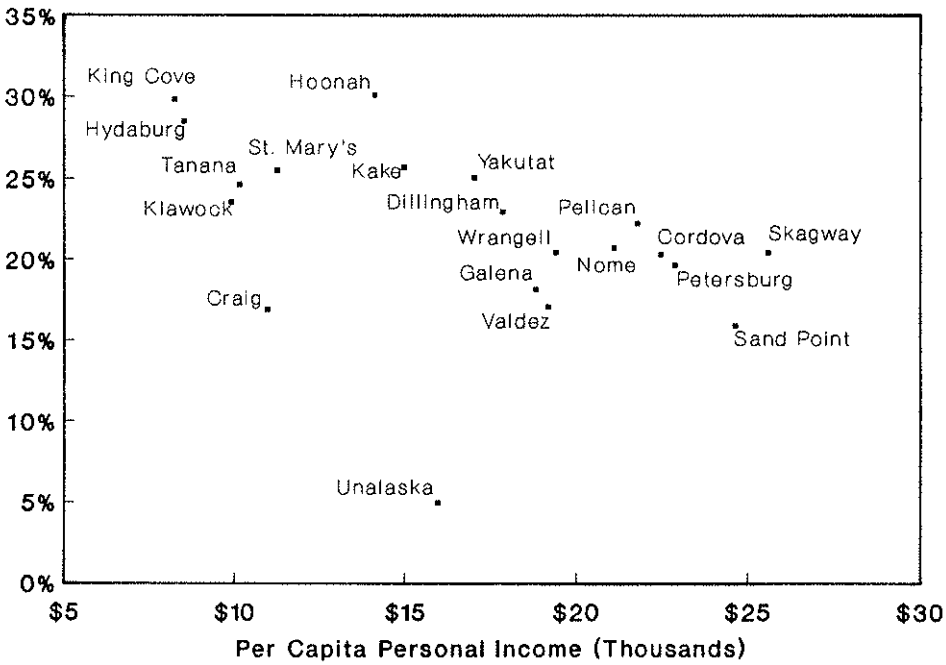
Source: Table D-7

Figure 53. Average Daily Membership per Population in 1988

A. Borough Distrticts



B. City Districts



Source: Ak Dept. of Ed. Annual Report and US Census Bureau

In Figure 53a, Average Daily Membership in borough schools ranges from a low of 16 and 17 percent of the total population in Kodiak and Anchorage, respectively, to a high of 23 percent for Haines and the North Slope districts. Kodiak Island and Anchorage have a higher ability to pay per school child than they do on a per capita basis, while the opposite holds for Haines and the North Slope districts. Figure 53b shows that the variation in ADM per population is much greater among city districts than among borough districts. King Cove and Hoonah have about 30 percent of the total population enrolled in elementary and secondary schools, while 5 percent of Unalaska's population (including Dutch Harbor) attended school in 1988. If we were to adjust ability to pay in these two communities to reflect ability to pay per pupil, Unalaska households would be able to pay more than the households in Juneau or Anchorage, and Yakutat would rank among the poorest.

These potential adjustments of ability to pay for cost of living and the percentage of school children in the population would be important considerations in an analysis of taxpayer equity in Alaska prior to Fiscal Year 1988 and in many other states today. The FY88 reforms in the foundation program, however, repealed an equalization program based on the district's basic need and per-capita property values, for which cost of living and children per capita are important considerations for assessing taxpayer equity. The legislature instead added a required local effort provision based on a constant tax rate across all communities without regard to basic need or per-capita property values. It is only in districts which reach the limit of 35 percent of basic need that more complicated equity considerations come into play. But this cap on the required local tax contribution violates the principle of taxpayer equity in such an obvious way -- as we saw in Figures 51a and 51b -- that the refinements discussed in this section are of secondary importance.

VIII. ACHIEVING TAXPAYER EQUITY WITH EDUCATION EQUITY

In this chapter we first summarize the findings of other chapters and then offer some recommendations about the Alaska Public School Foundation program. We offer four alternatives as suggestions for potential changes to the program in order to increase taxpayer equity, education equity, or both. The alternatives range from making only minor, technical corrections to the existing program to significant modifications. In offering these suggestions we wish to recognize the merits of the existing program. Some of its major problems in the past were eliminated in the 1987 reforms, and we recommend keeping many of the attributes of the existing program. We also recognize that any suggestions for tampering with a formula which distributes a $500 million entitlement of public funds come forth into a politically charged environment. We are sensitive to the problems facing individual school districts and to legislators who represent these constituencies, and acknowledge that none of our suggestions can be packaged into concrete bills without a great deal of refinement.

What Has Been Driving Education Cost Increases?

In Chapter 5, we discussed how national policy initiatives to promote vocational and bilingual education and to integrate special education students into public school programs has added enormously to the cost of education throughout the United States. The average total cost per pupil of elementary and secondary education in the U.S. has increased by nearly four percent per year faster than inflation since 1960. Alaska has faced these same program changes and experienced the same effects. We noted for example that the share of regular instruction fell from 77 percent of total instruction and pupil support costs of Alaska school districts to 66 percent during the 1970s and 1980s.

What differs about the pattern of growth in education costs is that Alaska education costs grew much faster than the national average from the mid 1970s to the mid 1980s. No single factor emerges as the primary culprit, but two factors played significant roles. We do not have enough information to be able to determine how much the cost per pupil changed for rural students when the state of Alaska assumed responsibility for schooling rural Native children from the U.S. Bureau of Indian Affairs, and turned over management of the state-operated school system to newly created Regional Education Attendance Areas. We do know, however, that the apparent amount spent per pupil by Alaska school districts increased by 8 to 10 percent in the mid 1970s just by factoring in the extremely high-cost REAAs into the average.

Construction of new school facilities with urban areas in the early 1980s also made a significant contribution. In Chapter 6, we presented figures which imply that new urban and suburban schools added 3 to 4 percent in added operations and maintenance costs to the overall education cost per pupil. During the 1980s, debt service on these schools (see Chapter 2) may have added as much as 10 percent to total education costs per pupil. Of course the direct state construction funding utilized for building these schools is an additional cost, as was the state appropriation for building the village high schools in the late 1970s. There is no point in making an issue out of the direct state capital appropriations for school buildings and equipment made in the past, since they have already been spent.

We also investigated the effect of higher teachers' salaries and rising energy prices on real school costs per pupil, and were unable to determine that a significant impact had occurred. There are certainly many other factors which may have contributed to the growth in Alaska education costs, but uncovering their effects goes beyond the scope of this study.

Foundation Formula: Conclusions and Suggestions

Our analysis of the Alaska Public School Foundation program addressed two principal issues: education equity and taxpayer equity. We found that the foundation formula provides education equity -- equal educational opportunity -- to a reasonable degree. We also found that the Alaska system generally performs reasonably well on the criteria of taxpayer equity -- local tax contributions consistent with ability to pay -- for taxpayers in most school districts. However, improvements are possible for both objectives.

A potentially bigger problem in Alaska is that the high percentage of state support, combined with a generous state-determined minimum funding level, relieves school districts and local taxpayers of responsibility for determining the appropriate size of education budgets. Without the strong budget constraint posed by the need to raise local taxes to meet basic educational need, there is no incentive for districts to reduce costs below the state-determined need even if they could provide the same services for a lower cost. Below, we summarize our recommendations for potential improvements to the state foundation program addressing education equity and taxpayer equity, respectively.

Education Equity

Formula for instructional units. The maxim, "If it ain't broke, don't fix it," is a good place to start. The unit formula has been changed numerous times in the past twenty years, most recently in 1987. The 1987 amendments corrected many of its most serious problems, and we found no evidence that the formula is substantially out of line with actual costs. In particular, the formula gives a lot more money to schools in small communities, which we found was appropriate. The formula does not award more money to districts with only one or two schools, which we also conclude is appropriate. There is not enough evidence that education in single-site districts costs much more per pupil or per school than it does in multiple site-districts. Even if it did, one must address whether state taxpayers should be asked to pay for the added cost of giving certain communities more local control of their schools? If residents of these communities want the state to support their efforts, the justification will have to come from a demonstration that single-site schools achieve better education results.

Area cost differentials. Area cost differentials in the foundation formula are much improved over earlier versions, but still do not fully reflect differences in surveyed area costs. Area cost differentials should reflect variations in the cost of living for employees and in local prices for purchased nonpersonnel items for schools, and nothing else.

PL 81-874 revenues. The state currently deducts 90 percent of eligible federal impact aid (PL 81-874) revenues from each school district's foundation entitlement. Districts are able to keep 10 percent. Some of the districts obtaining the largest PL 81-874 grants are REAAs. The ability of districts to keep 10 percent of these revenues does violate the principle of education equity. But districts must apply to the federal government for the grants. If districts did not receive any compensation for applying for PL 81-874 funds, they would see no point in their investing staff time to apply. The 10 percent share can be seen as an agent's fee which the state pays to school districts in order to save over $60 million in foundation funds which would otherwise need to be provided to ensure that each district has enough revenue to meet basic need. As such, it seems a reasonable compromise.

Taxpayer Equity

The easiest way to attain taxpayer equity among school districts is to have complete state funding of public education. If education equity is to be attained as well, the contribution of local communities to education above the basic state contribution must be strictly limited. Otherwise, children in richer communities will have more education opportunities than children in poorer communities. Among all the states, only Hawaii has chosen this alternative. Many communities prefer to have the greater control over the education process which comes from the ability of locally-elected representatives to set school budgets.

Another serious drawback with full state funding is that it provides no incentive for schools to reduce costs when they can do so without reducing the quality of education. Local taxpayers elect local school boards, mayors, and assembly members who make decisions about school budgets. If local taxpayers pay the same minimum amount for education regardless of the size of their school district's budget -- as is the case with the current Alaska required local effort provisions -- there is no incentive for schools to reduce costs.

Even with complete state funding of education, one needs to raise revenues with a state personal income tax if one really wishes to achieve taxpayer equity. A state income tax which includes all of Personal Income in the tax base comes closest to the goal of taxpayer equity. Even a tax based on money income is far more equitable than the property tax. In Chapter 7, we noted that residents of areas which have a higher value of taxable property per dollar of Personal Income will pay more in property taxes relative to their ability to pay than residents in areas with less property value per dollar of income. For example, Alaska city districts have less property value per dollar of Personal Income than boroughs, so the required local effort of 4 mills on property value takes a higher fraction of borough residents' income than of income of city residents. And residents of REAA districts pay nothing at all to support their schools.

In making suggestions for Alaska, our aim is to achieve taxpayer equity while simultaneously preserving education equity and increasing incentives for fiscal responsibility. The main taxpayer equity problem we noted for the existing foundation program is that it caps the required local contribution at 35 percent of basic need no matter how wealthy the district. However, the Alaska program can also be improved significantly on the criteria of education equity and fiscal responsibility. We offer four related proposals for consideration. Each builds on the strengths of the existing system. The alternatives start with modest revisions and move toward increasingly comprehensive reforms. All four contain provisions which have already been implemented in a number of other states.[22]

Four Alternative Proposals

The following alternatives propose modifications to the Alaska Public School Foundation formula which achieve a relatively high degree of taxpayer equity using the traditional ad valorem real and personal property tax as the basis for tax support for education. The proposals vary in the way in which they require local communities to determine and contribute to school district budgets. The more local responsibility for budgets, the more complex the system has to be in order to achieve taxpayer and education equity. Each alternative is based on the three current Alaska statutory standards for education finance, as follows:

1. The state makes no change in the way it defines "basic need," which forms the basis for state grant funding and a guideline for districts to follow in setting local budgets.

2. The state reduces grants by 90 percent of PL 81-874 funds.

3. The legislature retains the appropriate level of local support for education at 4 mills.

Alternative 1: Remove cap on required local effort

Synopsis: Exactly the same as the current program, except change the ceiling on required local effort from 35 percent to 100 percent. The state deducts 90 percent of eligible federal impact (PL 81-874) aid, and 4 mills times the full value of real and personal property in the district, up to the full amount of basic need.

Advantages of this alternative:

1. Only minor changes in current foundation program are required.

2. No change for most school districts. All districts can still levy taxes above 4 mills to provide additional support above basic need, as provided in the current law.

Disadvantages:

1. This modest proposed change will not provide any additional incentive for districts to reduce costs below what the state calculates as basic need.

2. It does not affect the existing lack of education equity in the differential ability of districts to increase funding above basic need. Districts with high property values per capita such as the North Slope Borough and Valdez can raise a lot more additional revenue with an additional mill than property-poor districts. REAAs of course can't obtain any more tax revenue.

3. Since it is possible for a district with a large local tax base to fund the entire basic need with less than 4 mills -- the North Slope Borough can do this right now -- this proposal does not achieve full taxpayer equity for the richest districts.

Alternative 2: Full taxpayer equity

Synopsis: Impose a state tax of 4 mills on the full value of real and personal property. Use state assessment in areas without local governments. Give all districts 100 percent of basic need, with no required local effort, but retain current provisions allowing local governments to provide tax support to increase funding above basic need.

Advantages of this alternative:

1. Simple to operate, easy to understand. After all, we already have the equivalent of a 4 mill education property tax everywhere except REAAs, the North Slope Borough, and Valdez.

2. No change in the funding picture for most school districts.

3. Households in REAAs would now be providing some support for education. The intent is that 4 mills is an appropriate amount for everyone to contribute to education.

Disadvantages:

1. The state would have to assess and collect property taxes in unorganized areas. This might cost more than the extra revenues received.

2. Requires minor change in petroleum property tax. As it now stands, the state reimburses local governments for the local mill rate, up to the full amount of the 20 mill state tax. Reimbursement limit would be changed to 16 mills.

3. No improvement over Alternative 1 for education equity. Districts still have differential ability to increase funding above basic need. Property-rich districts can get a lot more additional revenue with a one mill local tax than poor ones. There is still no way for REAAs to fund schools above basic need.

4. Provides no additional incentive for districts to reduce costs below what the state calculates as basic need.

Alternative 3: Education equity through a "guaranteed tax base"

Synopsis: The state calculates the required local contribution as in Alternative 2 (i.e., as currently, but without the 35 percent ceiling). This establishes a percentage of the school district operating budget -- the ratio of the amount raised by a four mill property tax to basic need, up to 100 percent -- which the local government provides. The foundation program then provides a matching grant equivalent to one minus the local share, but subtracts 90 percent of eligible PL 81-874 grants as presently before distributing the funds. REAAs would continue to be funded to the state-defined basic need.

Analysis: The idea is that basic need becomes a guideline instead of a requirement. Districts may fund at less than or greater than the basic need level, but the percentage of funds from local tax support would be the same for that district, no matter how much it wanted to spend. The reimbursement share would, of course, be different for each district for each year. The required share of local revenues under this program might be as high as 100 percent for property-rich districts (e.g., the North Slope Borough).

Advantages of this alternative:

1. Calculation of local effort based on current law. Little change required for local governments.

2. Allows local school boards equal access to funding for education if they want to fund at more than basic need. Districts may fund at less than basic need but would lose state support in proportion to the percentage reduction in expenditures.

3. Some incentive for controlling costs, since local taxpayers pay some share of changes in expenditures. This incentive does not work for REAAs, but the richer the district, the stronger the incentive.

Disadvantages:

1. REAAs do not have the ability to raise funding above basic need, while city and borough districts may get a very large state matching grant share to increase expenditures. So in this case, taxpayer equity may conflict with education equity. The foundation grants could have a ceiling (and a floor) level of spending as a percent of basic need, but this would reduce taxpayer equity between rich and poor districts.

2. As noted above, this program has weak incentives for REAAs and poor districts to restrain costs.

Alternative 4: Guaranteed tax base and full taxpayer equity

Synopsis: This proposal combines the state property tax of Alternative 2 with a matching-grant foundation program from Alternative 3 to achieve a high degree of both taxpayer equity and education equity. Local school boards would set the school budget, which might be above or below basic need, and the state would provide the matching share as calculated in Alternative 3. The two key advantages of this alternative are (1) the basic contribution for education is as equitable as possible for taxpayers regardless of where they live; and (2) REAA districts would set their budgets the same way as do organized city and borough districts.

For city and borough districts, the state collects a 4 mill tax, and gives the school district a grant amount equal to basic need less 90 percent of PL 81-874 grant funds. Local governments can then fund education at any level they want. If they fund at basic need, there is no additional local contribution. If they fund at above basic need, the state provides a matching grant equal to the ratio of four mills to the basic need (as in Alternative 3). If local governments decide to fund school districts at less than basic need, then the state gives the local governments a grant or tax credit equal to the ratio of four mills to basic need times the amount of the shortfall. The ratio of required local revenues to basic need might be zero or even negative for rich districts (e.g., NSB), as in alternative 2. Although not totally equitable with other districts, we propose that the rich district would simply have a zero state matching share.

For REAAs, the state would have to administer the tax collection, but the system would otherwise be the same. The district mill rate could be higher or lower than 4 mills in proportion to the amount by which the school district budget exceeded or fell short of basic need.

Advantages of this alternative:

1. Calculation of basic need and required local effort is still based on current law.

2. Allows local school boards equal access to funding for education if they want to fund at more than basic need. Districts may fund at less than basic need but they would lose state support in proportion to the reduced expenditures.

3. All school districts, even REAAs, have some incentive for controlling their costs.

4. REAAs would obtain the ability to fund at above basic need, if their residents want to pay more in taxes.

Disadvantages:

1. State would have to assess property taxes in unorganized areas.

2. Requires change in petroleum property tax to cap reimbursement at 16 mills.

The Four Proposals and Federal Equalization Standards

When the program distributing federal impact aid to school districts nationwide (PL 81-874) was set up in 1950, Congress wanted to ensure that states did not reduce their financial assistance to schools which were eligible for federal aid. As state aid to schools grew over the years, and various court cases began to force states to increase education equity among their school districts, Congress amended the law to allow states to take PL 81-874 funds into account when determining the level of state support, provided that the state grant program achieved certain equity standards.

Through its regulations implementing PL 81-874, the federal government now sets two specific standards for education equity and taxpayer equity. The standards are actually very lenient, and state aid programs have to meet only one of them. Even if a state does not strictly meet either standard, it may obtain an exception from the U.S. Department of Education which allows its school districts to continue to receive federal funds. In practice, however, the two standards -- called the disparity test and the wealth-neutrality test -- provide national benchmarks for minimun levels of taxpayer and education equity.

In order to satisfy the disparity test, a state grant program must provide funding to districts in such a way that total operating expenditures per-pupil in the highest-spending district are no more than 25 percent higher than in the lowest-spending district. This is a minimum standard for education equity. Satisfying the wealth-neutrality test, on the other hand, requires that 85% of all local and state revenues be collected in a way that does not give wealthier districts a funding advantage over poor districts. For example, subtracting a required local effort of 4 mills on the full value of property in every district from a state grant program is considered wealth neutral. This standard involves both education and taxpayer equity. Both the disparity test and the wealth-neutrality test permit states to take into account cost differences -- as Alaska does in computing basic need -- based on the size of schools and on area cost differentials.[23]

Alaska's foundation program subtracts 90 percent of PL 81-874 funds from its grants to school districts, so the program must achieve one or the other of these federal equity standards. In fact, Alaska meets the disparity test (just barely), because Alaska law caps local contributions in excess of basic need at 23 percent. Alaska fails the wealth-neutrality test, however, because required local effort is lower for REAAs, the North Slope Borough, and Valdez than it is for other districts, and because the latter two districts raise so much extra funds above basic need with a relatively low tax rate.

Removing the 35 percent ceiling from required local effort and requiring a local tax contribution from REAAs as we have suggested here, will improve the wealth-neutrality rating for the Alaska foundation program without affecting the disparity test. Our calculations show that the proposed matching grant programs (Alternatives 3 and 4) easily achieve the federal wealth-neutrality standard as well as the disparity standard. Alternative 4, with full taxpayer equity and the matching grant program, would be the most equitable, according to the national standards set in the regulations for PL 81-874.

Additional Considerations

The disparity test and the wealth-neutrality test only apply to operating expenditures. Indeed, the entire discussion of education equity and taxpayer equity in this chapter has ignored funding for capital improvements. This is primarily because the state has historically provided such a high share of funds for capital expenditures, including reimbursement for debt service. Needs for new and improved facilities vary greatly from year to year and around the state, and the legislature has traditionally retained the right to determine equity among school districts in allocating capital grants. As competition for state revenues increases, some kind of foundation program could begin to include capital as well as operating expenditures, and the same principles of education equity and taxpayer equity discussed here would continue to apply.

The principle of taxpayer equity, of course, also applies to local expenditures other than education. And one could define a term, "public services equity," analogous to education equity. Public services equity would mean that local governments should have equal access to funds to pay for public services regardless of the size of the local tax base. State revenue-sharing and municipal assistance programs could include area cost differentials, required local effort, and guaranteed tax base provisions just like those in place or proposed for the school foundation program. However, analyzing general revenue-sharing programs and designing revisions which would achieve greater public services equity and taxpayer equity are beyond the scope of this study.

ENDNOTES

1. Currently, Mt. Edgecumbe and state correspondence study, as well as the state's school districts, receive funds from the foundation. We assumed school districts received the same share of PL 81-874 revenues awarded to the state as they received in total foundation revenues.

2. ACIR (1990), page 5.

3. Federal PL 81-874 revenues received directly by the state of Alaska for military bases, Mt. Edgecumbe, and state correspondence study appear to have been included in the state rather than the federal share of school district revenues in the NCES data. As mentioned above, the state received $20.6 million of these funds in FY90. Correctly accounting for these federal receipts would bring the federal share to 14 percent of total revenues rather than the 12 percent shown in Figures 6 and 8.

4. ACIR (1990), page 11.

5. All dollar amounts are deflated by the Gross State Product implicit price deflator for "Other Services" which includes educational services, managerial services, and other related services. See Larson (1991).

6. McDowell (1985).

7. The instructional unit allotment multipliers are weighted by the ADM of the district in this calculation. For each district we calculated the product of the instructional unit allotment multiplier times the ADM of the district. The sum of these products divided by the total ADM is the weighted average of the instructional unit allotment multipliers.

8. No additional state support was allocated to city and borough districts in FY 1984 or FY 1985 except emergency grants.

9. ISER calculations (Goldsmith 1990) place the cost of living in Anchorage 14 percent higher than the national average in 1988, based on U.S. Bureau of Labor Statistics data adjusted by the Consumer Price Index. The American Chamber of Commerce Intercity Cost of Living Index places Anchorage 30 percent higher than the national average using a different methodology. The figures for Alaska and U.S. average teachers' salaries are taken from Office of the Governor (1989). Base and average salaries of various Alaska school districts vary somewhat from year to year. Anchorage is a good benchmark for comparing teachers' salaries because one-third of the students in Alaska attend Anchorage schools, the district is large enough so that salary fluctuations from year to year are minimal, and because many districts in Alaska set their salaries with reference to the Anchorage salary schedule.

10. Associates for Education Finance and Planning (1984) contains an extensive analysis and discussion of factors which might influence the salary paid to an individual teacher in a school district in Alaska.

11. Data on salaries and benefits from Alaska Office of the Governor (1989).

12. The training and experience index used was the 1985 Alaska Department of Education index presented in the minutes of the July 23-24, 1985 meeting of the Funding Formula Advisory Committee, Juneau.

13. Data from the Kenai Peninsula District suggest that the accounting revisions added 3 percent to the reported cost of regular instruction, and reduced pupil support by about 50 percent. The increase in special education expenditures approximately balanced the amount removed by the creation of a new category for gifted and talented instruction (Component Unit Financial Report, Kenai Peninsula Borough School District, 1990). Cost adjustment for other districts may differ.

14. Before 1976, the state of Alaska operated some public schools outside cities and boroughs and the federal Bureau of Indian Affairs operated others. When the REAAs were created in the 1976-77 school year, 44 rural schools and the Mt. Edgecumbe high school were still operated by the BIA. REAAs gradually acquired the BIA schools over the next several years except for Mt. Edgecumbe, now operated by the state. Unfortunately, no data are available on the cost of the BIA schools. During the 1974-75 school year, 53 total BIA schools had a combined ADM of 4,821 and 253 teachers, for a pupil-ratio of 19.1 (Coon, 1976). City and borough districts had an average ADM/teacher of 17.2 that year.

15. Hootch v. Alaska State-Operated School System, Alaska, 536 P.2nd 793.

16. The results in Table C-5 show a 19 percent decline in the number of teachers per pupil. This is equivalent to a 16 percent increase in the number of pupils per teacher.

17. See AS 17.14.025.

18. For a description of the computation of required local effortfor the North Slope Borough and Valdez, see *Alaska Taxable,* 1989.

19. Unfortunately, some communities do not separate apartments with more than 4 units in the structure from commercial property, so our estimates of household property understate the household tax base somewhat in these places.

20. Housing is the main component of taxable household property. Berman and Huskey (1986) estimated that a household in Anchorage would spend about 80 percent more on housing if their income doubled.

21. The 4 mill requirement is a minimum tax rate on the full value of real and personal property. The mill rate which city and borough residents see on their tax bills represents a rate on assessed property. Exempt property and underassessment mean that the nominal mill rate for education typically will exceed 4 mills in order for the district to meet the 4 mill local effort minimum on the full value of property.

22. For a summary and technical analysis of education finance systems used in other states, see ACIR (1990).

23. The details of these two tests are contained in federal regulations implementing PL 81-874. See 34 CFR Sh. II §222.60 - §222.66 (pp 600 --606, July 1, 1990 ed.).

REFERENCES

(U.S.) Advisory Commission on Intergovernmental Relations, The Structure of State Aid to Elementary and Secondary Education, Washington, D.C., December 1990.

Alaska Energy Authority, Second Annual Statistical Report of the Power Cost Equalization Program, March 1990.

Alaska Office of the Governor, Public Education Costs in Alaska: Perceptions and Facts, Division of Policy, Juneau, November 1989.

Anonymous, Small District Funding Study, Small Schools Financial Consortium, January 1989.

Associates for Education Finance and Planning, Inc., The Development of a Program Cost Model and a Cost-of-Education Model for the State of Alaska, Stanford, CA, December 1984.

Augenblick, John, Steven D. Gold, and Kent McGuire, Education Finance in the 1990s, Education Commission for the States, November 1990.

Berman, Matthew, and Lee Huskey, The Effect of Changes in the Alaska Housing Finance Corporation Mortgage Programs, Final Report, Institute of Social and Economic Research, November 1986.

Cole, Nathaniel, The History of Public School Finance in Alaska, Alaska Department of Education, no date.

Coon, E. Dean, Anne E. Just, and Jerry N. Waddell, School Finance in Alaska, Center for Educational Research, University of Alaska, Fairbanks, September 1976.

Larson, Eric, Alaska Gross State Product Estimates for 1961 through 1987, Institute of Social and Economic Research, 1991 (draft).

The McDowell Group, Alaska School District Profiles and Differential Study, Alaska Legislature, Budget and Audit Committee, November 1988.

The McDowell Group, Alaska Geographic Differential Study, 1985.

McGuire, C. Kent, and John Augenblick, Evaluating School Finance in Alaska, Education Commission of the States, Denver, March 1983.

Livey, Jay, and Gretchen Keiser, Public School Financing in Alaska, House Research Agency Report 87-A, Alaska Legislature, February 1987.

Thurlow, Gary, "Section by Section Analysis of Senate Bill 119 -- School Foundation Program," State of Alaska, Senate Health and Social Services Committee, Juneau, March 1987.

APPENDIX A. HISTORY OF THE FOUNDATION FUNDING FORMULA

APPENDIX A. Foundation Formula History from FY 1971 through FY 1990

TABLE A–1: Summary of Changes to Foundation Formula

Fiscal Year Enacted	Fiscal Year Effective	Formula: Cities & Boroughs	Formula: REAAs	Instructional Units	Base Value	Multiplier	Minimum Equalization Percentage
1970	1971	State Aid = Basic Need * Equalization Percentage	none	Original definition of all instructional unit formulas; Separate formulas for small and large districts	$19,250	Four areas, ranging 100% to 115%; additional 5% for inaccessible areas	90%
1971	1972	same	none	same	$19,250	Four areas using census areas, ranging from 100% to 115% additional 5% for inaccessible areas	90%
1972	1973	same	none	Average number of units/ADM in voca–tional ed increased for large schools.	$19,250	same	90%
1973	1974	same	none	same	$20,250	same	90%
1974	1975	same	none	same	$21,750	same	90%
1975	1976	same	State Aid = Basic Need + "In Lieu of Local" – "PL 81–874"	Special ed units de–termined by Full Time Equivalent (FTE) ADM instead of ADM.	$23,500	Eight areas using district boundaries, ranging from 100% to 133.75%	93%
1976	1977	same	same	same	$25,000	same	95%
1977	1978	same	same	Average units/ADM in small schools increased; Average units/ADM in small correspondence programs increased; Special units added for ADM in remote junior high facilities with specified minimum enrollment; Separate formulas for secondary and elementary schools	$27,500	Nine areas using district boundaries, ranging from 100% to 155%	95% Equalization percentage applied only to Cities & Boroughs hereafter
1978	1979	same	same	Instructional units for Bilingual /Bicultural instruction added to count of units	$29,000	minor revisions to multipliers for a few districts	97%
1978	1980	same	same	same	$31,900	same	97%

TABLE A–1: Summary of Changes to Foundation Formula Continued

Year Enacted	Fiscal Year Effective	Local Effort Provisions	PL–81–874 Deductions	Hold Harmless Provisions	Other Provisions
1970	1971	Required local effort = (1 – equalization percentage)			Districts operating a school in a remote area can calculate the number of units to which that school would be entitled if it were a separate district.
1971	1972	same			
1972	1973	same			
1973	1974	same			
1974	1975	same			Special edcuation eligibility includes students three years or older
1975	1976	In–Lieu–of–Local support added to state aid for REAAs; No required local effort for REAAs	100% of PL–874 funds implicitly deducted from state aid to REAAs in DOE accounts	Hold harmless on instructional unit multiplier: if instruction units < 25 then multiplier is at least 107.5%	REAAs created and placed under foundation program starting in FY 76
1976	1977	same	same		
1977	1978	same	Law explicitly states that 100% of PL–81–874 funds deducted from state aid to REAAs	Hold harmless on instructional units with phase–in period Hold harmless on instructional unit allottment	
1978	1979	same	same	same	
1978	1980	same	same		

TABLE A–1: Summary of Changes to Foundation Formula Continued

Year Enacted	Fiscal Year Effective	Formula: Cities & Boroughs	Formula: REAAs	Instructional Units	Base Value	Multiplier	Minimum Equalization Percentage
1980	1981	same	State Aid = Basic Need + "In Lieu of Local" – 80% of "PL 81–874"	Average number of units /ADM for small schools increased; No distinction in formula between small and large districts	$34,935	same	97%
1980	1982	State Aid = Basic Need + Supplemental Equalization	State Aid = Basic Need + Supplemental Equalization – 80% of "PL 81–874"	Average number of units /ADM for large secondary schools decreased; Special Ed. formula revised	$38,590	minor revisions to multipliers for a few districts	Equalization percentage eliminated
1981	1983	same	same	same	$42,250	same	none
1983	1984	State Aid = (Specified $/ADM) * District ADM	State Aid = (Specified $/ADM) * District ADM – 80% of "PL–81–874"	All formulas suspended	none	none	none
1984	1985	same	same	All formulas suspended	none	none	none
1985	1986	State Aid = (Specified $/ADM) * District ADM + "80% Distribution"	same	All formulas suspended	none	none	none
1986	1987	State Aid = Basic Need * Equalization Percentage * Secondary Allocation	State Aid = Basic Need	Average units/ADM for schools in small districts other than REAAs increased; Separate formulas for small and large districts; Separate formulas for elementary and secondary schools in large districts	$42,184	New multipliers for most districts ranging from 95% to 185%	97% Equal–ization percentage reinstated for fiscal year 1987 only
1987	1988	State Aid = Basic Need – Required Local Effort – 90% of "PL 81–874"	State Aid = Basic Need – Required Local Effort – 90% of "PL 81–874"	All instructional unit formulas revised to eliminate "steps"; Categories and weights added to all non–regular instructional programs	$60,000	All multipliers revised, ranging from 100% to 142%	Equal–ization percentage no longer applicable
1989	1990	same	same	same	$60,000	same	none

TABLE A–1: Summary of Changes to Foundation Formula Continued

Year Enacted	Fiscal Year Effective	Local Effort Provisions	PL–81–874 Deductions	Hold Harmless Provisions	Other Provisions
1980	1981	same	80% of PL–874 funds deducted from state aid to REAAs	Hold harmless provision on instructional units	
1980	1982	Eliminated any reference to required local effort; Supplemental equalization aid for all districts	same	Hold harmless provision on instructional units	
1981	1983	same	same		
1983	1984	none	same		Foundation formula suspended Funding specified as certain $ per ADM for each district
1984	1985	none	same		$ per ADM for each district increased by 4%
1985	1986	80% Distribution to city and borough districts contingent on local effort	same		$ per ADM for most districts increased
1986	1987	Supplemental support to city and borough districts contingent on local effort No required local effort for any districts	No deduction of PL–874 funds		Foundation formula reinstated with substantial changes
1987	1988	Required local effort for cities and boroughs of 35% of basic need or 4 mill property tax. District can contribute additional 2 mill property tax or 21% of basic need.	90% of PL–874 funds deducted from state aid to all districts	Hold harmless provision on instructional units Hold harmless on total state grant with phase–in period	
1989	1990	Districts can contribute additional 2 mill property tax or 23% of basic need.	same	same	

1970 Chapter 238 -- effective FY 71

The original definition of instructional unit foundation formula included two components: basic need and the equalization percentage. Basic need was defined as the product of the instructional unit allotment and the number of instructional units. The instructional unit allotment was defined as a certain percentage of the base instructional unit value. In more technical terms,

State Aid = Basic Need * Equalization Percentage

Basic Need = Instructional Unit Allotment * Number of Instructional Units

Instructional Unit Allotment = A certain percentage of the Base Instructional Unit Value

Equalization Percentage = $P_i = 1 - (1-k) * (V_i/V_s)$

P_i = percent of basic need provided by state

k = level of average level of state support = 90 percent
(later called minimum level of state support of basic need)

V_i = Full value of taxable real and personal property per ADM in district i.

V_s = Average V_i in the state.

P_i must be greater than or equal to the value of k.

Number of instructional units = elementary units + secondary units
+ vocational education units
+ special education units + correspondence units.

For the detailed definition of instructional units, see Section A-3. In addition to these definitions of instructional units, the law allowed for special counting of remote schools: "The commissioner may authorize any school district operating a school in a remote area to calculate the number of units to which that school would be entitled if it were a separate district and to include that number of units in the total number of instruction unit within that district."

The law defines the instructional unit allotment as a "percentage" of the base instructional unit value. For the purpose of clarity, these percentages are called the instructional unit allotment multiplier in this report. The instructional unit allotment is described as the product of the instructional unit allotment multiplier and the base instructional unit value throughout this report.

In technical terms,

Instructional Unit Allotment = Instructional Unit Allotment Multiplier * Base Instructional Unit Value.

See Section A-4 for the history of the base instructional unit value over time. See Section A-5 for definitions of instructional unit allotment multipliers by region. In the 1970 law the state was divided into four regions, each region was assigned a separate multiplier, and remote regions not accessible by road, ferry, or train were given an additional five percent. The exact definitions of regions used in the 1970 law were not available, but the four regions defined in likely match the four groups of election districts defined by the law in 1970.

The original law required local tax effort from the districts: "Payment of state aid to a local school district is contingent upon matching by the district in the amount of the required local effort for that district in the ratio of required local effort: state contribution = 1 : $P_i/(1-P_i)$." In other words, for every P_i dollars that the state contributed, the districts were required to match those funds with $1-P_i$ dollars.

1971 Chapter 40 -- effective FY 72

See Section A-5 for changes in the definition of regions used to define the instructional unit allotment multiplier. Election districts were used to define four regions of the state.

1972 Chapter 137 -- effective FY 73

See Section A-3 for changes in the definition of vocational education instructional units.

1973 Chapter 88 -- effective FY 74

The base instructional unit value was changed from $19,250 to $20,250 for FY 74

1974 Chapter 140 -- effective FY 75

The base instructional unit value was changed from $20,250 to $21,750 for FY 75

1974 Chapter 79 -- effective FY 75

Special education eligibility was defined to include only students three years and older.

1975 Chapter 81 -- effective FY 76

The minimum level of state support (the value of k) was changed from 0.90 to 0.93.

See Section A-3 for changes in instructional unit counts for special education. Units for special education are calculated use ADM full-time-equivalent rather than just ADM.

See Section A-5 for substantial changes in the instructional unit allotment multiplier. The number of regions used to define the multipliers was changed from four to eight.

A hold harmless provision placed a minimum level on the instructional unit allotment for small districts: "If the school district is entitled to less than 25 total instructional units ... the school district shall receive not less than 107.5 percent of the base instructional unit allotment."

The base instructional unit value was changed from $21,750 to $23,500 in FY 76 and $25,000 in FY 77.

1975 Chapter 124 -- effective FY 76

The Regional Education Attendance Areas (REAAs) were created and placed under state foundation funding starting in FY 76.

The new REAA's were funded by the state at basic need plus an amount equal to the ADM of the REAA district times the average local tax appropriation per ADM in city and borough districts. There was no required local effort for REAAs and the equalization percentage was not applied to the state grant to REAAs.

The deduction of PL-81-874 funds is not explicitly mentioned in the 1975 law. However, in FY 77 accounts for REAA districts, PL-81-874 funds are not listed as separate revenues for REAAs but are listed as separate revenues for cities and boroughs. PL-81-874 funds were likely treated as a transfer from the federal to state government and then used by the state to fund part of the state foundation grant for REAAs.

1975 Chapter 135 -- effective FY 76

The count date for the number of instructional units was revised to the end of the first nine weeks of school.

1975 Chapter 190 -- effective FY 76

Placed centralized correspondence under the elementary instructional unit schedule of the foundation formula. See Section A-3 for the detailed definition of instructional units.

1976 Chapter 173 -- effective FY 77

The minimum level of state support (the value of k) was changed from 0.93 to 0.95.

1977 Chapter 90 -- various sections effective FY 78 or FY 79.

The funding for REAAs was changed to explicitly allow for the deduction of PL-81-874 funds (effective FY 78). At this point, the funding formula for REAAs was equal to basic need minus PL-81-874 funds plus "In-Lieu-of-Local Support." No equalization percentage was applied to the REAA state grant.

The funding formula for city and borough districts remained essentially the same -- the product of basic need times the equalization percentage. The state law explicitly permitted for the deduction of PL-81-874 funds from the state grant to cities and boroughs when allowable by federal law. However, no PL-81-874 were deducted from the state grant to cities and borough districts until FY 88.

The minimum level of state support (the value of k) was changed from 0.95 to 0.97 (effective FY 79)

See Section A-3 for changes in the number of instructional units for correspondence instruction and regular instruction in elementary and secondary schools (effective FY 79).

Special instructional units were granted for remote junior high sites. The districts were allowed to treat students in grades five through eight as a separate "junior high school" site. If there were more than twenty students, they were treated as though they were a separate school site, and if there were fewer than twenty students, they used a special table to calculate the units.

A hold harmless provision allowed any decrease in the number of instructional units to be phased-in over several years (effective 7/1/77):

> " If the instructional units which a school district is entitled to ... decrease by ten percent or more from one year to the next, the school district may use the last year before the reduction as a base year and offset its reduction according to the following schedule:
>
> 1) for the first year after the base year, the school district is entitled to the instructional units plus 75 per cent of the difference in instructional units between the base year and the first year.
>
> 2) for the second year ... 50 per cent of the difference ... between the base year and second year.

3) for the third year ... 25 per cent of the difference ... between the base year and the third year."

In other words, if the district stood to lose units, its losses were phased in over four years by letting it keep a certain percentage of the "extra" units that it used to receive.

See Section A-5 for changes in instructional unit allotment multipliers. Instructional unit allotments were defined according to school district, rather than election district, and the range of percentage adjustments became much larger (effective FY 78).

A hold harmless provision on the instructional unit allotment effectively prevented the instructional unit multiplier from decreasing (effective FY 78): "... The value of the instructional unit allotment for any school district or REAA is not less than it would have been for the fiscal year beginning July 1, 1977."

The base instructional unit value was changed from $25,000 to $27,500 in FY 1978 and to $29,000 in FY 1979.

1978 Chapter 115 -- effective FY 79

See Section A-3 for the addition of instructional units counts for bilingual education. Units for bilingual education are defined using weighted ADM rather than ADM.

See Section A-5 for changes in the instructional unit multipliers for several districts.

The base instructional unit value was changed from $29,000 to $31,900 for FY 79.

1980 Chapter 26 -- effective FY 81

The state grant was changed so that only 80% (instead of 100%) of PL-81-874 funds were deducted from the state grant "if permitted under [federal law]." This change affected only REAA districts; no PL-81-874 funds were deducted from the state grant to city and borough districts.

See Section A-3 for changes in the number of instructional units allocated to elementary and secondary schools. The distinction between small and large districts in the instructional unit formulas was dropped.

See Section A-5 for minor changes in instructional unit allotment multipliers for a few districts.

The base instructional unit value was changed from $31,900 to $34,935 for FY 81.

A hold harmless provision prevented the final computation of the state foundation grant from decreasing relative to the previous fiscal year.

1980 Chapter 26 -- effective FY 82

Several substantial changes were made in the definition of basic state aid. The distinction between REAA districts and city or borough districts was eliminated; REAAs were included in the definition of "district." For all districts, the state foundation grant was equal to basic need minus 80% of PL-81-874 funds (if permitted by federal law) plus supplemental equalization aid. Notably, the equalization percentage and required local effort were not explicitly mentioned in this new definition of state aid.

The new ingredient to the formula was supplemental equalization aid. This supplemental aid was similar to "in-lieu-of-local support" which had previously been received only by REAA districts. The amount of supplemental equalization aid for a district was calculated by multiplying the ADM of the district by the amount equal to the average local tax contributions per ADM in city and borough districts in the previous fiscal year. This amount was reduced by the amount of the average local tax contributions per ADM in the previous fiscal year. In addition, the amount was adjusted by the district's instructional unit allotment multiplier.

There are no explicit legal provisions for what supplemental equalization aid would be when the local tax appropriation of a districts was greater than the average local tax appropriation of all city and borough districts. However, in the FY 82 and FY 83 accounts, the supplemental equalization to districts with tax appropriations per ADM above the state average, supplemental equalization aid is zero.

See Section A-3 for minor changes in the number of instructional units allocated to secondary schools.

The base instructional unit value was changed from $34,935 to $38,590 for FY 82.

1981 Chapter 119 -- effective FY 82

See Section A-3 for changes in the instructional unit allotment for special education.

See Section A-5 for minor changes in the instructional unit allotment multiplier for one district.

A hold harmless provision set the level of instructional units in FY 81 as the floor for FY 82.

1981 Chapter 119 -- effective FY 83

The base instructional unit value was changed from $38,590 to $42,250 for FY 83.

1983 Chapter 82 -- effective FY 84

The foundation formula was suspended: all instructional unit calculations, instructional unit allotments, and supplemental equalization provisions were suspended. The amount of state aid was calculated by multiplying the ADM of a district by a dollar amount per ADM specified for each district. These dollar amounts were approximately what the foundation formula would have specified for that year if the formula were still in use. Despite the suspension of the formula, 80% of PL-81-874 funds were still deducted from the state grant to REAAs.

1984 Chapter 127 -- effective FY 85

The suspension of the formula was continued.

The dollar amount per ADM for each district was increased by four per cent for FY 85.

The law permitted the state to provide for pro rata payments to districts if the original state appropriation is insufficient.

1985 Chapter 75 -- effective FY 86

The suspension of foundation formula was extended. New dollar amounts per ADM were set for each district for FY 86.

A new local effort incentive, called the "80% distribution" was created: "The Dept. of Education shall allocate 80 per cent of the funds remaining [after the basic provisions of state aid are met] to school districts whose 1) local contribution to education for each student in ADM excess the statewide average local contribution to education [per ADM] and 2) local contribution to education exceeds the amount that would be generated by a two-mill levy .... "The department shall allocate [to each qualifying school district] an amount equal the portion of the school district's local contribution [per ADM] that exceeds the statewide average local contribution [per ADM]. If the available funds are insufficient to meet [these authorized allocations] the available funds shall be distributed pro rata among the eligible school districts."

1986 Chapter 75 -- effective FY 87

The foundation formula was reinstated with some changes. State aid was calculated by multiplying basic need by the equalization percentage and then adding "secondary aid." Notably, the law does not make any provisions for local effort. In addition the law does not specify that any PL-81-874 funds be deducted from either REAAs or from city and borough districts.

The new addition to the foundation formula was called the "secondary formula account." Allocations from this account were nearly identical to the "80% distribution" first used in FY 86. The secondary formula account consisted of 80% of the funds remaining after each district had received basic need times the equalization percentage. The funds in this account were allocated to districts with above-average local tax appropriations per ADM and have a contribution which exceeds two mill equivalent property tax.

See Section A-3 for substantial changes in the calculation of instructional units. Separate instructional unit formulas were specified for small and large districts.

See Section A-5 for substantial changes in the instructional unit allotments multipliers. The range of multipliers widened substantially.

The base instructional unit value was set at $42,184 for FY 87.

1987 Chapter 91 -- effective FY 88

The foundation formula was revised so that state aid was equal to basic need minus 90% of PL-81-874 funds minus required local effort. Notably, this revised formula did not include any mention of an equalization percentage.

The deduction of PL-81-874 funds applied to all districts, not just REAA districts as in formulas used in earlier fiscal years.

The required local effort provision stated that each city and borough district is required to appropriate and contribute to the school operating fund of the district for each fiscal year at least the lesser of 1) the equivalent of a four mill tax levy on the full and true value of the taxable real and personal property in the district or 2) 35 per cent of the district's basic need for the preceding fiscal year. In addition, local contributions by a city or borough district may include no more than the greater of the equivalent of a two mill tax levy on real and personal property or 21 % of basic need.

See Section A-3 for major conceptual changes in the definition of instructional units. Formulas allow fractional units so that the formulas no longer have "steps." Special provisions in the instructional unit formulas were made for categories of vocational, bilingual, and special education with special weighting factors for each category. Minimum fractional units are provided for each of these types of instruction. In addition, the instructional unit formula for centralized correspondence was also changed.

A hold harmless provision slowed any decreases in the count of instructional units: "... 90 per cent of the district's total elementary and secondary instructional units for the preceding fiscal year is used if that number is greater than the districts total ... for the current fiscal year."

See Section A-5 for changes in the instructional unit allotment multipliers. These multipliers were called area cost differentials.

The base instructional unit value was changed from $42,184 to $60,000 for FY 88.

Districts were not allowed to accumulate substantial fund balances: "A district may not accumulate in any fiscal year an unreserved portion of its year-end fund balance in its school operating fund, ..., which is greater than five per cent of its expenditure for that fiscal year."

The law provided for special provisions for transition funding if a district was calculated to receive less than previous years. If the calculated state aid for a district was less than previous years, the district would receive a certain percentage of the difference between what it had received in previous years and what the new calculations implied it should receive.

1989 Chapter 65 -- effective FY 90

The required local effort provision was revised so that districts could be allowed to contribute local tax appropriations amounting to an additional 23% of basic need instead of 21% of basic need.

Section A-3: Instructional Units

The total number of instructional units for a district is calculated as the sum of instructional units for each instructional program (elementary, secondary, correspondence, vocational, special education, bilingual/bicultural, and gifted/talented). The number of instructional units for each program is calculated as the sum of the units for that program in each school or funding community in the district. The number of units in each program is calculated separately for each school prior to FY 88. After FY 88, the number of units in each program is calculated separately for each funding community. The number of units generated by each program in each school (or funding community) is determined by the average daily membership in the program in the school (or funding community).

The instructional unit formulas specify how many units are awarded to different levels of ADM in each program in each school (or funding community). These instructional unit formulas have undergone considerable change over time, as listed in Table A-2. For example, the number of units for elementary and secondary education programs have been changed about every five years. In addition, new formulas for new special programs (such as bilingual/bicultural and gifted/talented) have been added.

For nearly all of these unit formulas the average number of units per ADM declines as ADM increases. For example, during the early 1970s in a small elementary school with an ADM of 10 would generate 2 instructional units -- implying 0.5 instructional units for each student in average daily membership (2 units/10 ADM). For a slightly larger school with an ADM of 50, the formula in the early 1970s indicated a total of 5 units or 0.1 units per ADM (5 units/50 ADM). In a much larger elementary school, with an ADM of 200 for example, the 1970 formulas specified 13 units or 0.07 units per ADM. As these examples suggest, the average number of instructional units generated by each student declines as a school gets more and more students. All of the formulas for other programs have this same characteristic of declining average units per ADM. This characteristic of the formulas was intended to adjust for the fact that the average cost of education services per student in a large school is less than the average cost per student in a small school.

For the formulas used up to FY 87, the number of units per ADM does not decline steadily with ADM due to discrete jumps in the formula. In the earlier versions of the instructional unit formula, the number of units was specified for a range of ADM. As a result, the number of units per ADM would jumps at certain threshold levels of ADM. For example, in the early elementary school formula, an ADM of 32 generates 3 units while an ADM of 33 generates 4 units. As a result, the average number of units per ADM in a school with 32 ADM is 0.09 units per ADM while the average number of units per ADM in a school with 33 students is 0.12 units per ADM. These discrete jumps are most pronounced in smaller schools.

Because of these discrete jumps, the average number of units per ADM does not decline steadily with increasing ADM. Instead the average number of units per ADM declines for a while and then jumps to a higher level. These discrete jumps in the formula may have given districts the incentive to add additional ADM just up to the point where the formula would add an additional unit. These discrete jumps in the formula were eliminated in FY 88 and replaced by unit formulas which are continuous functions of ADM.

TABLE A–2: Summary of Instructional Unit Formulas

	Year Enacted / Fiscal Years Effective	1970 / 1971–1972			1972 / 1973–1975			1975 / 1976–1977			1977 / 1978		
		ADM min	ADM max	Units	ADM min	ADM max	Units	ADM min	ADM max	Units	ADM min	ADM max	Units
REGULAR INSTRUCTION	Elementary schools in districts with total ADM < 1000	0	9	1	no change			no change			0	19	2
		10	20	2							20	32	3
		21	32	3							33	48	4
		33	46	4							47	62	5
		47	62	5							63	80	6
		63	80	6							81	999	6 plus one for every 18 over 81
		81	999	6 plus one for every 18 over 81									
	Elementary schools in districts with total ADM > 1000	0	9	1	no change			no change			0	19	2
		10	20	2							20	32	3
		21	32	3							33	48	4
		33	46	4							47	62	5
		47	62	5							63	80	6
		63	80	6							81	99	7
		81	99	7							100	3005	7 plus one for every 19 over 100
		100	3005	7 plus one for every 19 over 100							3006		160 plus one for every 21 over 3006
	Secondary schools in districts with total ADM < 1000	0	9	1	no change			no change			0	32	3
		10	20	2							33	46	4
		21	32	3							47	62	5
		33	46	4							63	80	6
		47	62	5							81	999	6 plus one for every 18 over 81
		63	80	6									
		81	999	6 plus one for every 18 over 81									
	Secondary schools in districts with total ADM > 1000	0	9	1	no change			no change			0	32	3
		10	20	2							33	46	4
		21	32	3							47	62	5
		33	46	4							63	80	6
		47	62	5							81	99	7
		63	80	6							100	3005	7 plus one for every 19 over 100
		81	99	7							3005		160 plus one for every 21 over 3005
		100	3005	7 plus one for every 19 over 100									
		3006		160 plus one for every 23 over 3006									
SPECIAL INSTRUCTION	Vocational Education	ADM FTE min	ADM FTE max	Units	ADM FTE min	ADM FTE max	Units	no change			no change		
		5	10	1	5	10	1						
		11	20	2	11	25	2						
		21	50	3	26	40	3						
		51	90	4	41		3 plus one for every 20 over 41						
		91	140	5									
		141	190	6									
		191	240	7									
		241		7 plus one for every 50 over 241									
	Special Education	ADM min	ADM max	Units	no change			ADM FTE min	ADM FTE max	Units	no change		
		5	8	1				5	8	1			
		9	15	2				9	15	2			
		16	23	3				16	24	3			
		24	32	4				25	35	4			
		33		4 plus one for every 19 over 33				36		4 plus one for every 11 over 36			
	Correspondence	ADM min	ADM max	Units	no change			no change			ADM min	ADM max	Units
		5	10	1							0	20	2
		10	20	2							20	32	3
		21	32	3							33	46	4
		33	46	4							47	62	5
		47	62	5							63	80	6
		63	80	6							81	999	6 plus one for every 18 over 81
		81	999	6 plus one for every 18 over 81									
	Bilingual Education	not yet enacted			not yet enacted			not yet enacted			not yet enacted		
	Remote Junior High Schools	no special provisions			no special provisions			no special provisions			ADM min	ADM max	Units
											0	12	3
											12	20	4
											21	32	5

TABLE A–2: Summary of Instructional Unit Formulas Continued

	Year Enacted	1978			1980			1981			1983–1985
	Fiscal Years Effective	1979–1980			1981			1982–1983			1984–1986
		ADM min	ADM max	Units	ADM min	ADM max	Units	ADM min	ADM max	Units	
REGULAR INSTRUCTION	Elementary schools in districts with total ADM < 1000	no change			Elementary Schools in all districts	0	31	3	no change		All Formulas Suspended
						32	46	4			
						47	62	5			
						63	80	6			
						81		6 plus one for every 18 over 81			
	Elementary schools in districts with total ADM > 1000	no change									
	Secondary schools in districts with total ADM < 1000	no change			Secondary Schools in all districts	0	29	4	0	30	4
						30	59	6	30	59	6
						60	88	8	60	89	8
						90		10 plus one for every 20 over 90	90		10 plus one for every 18 over 90
	Secondary schools in districts with total ADM > 1000	no change									
SPECIAL INSTRUCTION	Vocational Education	no change			no change			no change			All Formulas Suspended
	Special Education	no change			no change			ADM FTE min	ADM FTE max	Units	
								0	3000	one for every 15	
								3000		one for every 11	
	Correspondence	no change			no change			no change			
	Bilingual Education	Weighted ADM min	Weighted ADM max	Units	no change			no change			
		1	12	1							
		13	18	2							
		19	42	3							
		43		3 plus one for every 24 over 43							
	Remote Junior High Schools	no change			no change			no change			

TABLE A–2 Summary of Instructional Unit Formulas Continued

	Year Enacted / Fiscal Years Effective	1986 / 1987			1987 / 1988–1990			
		ADM min	ADM max	Units		ADM min	ADM max	Units
REGULAR INSTRUCTION	Elementary Schools in Cities and Boroughs with ADM < 1000	1	10	2	Elementary Schools in funding communities with ADM > 200			15 + (ADM – 200) / 17
		11	20	4				
		21	30	6				
		31	40	8				
		41	50	10				
		51	60	12				
		61	499	12 plus one for for every 12 over 61				
		500	999	49 plus one for every 15 over 500				
	Elementary Schools in REAAs and Cities and Boroughs with ADM > 1000	0	19	2	Secondary schools in funding communities with ADM > 200			16 + (ADM – 200) / 13
		20	32	3				
		33	46	4				
		47	62	5				
		63	80	6				
		81		6 plus one for every 18 over 81				
	Secondary Schools in Cities and Boroughs with ADM < 1000	1	10	2	Funding communities with combined elementary ADM < 200 and secondary ADM < 200	1	10	2
		11	20	4		11	20	2 + (ADM–10) / 5
		21	30	6		21	60	4 + (ADM–20) / 8
		31	40	8		61	120	9 + (ADM–60) / 12
		41	50	10		121	525	14 + (ADM–120) / 15
		51	60	12				
		61	499	12 plus one for every 12 over 61				
		500	999	49 plus one for every 15 over 500				
	Secondary Schools in REAAs and Cities and Boroughs with ADM > 1000	0	27	4				
		28	41	5				
		42	58	6				
		57	73	7				
		74		7 plus one for every 16 over 74				

		ADM FTE min	ADM FTE max	Units		
SPECIAL INSTRUCTION	Vocational Education	5	10	1	ADM * Weight Factor * 0.05	
		11	25	2		
		26	40	3		
		41		3 plus one for every 20 over 41		
		ADM FTE min	**ADM FTE max**	**Units**		
	Special Education	1	15	1	gifted services	0.025 units/child
		16	30	2	resource services	0.056 units/child
		31	45	3	self–contained services	0.100 units/child
		46		4 plus one for every 11 over 46	intensive/hospital services	0.333 units/child
		ADM min	**ADM max**	**Units**		
	Correspondence	0	20	2	Included in ADM of largest community in district	
		20	32	3		
		33	46	4		
		47	62	5		
		63	80	6		
		81	999	6 plus one for every 18 over 81		
		Weighted ADM min	**Weighted ADM max**	**Units**		
	Bilingual Education	1	12	1	0.042 * Language dominance category weight	
		13	18	2		
		19	42	3		
		43		3 plus one for every 24 over 43		
		ADM min	**ADM max**	**Units**		
	Remote Junior High Schools	0	12	3	No special provisions	
		12	20	4		
		21	32	5		

In general, the average number of units per ADM for schools in large districts is lower than in schools in small districts. Starting in FY 1971, the formula for calculating units in small and large districts has been specified differently. A large district was defined as a district with ADM greater than 1000. At first, the differences in the formulas were only slight. For schools smaller than 100 ADM, the formulas for small and large districts remained the same up until FY 1986. However, for larger schools, the formulas were different from FY 1971 through FY 1980. For example, in a school with an ADM of 300, the formula for small districts generated 19 units. The formula for the same size school in a large district generated 18 units. These distinctions between small and large districts were dropped in FY 1981, then briefly reintroduced in FY 1987 and then dramatically changed in FY 1988 as will be discussed below.

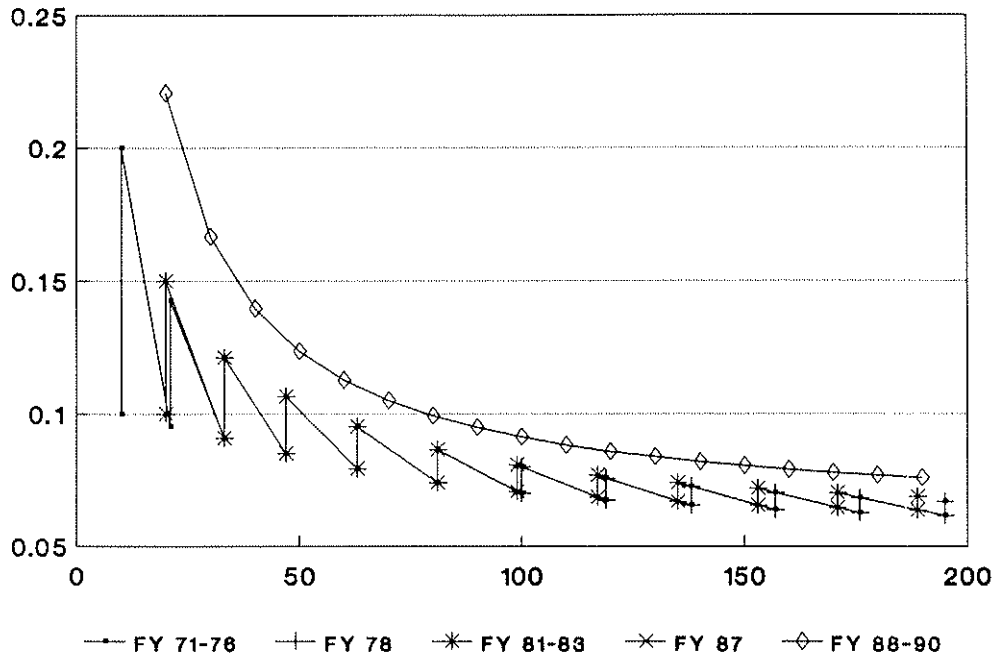
Revisions in the formula have affected schools differently. The average number of units per ADM generated by very small schools (with ADM$<$40) and large schools (with ADM$>$100) have shifted up over time. The most substantial of these changes have affected small schools with ADM below 32. The formulas have also been changed so that large schools receive slightly more units per ADM than they did in the original specification. This shift is most pronounced in the formulas for large secondary schools. In the most recent revisions (starting in FY 1988) the number of units per ADM has shifted up unambiguously for secondary schools larger than 100 ADM and have shifted up unambiguously for elementary schools greater than about 40 ADM. From 1970 to 1988, the number of units per ADM has gone up approximately 20% to 40% for elementary schools and approximately 40% to 60% for secondary schools. The exact percentage depends critically on the size of the school.

As an example of these changes in the average number of units awarded to schools, the average number of units per ADM in elementary and secondary schools in districts with ADM greater than 1000 are graphed in Figures A-1 and A-2. Notably, the average number of units per ADM have shifted up for very large and very small schools over time. The discrete jumps in the formula make these shifts more ambiguous for medium sized schools. The most recent changes in the formula (in FY 1988) have unambiguously increased the average number of units per ADM in elementary schools with ADM above 40 and in secondary schools with ADM above 100.

Special provisions for programs other than secondary and elementary education change the number of units slightly. In the cases of special, vocational, and bilingual education, the level of ADM is counted using either full-time-equivalent or other special weighting schemes. Since FY 1988, the number of units for all special programs including vocational, special education, bilingual, and gifted/talented are based on special weightings of ADM.

In general, the number of units generated by these programs are simply added to the number of units generated by secondary and elementary education. However, in some years vocational education students are counted once for vocational education units and are counted a second time as secondary students. Later, special education and bilingual education were treated the same way. The units were counted once with FTE ADM under that program and then a second time as regular ADM in elementary or secondary programs. Effectively, this shift from ADM counts to FTE counts served to increase the number of instructional units. For correspondence study, the formula for calculating units has usually

Figure A-1. Instructional Units per ADM Elementary Schools in Districts with ADM over 1000

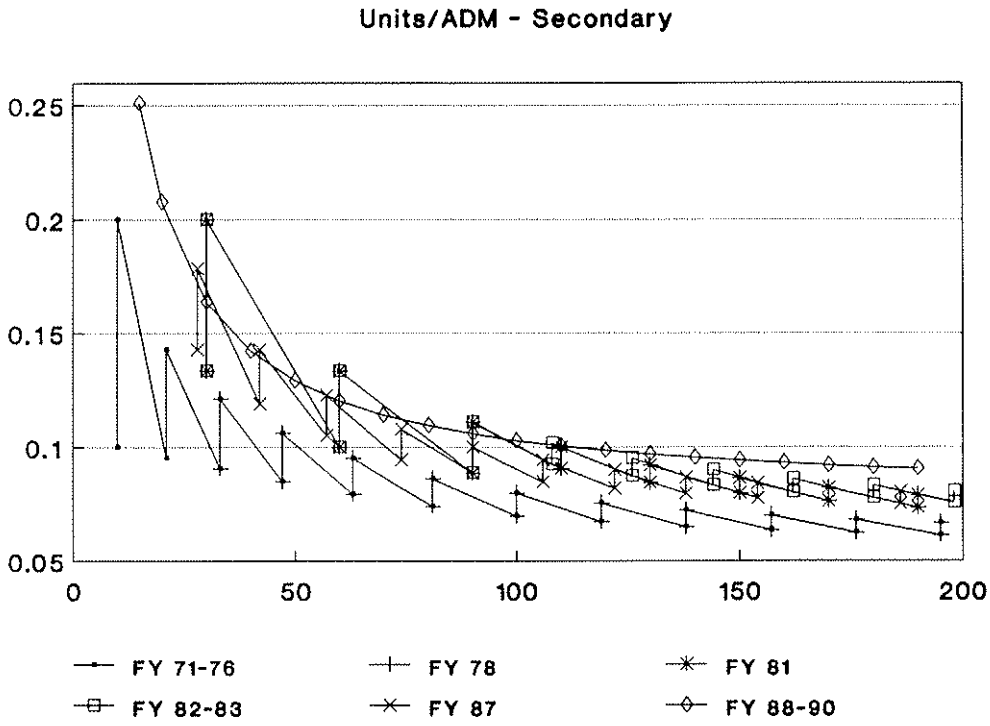


been the same formula used to calculate elementary instruction units. So the systematic increases in the elementary program increased the number of units per ADM in correspondence study as well.

Special provisions for remote schools changed the number of units at various times. Beginning in FY 1971, a district operating a school in a remote area could calculate the number of units to which that school would be entitled if it were a separate district. Then it could add that number of units in the total number of instructional units for the district as a whole. In effect, a remote school could be classified as a small district and benefit from the extra units awarded to small districts by the formula. Beginning in FY 1978, a district operating a school in a remote site with at least 20 students in grades 5 through 8 could conduct a separate secondary program and count the units generated by that program. In other words, even if they are not a separate site, students in grades five through eight could be counted as a separate school when calculating units. These remote school provisions effectively gave districts the opportunity to count additional instructional units for remote schools.

Various hold harmless provisions on the number of instructional units affected the level of funding received. These hold harmless provisions made it more difficult for the number of instructional units received to decrease. Starting in FY 1976, any district entitled to less than

Figure A-2. Instructional Units per ADM in Secondary Schools in Districts with ADM greater than 1000



25 units could receive no less than 107.5 % of the base instructional unit value per unit. This condition effectively raised the total number of instructional units awarded to very small districts by 7.5%. In FY 1978, these provisions became even stronger. If the number of instructional units which a district is entitled to decreased by ten percent or more from one year to the next, the district may use the same number of units it received in the previous year. Then over the next three years, the number of instructional units was gradually phased in to the new level to which it is entitled. The hold harmless provision on instructional units was changed once again in FY 1987 when the laws were changed to read, "90 per cent of the district's total elementary and secondary units for the preceding fiscal year is used if that number is greater than the district's total ... for the current fiscal year."

Section A-4: Base Instructional Unit Value

The base instructional unit value can be interpreted as the statutory price of one instructional unit of education services purchased in Anchorage. This base value has undergone the largest changes among all of the components of the formula. The base instructional unit value is specified as a certain number of dollars per instructional unit as listed in Table A-3 below. The base value, as measured in constant dollars, decreased from FY 1971 through FY 1975. From FY 1976 through FY 1983, the base value increased a total of twenty percent. When the formula was reinstated in FY 1987, it was increased only slightly higher than the level in FY 1983. Then in FY 1988, the base unit instructional value was increased by about fifty per cent. Many of these dramatic changes in the base instructional unit value were offset by changes in other parts of the formula.

Table A-3: History of Base Instructional Unit Value

Enactment Year	Fiscal Years Effective	Current Dollars	Constant 1990 dollars
1970	1971	19250	50656
1970	1972	19250	48183
1970	1973	19250	44066
1973	1974	20250	39311
1974	1975	21750	36412
1975	1976	23500	35955
1975	1977	25000	37640
1977	1978	27500	43407
1978	1979	29000	43699
1978	1980	31900	44483
1980	1981	34935	41549
1980	1982	38590	40079
1981	1983	42250	42839
1983	1984	Suspended	
1984	1985	Suspended	
1985	1986	Suspended	
1986	1987	42184	47915
1987	1988	60000	65690
1987	1989	60000	62603
1987	1990	60000	60000

Note: Constant 1990 dollar estimates are deflated by the "Other Services" Gross State Product implicit price deflator

Section A-5: Instructional Unit Allotment Multiplier

The instructional unit allotment multiplier scales the base instructional unit value by a specified percentage for each district. The original intent of these multipliers was likely to scale for variations in the cost of providing education services in various regions. However, the instructional unit allotment multipliers do not accurately reflect variations in the actual cost of buying educational services across districts. Table A-4 summarizes the many changes in the multipliers from FY 1971 through FY 1990.

From FY 1971 through FY 1976, the multiplier was set according to election districts. In these early years there were only four to eight different multipliers for different collections of election districts. In addition, the multiplier for districts not accessible by road, train, or ferry from one of the major cities in Alaska (Anchorage, Fairbanks, Juneau, or Ketchikan) was increased by an additional five percent. Starting in FY 1978, the multipliers were set for several new groups of districts. Minor changes from FY 1978 through FY 1984 modified the multipliers for particular districts or added multipliers for new districts. The multipliers were suspended, along with the rest of the formula from FY 1984 through FY 1986. When the foundation formula was re-instated in FY 1987, the multipliers were dramatically different from earlier years and did not correspond to the area cost differentials estimated in 1988 by the McDowell Group. In FY 1988, the multipliers were changed again and more closely match the McDowell estimates of cost differentials.

The changes in the instructional unit allotment multiplier are relatively small when compared to changes in other components of the formula. In Figure A-3 the effect of the multipliers on the base unit instructional value is shown graphically. The lower line is the base instructional unit value measured in 1990 dollars. The upper line is the product of the base value and the weighted average instructional unit allotment multiplier for all districts. The multiplier has scaled the base value up by two to ten percent at various times. Meanwhile, the base unit instructional value has varied by as much as thirty to fifty percent over time. Notably, the changes in the base unit value have dwarfed the changes in the multiplier.

Figure A-4 displays the cumulative effect of the changes in the base value, the multiplier, and the number of units. This graph shows changes in basic need per ADM. Basic need is defined as the product of the base instructional unit value, the instructional unit allotment multiplier, and the number of instructional units. Notably, basic need per ADM has roughly doubled from FY 1974 to FY 1990. Roughly half of this change can be explained by the increase in the average number of instructional units per ADM and the other half can be explained by increase in the base instructional unit value. Changes in the instructional unit multiplier are small relative to these changes in the base and the units formulas.

TABLE A–4: Summary of Instructional Unit Alottment Multipliers

Year Enacted	1970	1971	1975	1977	1978	1981	1983	1986	1987	1988
Effective Fiscal Years	FY 71	FY 72–75	FY 76–77	FY 78	FY 79–81	FY 82–83	FY 84–86	FY 87	FY 88–90	McDowell Differentials
ADAK	NA	NA	1.26	1.40	1.40	1.40	Found–	0.95	1.27	1.30
ALASKA GATEWAY	NA	NA	1.11	1.20	1.20	1.20	ation	1.25	1.19	1.11
ALEUTIAN REGION	NA	NA	1.26	1.50	1.50	1.50	Formula	1.25	1.31	1.34
ANCHORAGE	1.00	1.00	1.00	1.00	1.00	1.00	Suspended	1.04	1.00	1.00
ANNETTE ISLAND	NA	NA	1.00	1.04	1.04	1.04		0.90	1.03	1.07
BERING STRAIT	NA	NA	1.26	1.55	1.55	1.55		1.45	1.39	1.40
BRISTOL BAY	1.15	1.15	1.26	1.55	1.55	1.55		1.55	1.27	1.33
CHATHAM	NA	NA	1.08	1.08	1.08	1.08		1.00	1.03	1.10
CHUGACH	NA	NA	1.15	1.20	1.20	1.20		1.25	1.14	1.20
COPPER RIVER	NA	NA	1.04	1.15	1.15	1.20		1.40	1.14	1.13
CORDOVA	1.05	1.05	1.15	1.15	1.15	1.15		0.95	1.11	1.21
CRAIG	1.00	1.00	1.00	1.08	1.08	1.08		1.20	1.03	1.06
DELTA GREELY	NA	NA	1.11	1.20	1.20	1.20		1.15	1.16	1.11
DILLINGHAM	1.15	1.15	1.26	1.55	1.55	1.55		1.50	1.27	1.29
FAIRBANKS	1.05	1.05	1.11	1.12	1.12	1.12		1.13	1.04	1.03
GALENA	NA	NA	1.34	1.55	1.55	1.55		1.55	1.30	1.33
HAINES	1.00	1.00	1.08	1.15	1.15	1.15		1.12	1.05	1.03
HOONAH	1.00	1.00	1.08	1.12	1.12	1.12		1.12	1.08	1.07
HYDABURG	1.00	1.00	1.00	1.08	1.08	1.08		1.04	1.03	1.11
IDITAROD	NA	NA	1.34	1.55	1.55	1.55		1.65	1.33	1.29
JUNEAU	1.00	1.00	1.00	1.00	1.00	1.00		1.04	1.00	1.02
KAKE	1.00	1.00	1.04	1.08	1.08	1.08		1.12	1.03	1.13
KASHUNAMIUT	NA	NA	NA	NA	NA	NA		1.40	1.33	1.37
KENAI	1.00	1.00	1.08	1.08	1.08	1.08		1.04	1.00	1.01
KETCHIKAN	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.02
KING COVE	1.15	1.15	1.26	1.50	1.50	1.50		1.40	1.27	NA
KLAWOCK	1.00	1.00	1.00	1.08	1.08	1.08		1.04	1.03	1.08
KODIAK	1.05	1.05	1.08	1.12	1.16	1.16		1.35	1.09	1.08
KUSPUK	NA	NA	1.34	1.55	1.55	1.55		1.60	1.33	1.34
LAKE & PENINSULA	NA	NA	1.26	1.55	1.55	1.55		1.45	1.31	1.34
LOWER KUSKOKWIM	NA	NA	1.30	1.55	1.55	1.55		1.55	1.42	1.40
LOWER YUKON	NA	NA	1.30	1.55	1.55	1.55		1.20	1.35	1.37
MAT–SU	1.00	1.00	1.04	1.04	1.04	1.04		1.04	1.00	1.00
NENANA	1.05	1.05	1.34	1.20	1.20	1.20		1.25	1.20	1.16
NOME	1.15	1.15	1.26	1.55	1.55	1.55		1.55	1.34	1.36
NORTH SLOPE	1.15	1.15	1.34	1.55	1.55	1.55		1.75	1.45	1.49
NORTHWEST ARCTIC	NA	NA	1.34	1.55	1.55	1.55		1.55	1.45	1.43
PELICAN	1.00	1.00	1.08	1.12	1.12	1.12		1.10	1.08	1.07
PETERSBURG	1.00	1.00	1.04	1.04	1.04	1.04		0.90	1.00	1.01
PRIBILOF	NA	NA	1.26	1.50	1.50	1.50		1.05	1.30	1.34
RAILBELT	NA	NA	1.34	1.20	1.20	1.20		1.75	1.23	1.14
SAND POINT	1.15	1.15	1.26	NA	NA	NA		1.15	1.27	NA
SEALAWIK	1.15	1.15	1.34	1.55	1.55	1.55		NA	NA	NA
SITKA	1.00	1.00	1.04	1.04	1.04	1.04		1.04	1.00	1.02
SKAGWAY	1.00	1.00	1.08	1.08	1.08	1.08		0.80	1.05	1.05
SOUTHEAST ISLAND	NA	NA	1.00	1.04	1.08	1.08		1.08	1.04	1.11
SOUTHWEST RE	NA	NA	1.26	1.55	1.55	1.55		1.25	1.31	1.33
ST. MARY'S	1.15	1.15	1.30	1.55	1.55	1.55		1.80	1.30	1.37
TANANA	NA	NA	NA	NA	NA	NA		1.40	1.30	1.33
UNALASKA	1.15	1.15	1.26	1.50	1.50	1.50		1.20	1.27	1.29
VALDEZ	1.05	1.05	1.15	1.15	1.15	1.15		1.15	1.11	1.08
WRANGELL	1.00	1.00	1.04	1.04	1.04	1.04		0.90	1.00	1.02
YAKUTAT	1.00	1.00	1.08	1.20	1.20	1.20		1.15	1.08	1.20
YUKON FLATS	NA	NA	NA	1.55	1.55	1.55		1.65	1.46	1.36
YUKON–KOYUKUK	NA	NA	1.34	1.55	1.55	1.55		1.50	1.34	1.31
YUPIIT	NA	NA	NA	NA	NA	NA		1.85	1.41	1.40

Figure A-3. Base Instructional Unit Value multiplied by Weighted Average Instructional Unit Allotment Multiplier

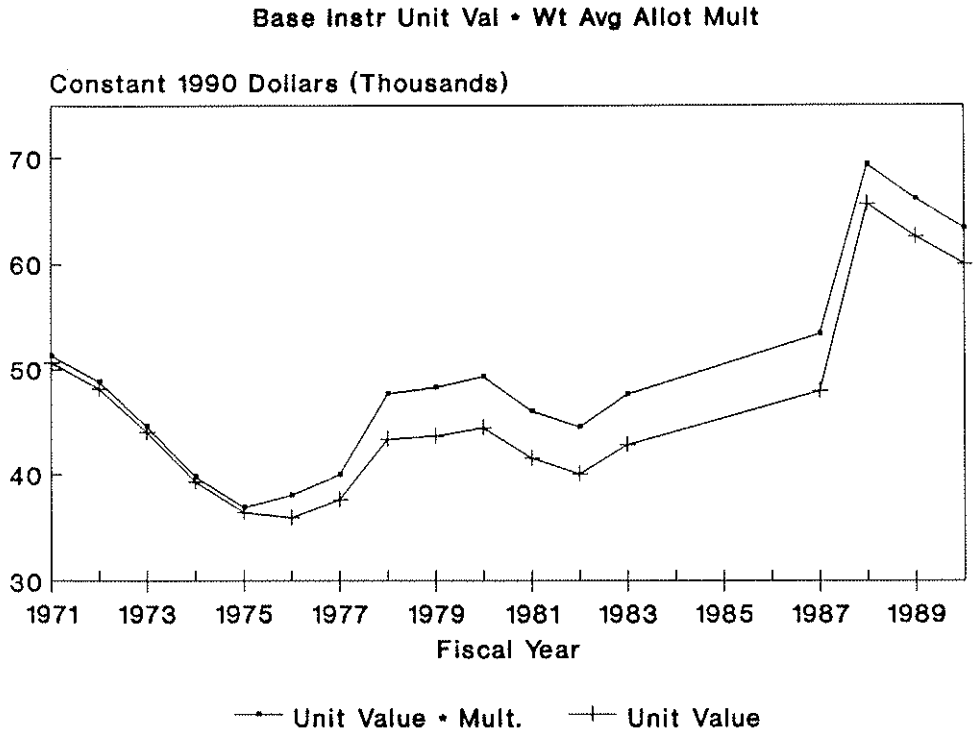
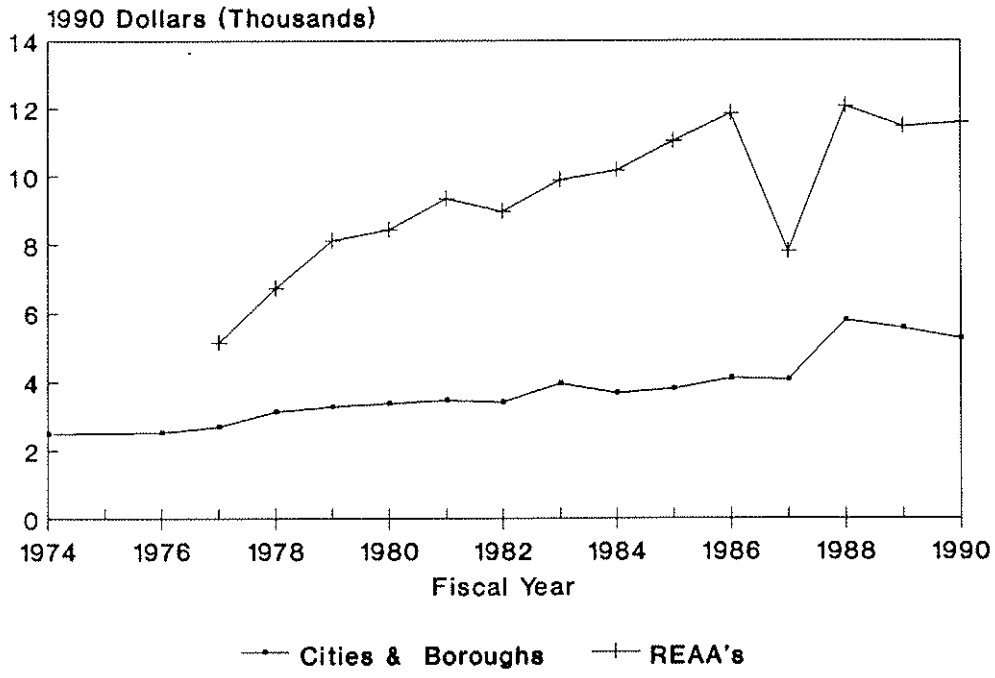


Figure A-4. Basic Need per ADM



Section A-6: Equalization Percentage

Until recently, the equalization percentage had been the fraction of basic need provided by the state. The equalization percentage was used from FY 1971 through FY 1981 and again in FY 1987. The equalization percentage is no longer used when calculating the level of state aid. Originally the equalization percentage was defined as a function of the relative wealth of a district:

Equalization Percentage $= P_i = 1 - (1-k) * (V_i/V_s)$

P_i = percent of basic need provided by state

k = minimum (or average) level of state support of basic need

V_i = Full value of taxable real and personal property per ADM in district i.

V_s = Average V_i in the state.

P_i must be greater than or equal to k per cent.

The ratio V_i/V_s is a measure of the wealth of the district relative to the average wealth of the state as a whole. For those districts with the lowest relative wealth (the smallest V_i/V_s) the equalization percentage is very close to one. For districts with relative wealth below the state average, the equalization percentage ranges between one and the value of k, which has been called alternatively either the "minimum" or "average" percentage. For districts with relative wealth above the state average, the equalization percentage is set at the value of k. The changes in the value of k are listed over time in Table A-5. The weighted average percentage listed in Table A-5 is the average percentage for all districts. The equalization percentage as a function of the relative wealth of a district is graphed in Figure 11 in Chapter III of this report.

TABLE A-5: Summary of Equalization Percentage

Enactment Year	Effective Fiscal Years	Minimum Percentage (value of k)	Weighted Average Percentage
1970	1971-1975	0.90	0.91
1975	1976	0.93	0.94
1976	1977-1978	0.95	0.96
1977	1979	0.97	0.98
1983	1984-1986	Suspended	
1986	1987	0.97	0.98
1987	1988-1990	no longer applies	

Section A-7: Local Effort Provisions

From FY 1971 through FY 1981, the level of required local effort for city and borough districts was set at the difference between total basic need and the amount of basic need provided by the state. In other words, the cities and boroughs were required to fund a certain percentage of basic need. That percentage was equal to one minus the equalization percentage.

Starting in FY 1977 when the REAA districts first appeared in the Department of Education accounts, the REAA's were not required to provide any local effort. Instead, the REAA's were given an additional amount equal to the average local tax contributions per ADM for school operating costs in the city and borough school districts in the prior fiscal year. In other words, the REAA's were given "In-Lieu-of-Local" support for each student equal to the average local appropriations per ADM in the City and borough districts. These "In-Lieu-of-Local" support amounted to about four per cent each year of the total state foundation grant in FY 1981.

Starting in FY 1982, both the required local effort provisions and the "in-lieu-of-local-support" provisions were suspended. These provisions were replaced by "supplemental equalization" payments which applied to FY 1982 and FY 1983. According to these supplemental equalization provisions, "Each city and borough school district received additional funds equal to the product of: 1) the district's average daily membership; and 2) the difference between the average per student local tax contribution for education made in all the city and borough school districts in the previous fiscal year and the district's per student local tax contribution made the previous fiscal year. Supplemental equalization payments to REAAs equaled the product of: 1) the district's ADM; and 2) the average per student local tax contribution made in all city and borough districts in the previous fiscal year. Supplemental equalization payments for both REAAs and city and borough districts were adjusted by the instructional unit allotment. On average in FY 1982 and FY 1983, these supplemental equalization payments amounted to about four per cent each year of the total state foundation grant.

The formula was suspended for FY 1984 and no mention of supplemental support appears in the final accounts or in the foundation calculations for FY 1984 or FY 1985. However, in FY 1986, while the formula was still suspended, the Department of Education was permitted to make an "80% distribution." The law stated that DOE shall allocate 80 percent of the funds remaining after [the initial allocations] to school districts whose (1) local contribution to education per ADM exceeds the statewide average local contribution per ADM; and (2) local contribution to education exceeds the amount that would be generated by a two-mill levy on the full and true value of taxable real and personal property.

In other words, those districts that contributed above average amounts per ADM and taxed higher than a two mill rate would receive a share of the extra funds. This same "80% distribution" was continued into FY 1987 even though the rest of the formula was reinstated. These "80% distributions" added about three per cent to the total state foundation grant in FY 1986 and about two percent in FY 1987.

From FY 1988 to the present, city and borough districts are required to provide at

least 35 % of the basic need (the level of state aid if the equalization percentage is not applied) or to provide the revenues from a four mill property tax on the full value of real and personal property in the district. This requirement effectively reduced the total state foundation grant by about 31% in FY 1988, about 28 % in FY 89, and about 22 % in FY 90. These many changes in required local effort are summarized in Table A-6.

Table A-6: Required Local Effort Provisions

Enactment Year	Effective Fiscal Years	Local Effort Provisions
1970	1971-1980	Required local effort established for all cities and boroughs
1975	1976-1980	In lieu of local support for REAAs No required local effort for REAAs
1980	1981-1983	Required local effort provisions repealed Supplemental Equalization for all districts
1983	1984-1985	All supplemental equalization suspended
1985	1986	"80% Distribution" contingent on local effort.
1986	1987	"Secondary Allocation" contingent on local effort.
1987	1988-1989	New Required local effort Maximum on additional local support
1989	1990	Maximum additional local support increased

Section A-8: Deduction of PL 81-874 Funds

In 1975, when the REAAs were created and included in the state foundation program, the law did not explicitly state that PL 81-874 funds would be deducted from the state grant to REAAs. However in FY 77, the first year for which complete accounts of revenues are available for REAAs, PL 81-874 funds are not listed as a separate source of revenue for REAAs -- suggesting that the PL 81-874 funds were included as part of the state foundation grant. Starting in FY 1978, the law explicitly states that 100% of the PL 81-874 funds awarded to the REAAs would be deducted from the state foundation grant. The total of these deductions amounted to three to seven percent of the total state foundation grant each year from FY 1977 to FY 1980.

Starting in FY 81, only 80% of the PL-874 funds were deducted from the state grant; REAAs were said to be able to "recapture" 20% of the PL-874 funds. Even after the formula was suspended in FY 1984, the 80% deduction of PL-874 funds continued through FY 86. On average, these deductions reduced the state foundation grant by three to six per cent each year from FY 1981 to FY 1986.

When the formula was reinstated in FY 1987, the deduction of PL 81-874 funds was suspended. Some hold harmless provisions may have allowed the level of PL 81-874 funds received in earlier years to affect current funding levels, however there was no explicit mention of PL 81-874 funds in the law. Starting in FY 88, 90 per cent of PL 81-874 funds were deducted from the state foundation grant to all districts, not just REAAs. Between FY 88 and FY 90, the deduction of PL-874 funds has amounted to about five to eight percent reduction of the total state foundation grant each year.

Table A-7: Summary of Deduction of PL 81-874 Revenues

Enactment Year	Effective Fiscal Years	Deduction of PL 81-874 funds
1975	1976-1980	100% of PL 81-874 funds deducted from REAA state aid
1980	1981-1986	80% of PL 81-874 funds deducted from REAA state aid
1986	1987	No deduction of PL 81-874 funds
1987	1988-1990	90% of PL 81-874 funds deducted from state aid to all districts

Section A-9: Hold Harmless Provisions

Hold harmless provisions in the law effectively "slow down" any decreases that may occur in pieces of the formula or in the total foundation grant to the district. The most common hold harmless provisions state that if the number of instructional units calculated for a district decreases relative to the previous year, then the district can use the number of units calculated from the previous year. In some cases the district was allowed to phase in the reduction of units over several years.

By comparing the number of units a district would have received to the number of units actually used in calculating the foundation grant, we estimated the impact of these hold harmless provisions. During the years in which the hold harmless provisions were in place, the total number of instructional units that would have applied without the hold harmless provision was about one percent smaller than the total number of units actually used in the foundation grant calculations. These comparisons suggest that the hold harmless provisions contributed roughly one percent increase in the number of instructional units each year.

In FY 1978, a second hold harmless provision was used in the formula. It specified that the instructional unit allotment could not decrease. In effect, the product of the multiplier and the base value could not decrease. This hold harmless provision applied to only a few districts since the instructional unit allotment multipliers were increased for most districts in FY 1978.

In more recent years, a third form of hold harmless provision stated that if a district is calculated to receive a smaller state foundation grant relative to the previous year, then that reduction can be phased in over several years. These adjustments amounted to less than one percent of the state foundation grant in FY 1988.

APPENDIX B. HISTORY OF ACCOUNTING PROCEDURES

APPENDIX B:

SUMMARY OF CHANGES IN THE SCHOOL OPERATING FUND ACCOUNTS

Changes in the accounts of the school operating fund are summarized in Table B-1 and described briefly below:

FY 1971 - FY 1974

Instruction included all forms of regular and special instruction as well as all forms of pupil and instructional support.

Administration included some forms support that were later called general support.

Fixed Charges was composed of all employee benefit payments paid to employees working in instruction, administration or operations and maintenance. To make these categories comparable to categories in later years, the benefits included in Fixed Charges can be distributed among these categories roughly in proportion to the expenditures in these categories.

Judging by the proportions of costs in the early years, the "Auxiliary Services" category may have included some expenditures which would later be allocated to Operations and Maintenance and to Administration.

Transfers to Pupil Transport and Food Services do not necessarily measure the full expenditures in these categories. These categories only measure the fund transfers from the school operating fund to other funds.

FY 1975

Some districts used the old accounting system present from 71-74 and some used the new accounting system initiated for all districts in 1976. A consistent set of data for all districts is not available in FY 1975.

FY 1976 - FY 1978

The "Instruction" category used prior to 1975 was split into numerous components. Separate functions were created for regular instruction, vocational education, correspondence study, and special education.

In addition, pupil support and instructional support functions which were previously included in the "Instruction" category were made into separate functions. The major component of instructional support was library services.

A new General Support category was created by combining the old "Administration" function as well as some unknown components of the "Instruction" function as well as some components of Auxiliary services. The largest component of the new general support category was the office of the principal.

Operations of Plant and Maintenance of Plant were combined into a single function called Operations and Maintenance of Plant.

Beginning in FY 1976, the expenditures at schools on military bases in Anchorage and Fairbanks were reported separately in the accounts. These accounts, however, are not consistent over time. Expenditures at the military-base schools are reported separately for FY 76, 77, 79, and 80 while revenues are reported separately for military base schools in FY 76, 77, and 79. The way in which state revenues are accounted for at these schools vary over time, sometimes reported as foundation revenues and sometimes as other state revenues. In addition, other data for military-base schools is not always comparable to the expenditure and revenue data for these schools. Average Daily Membership estimates are reported separately for military-base schools in the Department of Education accounts for FY 74 through FY 79, which does not coincide with the years in which expenditure and revenue data are available. In addition, the counts of facilities are available for FY 71 through FY 74, which also does not coincide with the years in which expenditures and revenues are available. For these reasons, the expenditures at military base schools are not included in the analysis of school finance. Expenditures at military base schools in Anchorage and Fairbanks are included in the analysis only after these schools were explicitly included in the Anchorage or Fairbanks school districts (in FY 81 for the Anchorage schools and FY 84 for the Fairbanks schools).

FY 1979 - FY 1980

Bilingual/Bicultural Instruction was added. Expenditures for this function were considered supplemental and additional funds allocated to fund a new program. Any expenditures previously used for bilingual/bicultural education may have been included in special education prior to FY 79.

FY 1981 - FY 1985

The pupil support function was split into pupil instruction support and pupil non-instruction support. The functions included in pupil instruction support likely included boarding home services, psychological services, and speech and pathology support services. Pupil non-instruction support was a relatively small component of expenditures and was not used by all districts.

Pupil transportation, Pupil Activities, Food Services, and are separate funds. The amounts appearing in the school operating fund for districts include only the transfers from the school operating fund to the other funds. Fund transfers from the School Operating fund to the respective funds met a large percentage of the total expenditures in these other funds in earlier years. But more recently these separate funds have derived a larger percentage of their revenues from other sources.

Functions were defined according to what activities could be charged to them. There were no explicit restrictions on which object codes could be included. In addition, the functions have included various groups of sub-functions which are listed in the Chart of Accounts provided by the Department of Education. These definitions of functions and the sub-functions included in each has changed over time. We have access only to Charts of accounts which applied to FY 84 to the present. As a result, the definition of functions in earlier years is not known with the same precision.

FY 1986 - FY 1987

Other Special Programs was added as a separate function. It was not used by all districts and the function codes included may have varied across districts.

FY 1988 - FY 1990

Gifted and Talented Instruction was added as a separate function. Expenditures on gifted and talented instruction were previously included in special education

Parts of the old definition of Pupil support (instructional and non-instructional) were reallocated to other functions. Boarding Home services was reallocated to regular instruction, Psychological services and Speech Pathology services were reallocated to Special Education, and Attendance and Social Work, Guidance, and Health services were allocated to the new definition of Pupil Support.

The old instructional support function was completely reallocated to other functions. Improvement of Instructional Services and In-service Training were reallocated to regular instruction. Library and Audio Visual services were reallocated to the new definition of Pupil Support.

The old definition of General Support was split into two pieces. The office of the principal was taken out of the old definition of general support and made into a new function called school administration. The remainder of general support (after the office of the principal was deducted) was called District Administration.

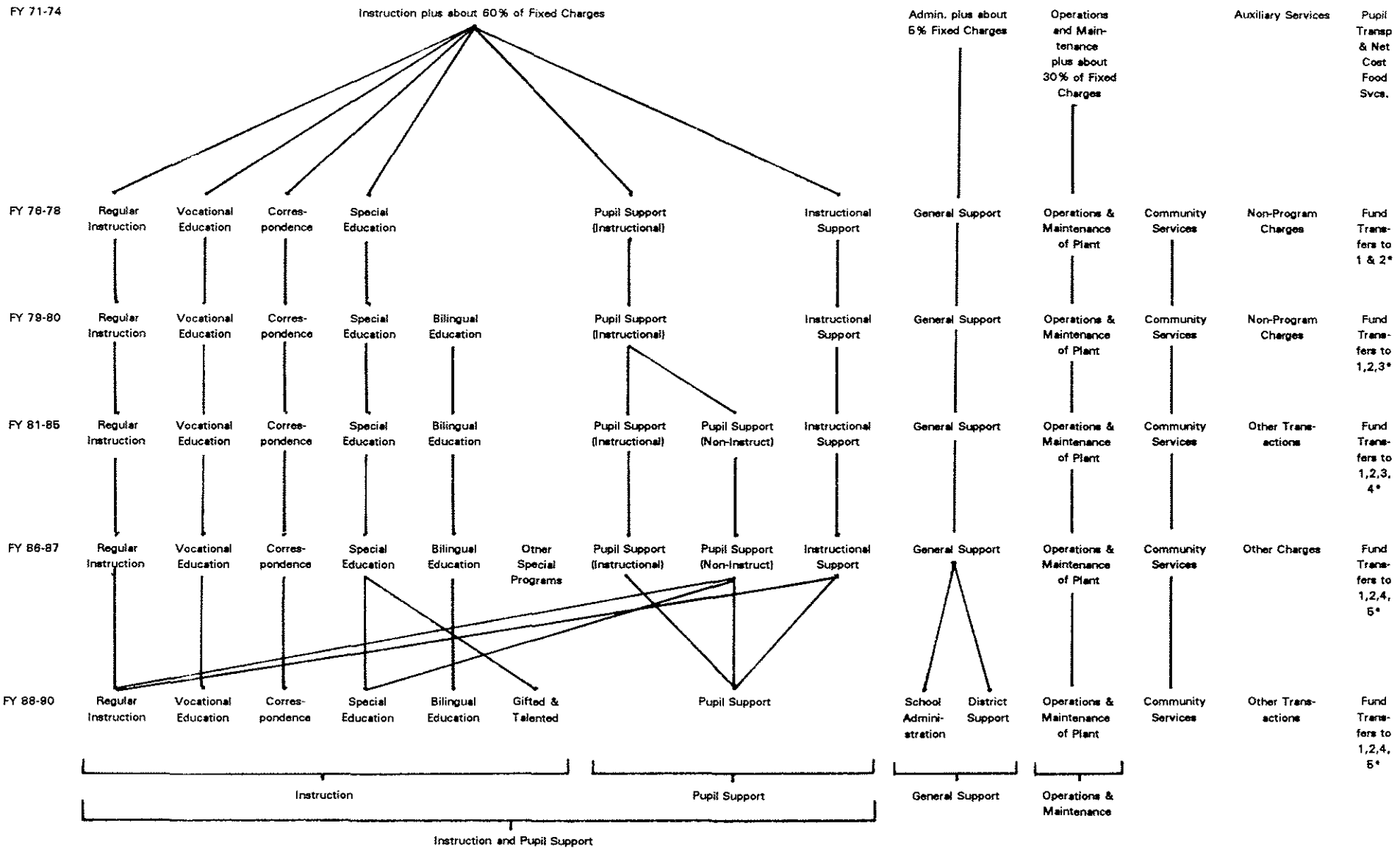
This split of General Support into two categories may have been complicated by changes in accounting procedures that are not discernable from accounting manuals. Judging by the proportions of operating expenditures allocated to General Support, School Administration, District Administration, and Pupil Support before and after FY 88, it appears that additional expenditures from Pupil Support may have been reallocated to the District Administration category in recent years. A comparison of accounting manuals before and after FY 88 does not indicate that any Pupil Support sub-functions were reallocated to General Support. However, the totals for each support function for many districts as well as detailed data from the Kenai Peninsula indicates that this reallocation occurred.

COMPARABLE ACCOUNTS OVER TIME

In order to construct comparable accounts for the years FY 71 through FY 90, the following categories were created:

Category used in this report	Fiscal Year	Functions Included in Category
Instruction	71-74	The "Instruction" function prior to FY 1975 included all forms of instruction as well as pupil support so no estimates of just instruction (as defined in later years) are available for FY 71-74.
	76-78	Regular Instruction, Vocational Education,Correspondence Study, Special Education
	79-85	Regular Instruction, Vocational Education, Correspondence Study, Special Education, Bilingual Education
	86-87	Regular Instruction, Vocational Education, Correspondence Study, Special Education, Bilingual Education, Other Special Programs
	88-90	Regular Instruction, Vocational Education,Correspondence Study, Special Education, Bilingual Education, Gifted and Talented
Pupil Support	76-80	Pupil Support, Instructional Support
	81-87	Instructional Pupil Support, Non-instructional, Pupil Support, Instructional Support
	88-90	Pupil Support
General Support	71-74	Administration plus 5% of Fixed Charges
	76-87	General Support
	88-90	School Administration, District Administration
Instruction and Pupil Support	71-74	Instruction plus 60% of Fixed Charges
	76-90	All forms of Instruction, Pupil Support, and Instruction Support listed above.
Operations and Maintenance	71-74	Operations, Maintenance plus 30% of Fixed Charges
	76-90	Operations and Maintenance

TABLE B-1: CHANGES IN SCHOOL OPERATING FUND ACCOUNTS



* 1 = Food Services; 2 = Pupil Transp; 3 = Special Revenue Funds; 4 = Pupil Activities; 5 = Other Fund Transfers

APPENDIX C. STATISTICAL EQUATION RESULTS

Table C–1. Equation for Base Salaries of Alaska Teachers, FY89 Data

Dependent Variable is Natural Logarithm of
Base Salary plus Benefits and Housing

Independent Variables

	Constant	Natural Log. Area Cost Differential	Road–Access	LN Popul. per Place in District	Estimated Percent Native	Anchorage	Mat–Su	Yakutat	Valdez	Aleutian Region	Standard error of Regress.	R^2	Number of Observations
Coefficient	10.401	0.503	–0.004	–0.004	0.065	–0.085	–0.055	–0.230	0.184	0.187	0.056	0.803	54
Standard error		0.072	0.025	0.007	0.039	0.070	0.061	0.057	0.061	0.058			
t statistic		6.946	–0.161	–0.596	1.688	–1.211	–0.905	–4.029	3.011	3.232			

Table C–2. Equation for Average Salaries of Alaska Teachers, FY88 Data

Dependent Variable is Natural Logarithm of Average Salary

	Constant	Natural Log. Base Salary	Natural Log. Training & Exper. Index	Aleutian Region	Yupiit	Standard error of Regress.	R^2	Number of Observations
Coefficient	4.80	0.54	0.69	0.24	–0.22	0.06	0.66	55
Standard error		0.08	0.15	0.06	0.06			
t statistic		6.71	4.70	3.77	–3.49			

Table C–3. Equations for Number of Certificated Personnel per District
Fiscal Year 1988 Data

(t statistics in parentheses)

Dependent Variable*	Independent Variables* Constant	Number of Schools	Average Enrollment per School	District Enrollment per ADM	FTE staff/ Cert. Reg. Teacher	Travel to Dist. Hdq. by Road	Road Travel within District	Standard Error of Regression	R^2	Number of Observations
Total Certificated Personnel per ADM	−1.15	−0.039 (−1.99)	−0.190 (−6.51)	0.186 (1.16)	−0.740 (−5.90)	−0.081 (−1.79)	−0.096 (−1.98)	0.13	0.84	55
Regular Classroom Teachers per ADM	−1.27	−0.024 (−1.23)	−0.201 (−6.92)	0.042 (0.27)	−1.045 (−8.40)	−0.096 (−2.13)	−0.090 (−1.88)	0.13	0.87	55
District Resource Teachers per ADM	−2.64	−0.146 (−1.53)	−0.334 (−2.32)	−1.479 (−1.88)	−1.381 (−2.24)	0.116 (0.52)	−0.608 (−2.57)	0.65	0.53	55
Special Education Teachers per ADM	−3.44	−0.020 (−0.23)	−0.241 (−1.88)	1.711 (2.00)	1.781 (2.84)	0.047 (0.24)	−0.083 (−0.40)	0.55	0.22	55
Bilingual/bicultural Teachers per ADM	−2.05	−0.708 (−5.24)	−0.527 (−2.34)	1.012 (0.33)	1.377 (1.26)	−0.069 (−0.21)	−0.299 (−0.76)	0.64	0.78	55
Vocational Education Teachers per ADM	−2.23	−0.430 (−4.48)	−0.553 (−3.63)	1.046 (1.26)	0.739 (1.14)	0.062 (0.27)	0.094 (0.38)	0.59	0.57	55
Correpondence Teachers per ADM	−3.56	−0.598 (−3.28)	−0.143 (−0.23)	−0.917 (−0.10)	3.223 (0.83)	0.632 (1.20)	−1.724 (−1.40)	0.46	0.92	55

*All Dependent and Independent Variables are in natural logarithms except Travel to District Headquarters and Road Travel within the District, which are dummy (0,1) variables.

Table C–4. School District Support Expenditures
Fiscal Year 1988 Data

(t statistics in parentheses)

Dependent Variable*	Constant	Number of Schools	Average Enrollment per School	District ADM per Enrollment	Total FTE staff per ADM	Cert. Reg. Teachers/ FTE staff	Travel to Dist. Hdq. by Road	Road Travel within District	Standard Error of Regression	$\bar{R}^2$	Number of Observations
		Independent Variables*									
Total Expenditures											
Total Support	11.48	1.03	0.85	1.01	1.23	1.02	−0.02	0.02	0.28	0.95	55
		(23.69)	(9.66)	(2.82)	(3.97)	(2.97	(−0.22)	(0.16)			
Pupil Support plus Admin. Support	7.79	1.18	1.07	1.15	0.84	1.32	−0.02	0.08	0.51	0.90	55
		(15.06)	(6.69)	(1.76)	1.50)	(2.12)	(−0.10)	(0.40)			
Pupil Support	1.69	1.27	1.32	1.88	−0.77	1.01	−0.22	−0.33	1.18	0.72	55
		(7.09)	(3.61)	(1.26)	(−0.59)	(0.71)	(−0.53)	(−0.75)			
Admin. Support	8.96	1.87	1.03	1.63	2.40	2.62	−0.23	1.24	2.26	0.47	55
		(5.40)	(1.46)	(0.57)	(0.97)	(0.96)	(−0.28)	1.46)			
District Support	11.33	0.79	0.84	0.95	1.45	0.80	0.21	−0.18	0.39	0.86	55
		(13.23)	(6.90)	(1.93)	(3.40)	(1.70)	(1.50)	(−1.25)			
Personnel Expenditures											
Total Support	9.41	0.95	0.98	1.16	0.81	0.94	0.12	−0.15	0.31	0.94	55
		(19.76)	(10.03)	(2.92)	(2.36)	(2.50)	(1.04)	(−1.29)			
Pupil Support plus Admin. Support	6.59	1.28	1.20	1.36	0.78	1.25	−0.05	0.14	1.04	0.73	55
		(8.09)	(3.71)	(1.03)	(0.68)	(1.00)	(−0.14)	(0.36)			
District Support	10.22	0.79	0.84	1.09	1.02	0.74	0.22	−0.25	0.43	0.85	55
		(12.18)	(6.34)	(2.01)	(2.18)	(1.45)	(1.44)	(−1.58)			
Nonpersonnel Expenditures											
Total Support	11.95	0.85	0.88	0.50	2.21	0.79	0.24	0.04	0.48	0.82	55
		(11.72)	(5.92)	(0.83)	(4.24)	(1.37)	(1.40)	(0.23)			
Pupil Support plus Admin. Support	10.84	1.09	0.96	0.28	2.85	1.20	0.28	0.53	0.70	0.77	55
		(10.14)	(4.41)	(0.31)	(3.70)	(1.42)	(1.10)	(1.99)			
District Support	11.61	0.81	0.88	0.77	2.15	0.90	0.21	−0.08	0.57	0.73	55
		(9.24)	(4.91)	(1.06)	(3.43)	(1.30)	(1.04)	(−0.39)			

*All Dependent and Independent Variables are in natural logarithms except Travel to District Headquarters and Road Travel within the District, which are dummy (0,1) variables.

Table C–5. School District Miscellaneous Expenditures
Fiscal Year 1988 Data
(t statistics in parentheses)

Dependent Variable*	Constant	Number of Schools	Average Enrollment per School	District ADM per Enrollment	Total FTE staff per ADM	Cert. Reg. Teachers/ FTE staff	Travel to Dist. Hdq. by Road	Road Travel within District	Standard Error of Regression	R^2	Number of Observations
		Independent Variables*									
Community Services	11.90	0.34 (0.69)	2.37 (1.56)	−15.78 (−0.87)	6.11 (1.81)	−1.93 (−0.21)	2.45 (1.44)	−2.41 (−1.55)	1.80	0.76	55
Fund Transfers	12.01	1.06 (4.58)	0.90 (1.91)	−0.90 (−0.41)	2.79 (1.85)	1.29 (0.65)	0.19 (0.35)	0.43 (0.81)	1.33	0.42	55
Pupil Activities	8.16	0.74 (9.01)	0.64 (3.71)	0.09 (0.13)	0.40 (0.67)	0.96 (1.45)	−0.22 (−1.13)	0.07 (0.33)	0.52	0.78	55

*All Dependent and Independent Variables are in natural logarithms except Travel to District Headquarters and Road Travel within the District, which are dummy (0,1) variables.

Table C–6. School District Nonpersonnel Operations and Maintenance Expenditures Fiscal Year 1988 Data

(t statistics in parentheses)

Dependent Variable*	Regression Number**	Independent Variables*: Total Area of Buildings in District	Average Sq. Ft. per Building	Average Fuel Cost	Average Electric Cost	Maritime Climate	Transitional Climate	Arctic/ Continental Climate	Standard Error of Regression	R^2	Number of Observations
Non–personnel Oper. and Maintenance Expenditures	1	−0.51 (−3.76)	0.88 (12.87)	0.31 (1.42)	−0.25 (−0.69)	10.94 (9.26)	11.54 (9.59)	11.44 (9.42)	0.46	0.87	55
	2	−0.56 (−3.87)	0.81 (9.75)	0.26 (1.22)	−0.47 (−1.22)	11.88 (9.41)	12.67 (9.79)	12.59 (9.50)	0.43	0.85	40
	3	−0.47 (−3.85)	0.88 (12.97)	0.29 (1.33)		10.17 (29.17)	10.75 (28.90)	10.64 (31.26)	0.45	0.87	55

*The Dependent and all Independent Variables are in natural logarithms except Maritime Climate, Transitional Climate, and Arctic/Continental Climate, which are dummy (0,1) variables.

**All three regressions have the same dependent variable. They differ in their treatment of the energy cost independent variables.
Regressions 1 and 3 assign the sample average fuel and electricity costs to 15 districts where these data are missing.
Regression 2 drops those 15 districts from the regression.
Regression 3 does not use Average Electric Cost as an independent variable.

APPENDIX D. DATA TABLES

TABLE D–1: Real Expenditures per ADM in 1990 dollars in All Districts

Fiscal Year	Regular Instruction	Vocational Education	Correspon–dence Study	Special Education	Gifted & Talented	Bilingual / Bicultural	All Pupil & Instructional Support	Total Instruction and Pupil & Instructional Support	General Support	Operations and Maintenance	Total General Support and Operations & Maintenance
1971								2445	245	501	746
1972								2513	264	544	808
1973								2377	262	511	774
1974								2289	223	400	623
1975											
1976	1674	171	11	190			138	2185	414	567	981
1977	1816	215	14	231			185	2461	491	657	1149
1978	2173	247	34	293			271	3018	657	997	1654
1979	2335	281	41	314		44	289	3305	775	1102	1878
1980	2449	298	40	359		63	330	3539	847	1169	2016
1981	2411	304	38	351		74	393	3572	849	1212	2061
1982	2458	302	41	376		87	419	3684	808	1192	2000
1983	2548	304	38	420		95	485	3890	816	1152	1969
1984	2705	292	36	445		102	566	4147	762	1177	1939
1985	2826	286	39	471		103	611	4335	804	1254	2058
1986	3180	289	39	544		119	678	4850	927	1449	2376
1987	3169	271	34	553		124	637	4788	958	1414	2371
1988	3043	258	36	647	59	133	340	4517	1130	1323	2453
1989	3008	244	30	664	58	143	361	4508	1137	1291	2428
1990	3051	226	30	688	57	141	370	4562	1127	1266	2394

Sources: School Operating Fund Expenditures and Final ADM compiled from
Alaska Department of Education Audited Annual Reports
Expenditure functions combined as specified in Appendix B
Expenditures deflated by Alaska Gross State Product
implicit price deflator for "Other Services" estimated by ISER 1/91.

TABLE D–2: Real Expenditures per ADM in 1990 dollars in City and Borough Districts

Fiscal Year	Regular Instruction	Vocational Education	Correspon– dence Study	Special Education	Gifted & Talented	Bilingual / Bicultural	All Pupil & Instructional Support	Total Instruction and Pupil & Instructional Support	General Support	Operations and Maintenance	Total General Support and Operations & Maintenance
1971								2445	245	501	746
1972								2513	264	544	808
1973								2377	262	511	774
1974								2289	223	400	623
1975											
1976	1674	171	11	190			138	2185	414	567	981
1977	1816	215	14	231			185	2461	491	657	1149
1978	2070	223	17	275			237	2822	564	800	1364
1979	2208	237	21	301		23	258	3048	645	881	1526
1980	2296	251	22	341		32	287	3228	687	941	1628
1981	2232	249	19	331		40	332	3203	698	957	1654
1982	2275	244	19	357		48	337	3280	685	952	1637
1983	2350	247	20	400		47	385	3448	694	908	1602
1984	2536	239	20	430		48	447	3721	669	958	1627
1985	2638	235	22	452		51	486	3883	710	1032	1742
1986	2981	248	23	530		59	549	4389	831	1206	2037
1987	2973	238	21	540		65	521	4359	875	1166	2041
1988	2803	231	26	630	56	71	346	4163	951	1119	2070
1989	2753	218	24	638	55	70	359	4118	962	1086	2048
1990	2823	206	23	660	54	72	369	4208	968	1088	2056

Sources: School Operating Fund Expenditures and Final ADM compiled from
Alaska Department of Education Audited Annual Reports
Expenditure functions combined as specified in Appendix B
Expenditures deflated by Alaska Gross State Product
implicit price deflator for "Other Services" estimated by ISER 1/91.

TABLE D–3: Real Expenditures per ADM in 1990 dollars in Borough Districts

Fiscal Year	Regular Instruction	Vocational Education	Correspon–dence Study	Special Education	Gifted & Talented	Bilingual / Bicultural	All Pupil & Instructional Support	Total Instruction and Pupil & Instructional Support	General Support	Operations and Maintenance	Total General Support and Operations & Maintenance
1971								2391	229	494	722
1972								2454	242	538	781
1973								2323	241	502	743
1974								2245	200	380	580
1975											
1976	1671	153	12	175			137	2147	395	555	950
1977	1812	200	14	211			178	2415	470	646	1116
1978	2052	197	19	248			229	2744	529	766	1295
1979	2188	209	23	276		21	256	2973	608	847	1455
1980	2275	223	23	314		29	283	3149	647	898	1545
1981	2197	218	21	310		38	324	3108	660	913	1573
1982	2232	214	19	335		44	325	3169	643	904	1548
1983	2300	217	19	380		42	364	3323	657	858	1515
1984	2487	215	19	415		44	423	3604	636	916	1552
1985	2586	212	22	438		45	459	3762	674	990	1664
1986	2928	222	22	520		54	519	4265	795	1155	1951
1987	2919	216	22	533		61	500	4250	845	1121	1966
1988	2738	209	26	627	57	68	345	4071	901	1076	1977
1989	2689	197	25	637	56	68	363	4036	921	1044	1965
1990	2778	187	24	660	56	70	370	4145	934	1056	1990

Sources: School Operating Fund Expenditures and Final ADM compiled from
Alaska Department of Education Audited Annual Reports
Expenditure functions combined as specified in Appendix B
Expenditures deflated by Alaska Gross State Product
implicit price deflator for "Other Services" estimated by ISER 1/91.

TABLE D–4: Real Expenditures per ADM in 1990 dollars in City Districts

Fiscal Year	Regular Instruction	Vocational Education	Correspon–dence Study	Special Education	Gifted & Talented	Bilingual / Bicultural	All Pupil & Instructional Support	Total Instruction and Pupil & Instructional Support	General Support	Operations and Maintenance	Total General Support and Operations & Maintenance
1971								3117	453	590	1042
1972								3237	527	613	1140
1973								3049	528	625	1153
1974								2807	487	643	1130
1975											
1976	1703	375	4	364			154	2600	623	704	1326
1977	1860	380	6	463			262	2971	726	786	1512
1978	2289	536	0	606			324	3755	977	1214	2192
1979	2446	567	0	602		49	291	3955	1083	1295	2378
1980	2541	581	0	653		63	331	4169	1154	1452	2606
1981	2636	602	3	584		67	416	4307	1134	1468	2602
1982	2790	604	20	628		95	473	4610	1185	1515	2700
1983	2973	615	23	650		106	646	5013	1158	1534	2692
1984	3206	569	22	628		107	787	5320	1125	1524	2649
1985	3412	588	20	654		128	883	5685	1245	1662	2907
1986	3781	640	27	690		126	1006	6270	1367	1974	3341
1987	3762	565	17	641		130	836	5951	1308	1823	3131
1988	3761	551	18	677	36	113	354	5510	1683	1753	3436
1989	3670	513	14	657	36	102	306	5297	1554	1686	3240
1990	3505	487	15	668	30	113	349	5167	1482	1580	3062

Sources: School Operating Fund Expenditures and Final ADM compiled from
Alaska Department of Education Audited Annual Reports
Expenditure functions combined as specified in Appendix B
Expenditures deflated by Alaska Gross State Product
implicit price deflator for "Other Services" estimated by ISER 1/91.

TABLE D–5: Real Expenditures per ADM in 1990 dollars in REAA Districts

Fiscal Year	Regular Instruction	Vocational Education	Correspon–dence Study	Special Education	Gifted & Talented	Bilingual / Bicultural	All Pupil & Instructional Support	Total Instruction and Pupil & Instructional Support	General Support	Operations and Maintenance	Total General Support and Operations & Maintenance
1971											
1972											
1973											
1974											
1975											
1976											
1977											
1978	2869	407	151	414			507	4347	1290	2323	3612
1979	3144	562	166	403		176	485	4935	1607	2507	4114
1980	3391	587	157	471		254	594	5454	1831	2572	4403
1981	3503	641	154	467		283	769	5817	1768	2763	4532
1982	3547	649	170	488		320	910	6084	1541	2620	4161
1983	3680	633	140	540		371	1057	6421	1516	2553	4070
1984	3731	613	136	539		424	1282	6726	1325	2505	3830
1985	4040	609	148	590		438	1423	7248	1412	2682	4094
1986	4416	546	141	633		496	1479	7711	1523	2961	4484
1987	4375	470	112	638		485	1350	7430	1467	2940	4407
1988	4728	447	107	765	78	571	302	6998	2388	2752	5139
1989	4792	429	67	844	76	659	376	7242	2364	2731	5094
1990	4726	374	81	891	76	644	373	7165	2295	2576	4871

Sources: School Operating Fund Expenditures and Final ADM compiled from
Alaska Department of Education Audited Annual Reports
Expenditure functions combined as specified in Appendix B
Expenditures deflated by Alaska Gross State Product
implicit price deflator for "Other Services" estimated by ISER 1/91.

TABLE D–6: Summary of Final Average Daily Membership

Fiscal Year	City and Borough Districts	Borough Districts	City Districts	REAA Districts	All Districts
1971	64,265	59,473	4,792		64,265
1972	65,577	60,671	4,906		65,577
1973	65,920	61,019	4,901		65,920
1974	68,630	63,226	5,403		68,630
1975	70,440	64,557	5,883		70,440
1976	73,328	67,271	6,058	8,885	82,213
1977	73,358	67,317	6,041	10,346	83,704
1978	72,546	66,972	5,574	10,731	83,277
1979	70,169	64,814	5,355	11,042	81,211
1980	68,069	62,758	5,311	11,058	79,127
1981	67,998	62,612	5,386	11,181	79,179
1982	69,181	63,831	5,350	11,628	80,809
1983	73,897	68,420	5,477	12,897	86,794
1984	79,470	74,067	5,403	13,152	92,622
1985	85,957	80,539	5,418	13,344	99,301
1986	88,001	82,561	5,440	14,163	102,164
1987	87,922	82,296	5,626	14,290	102,212
1988	88,528	82,867	5,661	12,614	101,142
1989	88,769	82,998	5,771	12,668	101,437
1990	91,551	85,922	5,628	12,485	104,035

Source: Final ADM by district compiled from
Alaska Department of Education
Annual Audited reports

TABLE D–7: Alternative Price Indexes

Fiscal Year	Anchorage Starting Teacher Salary: nominal dollars	Anchorage Starting Teacher Salary: index 1971 = 1	Alaska Gross State Product Implict Price Deflator for "Other Services": Base year: U.S. GNP in 1982 = 1	Alaska Gross State Product Implict Price Deflator for "Other Services": index 1971 = 1	Anchorage Urban Wage Earners and Clerical Workers' Consumer Price Index: Base year: 1982–84=1	Anchorage Urban Wage Earners and Clerical Workers' Consumer Price Index: index 1971 = 1
1971	9,950	1.00	68.2	1.00	43.4	1.00
1972	9,950	1.00	71.7	1.05	44.5	1.03
1973	10,350	1.04	78.4	1.15	46.4	1.07
1974	10,950	1.10	92.4	1.35	51.5	1.19
1975	11,350	1.14	107.2	1.57	58.5	1.35
1976	13,444	1.35	117.3	1.72	63.1	1.45
1977			119.2	1.75	67.2	1.55
1978	15,380	1.55	113.7	1.67	72.0	1.66
1979	16,181	1.63	119.1	1.75	79.0	1.82
1980	17,395	1.75	128.7	1.89	86.3	1.99
1981	18,613	1.87	150.9	2.21	92.9	2.14
1982	20,102	2.02	172.8	2.53	98.3	2.26
1983	21,710	2.18	177.0	2.60	98.9	2.28
1984	23,447	2.36	182.2	2.67	102.9	2.37
1985	25,075	2.52	178.9	2.62	105.8	2.44
1986	26,078	2.62	166.6	2.44	107.7	2.48
1987	26,078	2.62	158.0	2.32	107.9	2.49
1988	23,863	2.40	163.9	2.40	108.3	2.50
1989	25,428	2.56	172.0	2.52	111.3	2.57
1990	27,121	2.73	179.5	2.63	118.4	2.73

Sources: Anchorage Starting Teacher Salary from Anchorage School District
Alaska GSP implicit price deflator from ISER 1/91
Anchorage Consumer Price Index from U.S. Bureau of Labor Statistics

TABLE D–8: Summary of Kenai Peninsula Borough School District Expenditures and Foundation Revenues for Fiscal Year 1990

Type of Schools	Number of Schools	Average number of Instructional Units	Average ADM	Average Foundation Revenues per ADM	Average Expend–itures per ADM	Average District Subsidy per ADM
Combined	16	13	99	7403	7465	62
Elementary	10	27	354	3243	4182	939
Junior High	3	25	279	3844	5913	2069
High School	5	44	476	3910	6744	2834
Road Accessible	33	23	250	5073	5788	672
Not Road Accessible	4	9	59	7135	9666	2530
ADM < 50	10	5	23	7517	7409	–107
50 <= ADM < 250	11	17	164	4859	5871	1011
250 <= ADM < 400	10	28	335	3578	4782	1204
ADM >= 400	6	43	506	3593	5656	2062
All Schools	37	21	229	5308	6231	873
Unallocated Costs	NA	NA	NA	NA	1507	1507

Source: Units and ADM by site from FY 90 Kenai Penninsula Borough School District Foundation Report
Total revenues to the district from Alaska Department of Education Audited Annual Reports
Revenues by site = Total revenues to district * share of instructional units at the site
Expenditures by site from special computer printouts provided by the Kenai Penninsual Borough School District, 5/91

TABLE D–9: Summary of Mat–Su School District Expenditures and Foundation Revenues for Fiscal Year 1990

Type of Schools	Number of Schools	Average Instructional Units	Average ADM	Average Foundation Revenues per ADM	Average Expend–itures per ADM	Average District Subsidy per ADM
Combined	6	6	95	5891	8156	2265
Elementary	12	34	371	2933	2715	–217
Junior High	3	30	410	3580	4174	594
High School	4	32	348	4407	5076	669
Road Accessible	24	30	366	3929	4855	738
Not Road Accessible	2	3	21	9044	12643	3599
ADM < 50	4	1	10	9044	12643	3599
50 <= ADM < 250	6	8	85	4775	7067	2292
250 <= ADM < 400	4	27	336	2715	4093	473
ADM >= 400	12	47	577	3911	3939	28
All Schools	26	28	339	4355	5532	987
Unallocated	NA	NA	NA	NA	1483	1483

Sources: Units and ADM by site from FY 90 Mat–Su Borough School District Foundation Report
Total revenues to the district from Alaska Department of Education Audited Annual Reports
Revenues by site = Total revenues to district * share of instructional units at the site
Expenditures by site provided by Mat–Su Borough School District

TABLE D–10: Total Certified Personnel

Fiscal Year	Borough and City Districts	Borough Districts	City Districts	REAA Districts	All Districts
1970	2939	2641	299		2939
1971	3408	3063	345		3408
1972	3529	3151	378		3529
1973	3641	3255	386		3641
1974	3857	3433	424		3857
1975	4128	3657	471		4128
1976	4368	3880	488	653	5021
1977	4593	4083	510	774	5367
1978	4799	4287	513	971	5770
1979	4930	4408	522	1059	5989
1980	4815	4271	544	1188	6003
1981	4864	4315	549	1243	6107
1982	5337	4629	708	1391	6728
1983	5794	5160	634	1530	7324
1984	5728	5142	586	1413	7141
1985	5969	5382	587	1507	7476
1986	6694	6098	623	1441	8135
1987	6370	5762	608	1565	7935
1988	5110	4664	446	1078	6188
1989	6176	5637	539	1328	7504

Source: Final ADM and total certified personnel from Alaska Department of Education

TABLE D–11: Average Daily Membership per Certified Personnel

Fiscal Year	Borough and City Districts	Borough Districts	City Districts	REAA Districts	All Districts
1970	20.7	21.4	15.9		20.7
1971	18.9	19.4	13.9		18.9
1972	18.6	19.3	13.0		18.6
1973	18.1	18.7	12.7		18.1
1974	17.8	18.4	12.7		17.8
1975	17.1	17.7	12.5		17.1
1976	16.8	17.3	12.4	13.6	16.4
1977	16.0	16.5	11.8	13.4	15.6
1978	15.1	15.6	10.9	11.0	14.4
1979	14.2	14.7	10.3	10.4	13.6
1980	14.1	14.7	9.8	9.3	13.2
1981	14.0	14.5	9.8	9.0	13.0
1982	13.0	13.8	7.6	8.4	12.0
1983	12.8	13.3	8.6	8.4	11.9
1984	13.9	14.4	9.2	9.3	13.0
1985	14.4	15.0	9.2	8.9	13.3
1986	13.1	13.5	8.7	9.8	12.6
1987	13.8	14.3	9.3	9.1	12.9
1988	17.3	17.8	12.7	11.7	16.3
1989	14.4	14.7	10.7	9.5	13.5

Source: Final ADM and total certified personnel from Alaska Department of Education

TABLE D–12: Share of Personnel Expenditures in each Type of Expenditure

	Fiscal Year	Total School Operating Fund Expenditures	All Types of Instruction	Pupil Support and School Administration	District Administration	Operations & Maintenance
All Districts	1986	75.2%				
	1987	77.7%	92.3%	82.9%	75.5%	46.7%
	1988	82.7%	93.5%	90.0%	75.5%	48.3%
	1989	81.7%	92.8%	89.7%	66.6%	48.3%
Borough Districts	1986	78.7%				
	1987	85.2%	92.8%	84.7%	80.4%	51.4%
	1988	85.7%	95.0%	92.2%	79.3%	52.3%
	1989	84.8%	94.5%	92.1%	69.4%	51.7%
City Districts	1986	70.7%				
	1987	79.7%	93.7%	84.8%	70.3%	45.6%
	1988	80.4%	93.5%	86.7%	74.0%	43.7%
	1989	79.3%	92.9%	84.9%	66.1%	44.1%
REAA Districts	1986	65.1%				
	1987	72.6%	89.8%	77.5%	64.1%	37.7%
	1988	73.5%	87.8%	81.4%	67.7%	39.4%
	1989	72.9%	86.7%	80.8%	60.9%	41.1%

Source: Compiled from Alaska Department of Education School Operating Fund Audits of Salaries and Benefits Expenditures and Non–Personnel (Other) Expenditures

TABLE D–13: Total Number of Facilities and Average Daily Membership per Facility

Fiscal Year	All Districts		Borough Districts		City Districts		REAA Districts	
	Total Facilities	ADM per Facility	Total Facilities	ADM per Facility	Total Facilities	ADM per Facility	Total Facilities	ADM per Facility
1971	168	383	136	437	32	150		
1972	169	388	137	443	32	153		
1973	182	362	149	410	33	149		
1974	195	352	161	393	34	159		
1975	206	342	175	369	31	190		
1976	209	394	177	381	32	189		
1977	214	391	181	372	33	183		
1978	218	382	184	365	34	163		
1979	383	212	182	356	35	153	166	67
1980	409	193	193	325	36	148	180	61
1981	429	185	192	326	38	142	199	56
1982	430	188	196	326	41	130	193	60
1983	430	202	196	349	41	134	193	67
1984	430	215	196	378	41	132	193	68
1985	486	204	224	360	39	139	223	60
1986	486	210	224	369	39	139	223	64
1987	486	210	224	367	39	144	223	64
1988	483	209	244	340	39	145	200	63
1989	483	210	244	340	39	148	200	63
1990	483	215	262	328	39	144	182	69

Sources: Final ADM from Alaska Department of Education School Operating Fund Audits
Count of facilities by district is an APPROXIMATION compiled from Alaska Education Directory
Estimates of the number of Facilities in FY 73, 76–78, and 87–89
are interpolated from counts in adjacent years and are lower in precision than counts in other years.
Facility counts for 1985 – 1990 may be systematically higher than facilities
counts prior to 1985 due to changes in the types of facilities listed in the Alaska Education Directory

TABLE D–14: Real Operations and Maintenance Expenditures per Facility

Fiscal Year	All Districts ($ per facility)	Borough Districts ($ per facility)	City Districts ($ per facility)	REAA Districts ($ per facility)
1971				
1972				
1973				
1974				
1975				
1976	199,253	211,206	133,232	
1977	225,574	240,489	143,854	
1978	266,547	279,400	197,646	
1979	233,746	301,669	198,192	166,771
1980	226,195	291,995	214,234	158,035
1981	223,645	297,596	208,086	155,266
1982	223,948	294,505	197,655	157,880
1983	232,602	299,412	204,936	170,630
1984	253,596	346,260	200,803	170,708
1985	256,152	355,779	230,959	160,484
1986	304,655	425,836	275,285	188,068
1987	297,314	411,692	263,012	188,421
1988	277,025	365,443	254,467	173,556
1989	271,195	355,182	249,522	172,956
1990	272,757	346,153	227,962	176,699

Sources: Operations and Maintenance Expenditures from Alaska Department of Education School Operating Fund Audited Annual Reports.
Count of facilities by district is an approximation compiled from Alaska Education Directory Estimates of the number of Facilities in FY 73, 76–78, and 87–89 are interpolated from counts in adjacent years and are lower in precision than counts in other years.
Facility counts for 1985 – 1990 may be systematically higher than facilities counts prior to 1985 due to changes in the types of facilities listed in the Alaska Education Directory

TABLE D–15: Expenditures per ADM in Anchorage School District

Fiscal Year	Regular Instruction		Vocational Education		Special Education		Bilingual / Bicultural		Total Pupil and Instructional Support		Starting Teacher Salary	
	Current $ per ADM	Index, 1975 = 1	Current $ per ADM	Index, 1975 = 1	Current $ per ADM	Index, 1975 = 1	Current $ per ADM	Index, 1979 = 1	Current $ per ADM	Index, 1975 = 1	Current $	Index, 1975 = 1
1975	1280	1.00	149	1.00	128	1.00			38	1.00	11350	1.00
1976	1110	0.87	87	0.58	91	0.71			43	1.13	13444	1.18
1977	1232	0.96	112	0.75	110	0.86			50	1.32	NA	NA
1978	1300	1.02	87	0.59	133	1.04			77	2.01	15380	1.36
1979	1446	1.13	100	0.67	154	1.21	12	1.00	88	2.29	16181	1.43
1980	1616	1.26	116	0.78	199	1.55	15	1.33	107	2.81	17395	1.53
1981	1855	1.45	135	0.91	242	1.89	19	1.66	159	4.16	18613	1.64
1982	2186	1.71	146	0.98	305	2.39	27	2.31	199	5.22	20102	1.77
1983	2283	1.78	177	1.19	358	2.79	30	2.60	221	5.78	21710	1.91
1984	2585	2.02	189	1.27	408	3.19	34	2.94	276	7.24	23447	2.07
1985	2549	1.99	178	1.20	410	3.20	36	3.13	273	7.14	25075	2.21
1986	2700	2.11	176	1.19	454	3.55	40	3.43	297	7.77	26078	2.30
1987	2484	1.94	157	1.06	433	3.39	39	3.37	288	7.54	26078	2.30
1988	2207	1.72	155	1.05	589	4.60	48	4.13	293	7.66	23863	2.10
1989	2288	1.79	151	1.02	621	4.85	52	4.50	332	8.69	25428	2.24
1990	2476	1.93	143	0.96	678	5.29	59	5.12	361	9.44	27121	2.39

Sources: Expenditures and Final ADM compiled from Alaska Department of Education
School Operating Fund Audited Annual Reports
Starting Teacher Salary from Anchorage School District

TABLE D–16: Average Daily Membership per Certified Personnel in Kenai Peninsula School District

Fiscal Year	Certified Classroom Personnel		Certified Special Education Personnel		Certified Personnel other than Classroom or Special Education		All Certified Personnel	
	ADM/Personnel	Index,1979=1	ADM/Personnel	Index,1979=1	ADM/Personnel	Index,1979=1	ADM/Personnel	Index,1979=1
1979	18.6	1.00	117.0	1.00	127.6	1.00	14.3	1.00
1980	18.4	0.99	105.2	0.90	113.4	0.89	13.7	0.96
1981	18.1	0.97	106.0	0.91	113.0	0.89	13.6	0.95
1982	17.9	0.96	89.2	0.76	111.3	0.87	13.2	0.92
1983	17.4	0.93	94.3	0.81	107.0	0.84	12.9	0.90
1984	18.4	0.99	97.6	0.83	107.8	0.85	13.5	0.95
1985	18.2	0.98	93.7	0.80	111.9	0.88	13.4	0.94
1986	17.6	0.95	89.1	0.76	109.9	0.86	13.0	0.91
1987	17.8	0.96	89.2	0.76	112.3	0.88	13.1	0.92
1988	19.3	1.04	84.7	0.72	140.4	1.10	14.2	0.99
1989	18.7	1.01	78.2	0.67	96.3	0.75	13.1	0.92
1990	18.5	0.99	83.2	0.71	99.6	0.78	13.1	0.92

Sources: ADM and Personnel by type from Component Unit Financial Reports for Kenai Peninsual Borough School District

TABLE D–17: Instructional Units Weighted by Area Cost Differential

	Fiscal Year	All Forms of Instruction	Regular Instruction	Vocational Education	Special Education	Bilingual/ Bicultural	Correspon– dence Study
Borough	1983	5955	4592	268	969	71	55
Districts	1990	7345	6198	81	971	96	
City	1983	833	623	68	103	20	20
Districts	1990	660	552	22	74	12	
REAA	1983	2335	1967	34	205	129	
Districts	1990	2963	2261	186	242	192	81

Sources: Instructional Units and Area Cost Differential from
Alaska Department of Education Foundation Reports

Calculations: Weighted Instructional Units for each type of instruction =
(The sum across all districts of (Instructional Units in District) * (Area Cost Differential of District)
divided by (Sum of Area Cost Differentials for All Districts)
Total Weighted instructional units for all forms of instruction =
The sum of weighted instructional units for each type of instruction
Share of weighted instructional units for each type of instruction =
Weighted instructional units for each type of instruction
divided by total weighted instructional units for all forms of instruction
Share of Basic Need for each type of instruction =
share of weighted instructional units for each type of instruction

TABLE D–18: Alternative Measures of Local Ability to Pay in 1985 and 1988

	Income Measures in 1988 and 1985		Property Measures in 1988		
Borough Districts	Personal Income per capita Boroughs – 1988 Cities – 1985 (thousands of $ per capita)	Personal Income Boroughs – 1988 Cities – 1985 (millions of $)	All Property: Real and Personal including Oil and Gas (millions of $)	Local Taxable Property: Real and Personal without Oil and Gas (millions of $)	Household Property: Real and Personal without Oil and Gas, Commercial,Industrial, Vacant,Inventories, Machinery,or Boats (millions of $)
Anchorage	21.8	4772.1	10833.6	10766.6	6997.3
Bristol Bay	25.7	36.0	118.2	118.2	42.0
Fairbanks	16.8	1179.5	3670.9	3132.2	1801.8
Haines	33.3	56.7	112.6	112.6	41.8
Juneau	23.3	612.8	1353.3	1353.3	784.1
Kenai	16.0	656.8	3521.7	3034.6	3034.6
Ketchikan	23.5	281.8	833.0	833.0	389.4
Kodiak	16.6	229.2	594.6	594.6	237.8
Mat–Su	13.4	520.9	2290.0	2285.6	1013.5
North Slope	20.1	108.7	12292.0	191.2	191.2
Northwest Arctic	13.3	81.1	158.0	158.0	NA
Sitka	21.0	163.7	474.2	474.2	231.4
City Districts					
Cordova	22.5	51.0	116.1	116.1	62.0
Craig	11.0	12.8	38.8	38.8	19.5
Dillingham	17.8	38.7	121.6	121.6	48.8
Galena	18.8	16.6	19.6	19.6	NA
Hoonah	14.1	12.4	22.7	22.7	NA
Hydaburg	8.5	3.8	9.5	9.5	NA
Kake	15.0	11.8	17.7	17.7	NA
King Cove	8.2	4.9	NA	NA	NA
Klawock	9.9	5.4	9.7	9.7	NA
Nenana	15.6	10.0	16.5	16.5	2.5
Nome	21.1	59.7	140.1	140.1	120.6
Pelican	21.8	4.6	10.7	10.7	NA
Petersburg	22.9	65.2	173.1	173.1	86.3
Sand Point	24.7	24.2	NA	NA	NA
Skagway	25.6	15.6	55.5	55.5	15.5
St. Mary's	11.2	6.4	4.2	4.2	NA
Tanana	10.1	4.2	11.5	11.5	NA
Unalaska	16.0	32.2	96.6	96.5	14.8
Valdez	19.2	68.3	1457.1	143.1	90.7
Wrangell	19.4	43.1	104.3	104.3	NA
Yakutat	17.0	6.8	19.0	19.0	NA

Sources: Personal Income and Personal Income per capita for Borough Districts in 1988 from U.S. Department of Commerce, Bureau of Economic Analaysis, Local Area Personal Income
Money Income and Money Income per captia for City Districts in 1985 from U.S. Department of Commerce, Bureau of the Census, Local Popuation Estimates: 1986 Population and 1985 per ccapita income estimates for Counties and Incorporated Places. Estimates of personal income and personal income per capita for the city districts were created by adjusting for the differences between the Census definition of money income and the BEA definition of personal income.
These estimates of 1985 personal income for the cities are used to approximate 1988 personal income
All Census estimates of income after 1985 for cities are based on these more reliable 1985 figures.

Full Value of Real and Personal Income from Alaska Taxable
Estimates of commercial,industrial, vacant, machinery, inventory, and boat property from page 5 of Annual Financial Reports of cities and boroughs provided by Alaska Department of Community and Regional Affairs
These estimates of different types of property are not available for the following cities and boroughs: North Slope Borough,Northwest Arctic Borough,Galena,Hoonah,Hydaburg,Kake,King Cove,Klawok, Pelican,Sand Point,St.Mary's,Wrangell,Yakutat.
For most of these cities and boroughs, the estimate of Household Property is not available.
The estimate of Household property for the North Slope Borough is
approximated by the total full value of real and personal property excluding oil and gas property

TABLE D–19: Local Education Finance Effort in FY 1988

	Full Local Appropriation / Total Personal Income	Household Local Appropriation / Total Personal Income	Full Value of All Property / Total Personal Income	Household Property / Total Personal Income	Average Daily Membership / Population	McDowell Area Cost Differential
Borough Districts						
Anchorage	0.0139	0.0090	2.270	1.466	0.18	1.00
Bristol Bay	0.0040	0.0014	3.281	1.167	0.18	1.33
Fairbanks	0.0193	0.0095	3.112	1.528	0.19	1.03
Haines	0.0070	0.0026	1.987	0.738	0.22	1.03
Juneau	0.0151	0.0088	2.208	1.280	0.17	1.02
Kenai	0.0187	0.0161	5.362	4.620	0.20	1.01
Ketchikan	0.0174	0.0081	2.956	1.382	0.21	1.02
Kodiak	0.0087	0.0035	2.594	1.038	0.17	1.08
Mat–Su	0.0259	0.0115	4.396	1.946	0.22	1.00
North Slope	0.1408	0.0022	113.054	1.758	0.23	1.49
Northwest Arctic	0.0031	0.0031	1.949	1.949	0.25	1.43
Sitka	0.0182	0.0089	2.896	1.413	0.21	1.02
City Districts						
Cordova	0.0097	0.0052	2.275	1.216	0.20	1.21
Craig	0.0034	0.0017	3.024	1.520	0.17	1.06
Dillingham	0.0049	0.0020	3.140	1.262	0.23	1.29
Galena	0.0039	NA	1.182	NA	0.18	1.33
Hoonah	0.0036	NA	1.831	NA	0.30	1.07
Hydaburg	0.0030	NA	2.481	NA	0.28	1.11
Kake	0.0047	NA	1.501	NA	0.26	1.13
King Cove	0.0069	NA	0.000	NA	0.30	1.33
Klawock	0.0033	NA	1.779	NA	0.24	1.08
Nenana	0.0044	0.0007	1.649	0.254	NA	1.16
Nome	0.0039	0.0034	2.346	2.020	0.21	1.36
Pelican	0.0046	NA	2.329	NA	0.22	1.07
Petersburg	0.0118	0.0059	2.653	1.324	0.20	1.01
Sand Point	0.0021	NA	0.000	NA	0.16	1.33
Skagway	0.0076	0.0021	3.553	0.990	0.20	1.05
St. Mary's	0.0006	NA	0.653	NA	0.25	1.37
Tanana	0.0000	NA	2.771	NA	0.25	1.33
Unalaska	0.0059	0.0009	2.997	0.459	0.05	1.29
Valdez	0.0500	0.0031	21.342	1.329	0.17	1.08
Wrangell	0.0125	NA	2.421	NA	0.20	1.02
Yakutat	0.0044	NA	2.798	NA	0.25	1.20

Sources: FY 88 Local Appropration and ADM from Alaska Department of Education
School Operation Fund Audited Annual Reports
Personal Income, Full Value of Property, and Household Property from TABLE D–18
See notes in TABLE D–18 for full references for these variables.
1988 Personal Income for cities is approximated by Personal Income in 1985
Household Appropriation =
(Local Appropriation) * (Household Property/Full Value of Property)
Population for Boroughs from Bureau of Economic Analysis, Local Area Personal Income
Population for Cities from Bureau of the Census, preliminary estimates from 1990 census
McDowell Area Cost Differential is "Total District Differential" from Table I–3
in "Alaska School District Profiles and Differential Study: Volume I Summary and Analysis,"
The McDowell Group, November 1988