THE FISCAL CONDITION OF SCHOOL DISTRICTS IN NEBRASKA: IS SMALL BEAUTIFUL?

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Introduction

This paper examines the fiscal condition of school districts in Nebraska. Our methodology is a new one that has been applied to municipalities by several authors (see Bradbury et al. (1984), Ladd and Yinger (1989), and Yinger (1988)), but has not yet been applied to school districts. This approach defines "fiscal condition" as the ability of a district to provide reasonable quality services at a reasonable tax burden on its residents, and is based on new methods for estimating revenue-raising capacity and public service costs. On the basis of this approach, we examine the impact of social and economic factors on the fiscal condition of school districts, determine what types of districts are in good fiscal condition, estimate the extent to which current state assistance is directed to the school districts in greatest need, and calculate the potential gains from school-district consolidation.

Nebraska contained 927 school districts, which provided educational services to over 266,000 students in pre-kindergarten, kindergarten, elementary and secondary grades. State-wide school enrollment has declined steadily from a peak of 390,000 in the late 1960s. This decline has been accompanied by some consolidation; since 1984-85, 30 districts have been consolidated into others. Table 1 provides a three-year history of the number of school districts and students.

Most of the consolidation has involved class 1 districts, which provide elementary education only and cover areas of 1,000 inhabitants or fewer. Approximately 95 percent of the 582 active class 1 districts serve fewer than 100 students; 60 percent of the districts serve fewer than 20 students. Class 2 districts, which also serve populations of 1,000 or fewer, differ from class 1 districts in that they maintain a high school along with elementary schools. The 58 class 2 districts range in size from 30 to 250 students. The 222 class 3 districts provide elementary and secondary education in areas with populations between 1,000 and 100,000. Class 3 enrollments range from 70 to 1,500 students, and 75 percent of these districts have enrollments below 600. Classes 4 and 5 are reserved for Lincoln and Omaha. These two school systems contain 25 percent of total public school enrollment in the state. The 23 class 6 districts, which only maintain high schools, range in enrollment from 30 to 670 students.

Our analysis focuses on 865 districts. Districts reporting no school age children for which they are responsible and districts that send all their school-age children to other districts were eliminated from the analysis, along with a few small districts lacking some key information.

District Finances in Nebraska

Table 2, which is based on the accounting system employed by the U.S. Bureau of the Census, provides a picture of FY 1986 school finances in Nebraska and in the United States as a whole. The first two columns present amounts per student in the average school district. The second two columns present percentage distributions. The percentages in the second two columns are state-wide averages weighted by population and cannot be derived from the amounts in the first two column, which are unweighted averages across all school districts.

The average school district in Nebraska raised $4,484 per student in general revenue and spent $3,992 per student in general expenditure during 1986 .The small "surplus" in these numbers does not imply that school districts run a surplus in their own budgetary accounts.

The majority of Nebraska schools' general revenue, 67 percent, comes from their own sources, and about 80 percent of this own-source revenue comes from the property tax. Charges and miscellaneous sources make up the other approximately 20 percent of own-source revenue.

The Fiscal Condition of School Districts

The Concept of Fiscal Condition

As we use the term, a school district's is its ability to deliver a reasonable level of public education to its children at a reasonable tax burden upon its residents, as determined by economic and social factors outside the control of the school district's administrators. Our measure of fiscal condition does not reveal a school district's budgetary situation and it is not affected by management skill, teaching capabilities, or service preferences. In effect, a school district's fiscal condition indicates the severity of the constraints under which its administrators and teachers must operate, but it does not indicate how they respond to those constraints.

This approach to fiscal condition has three key advantages. First, it facilitates comparisons across school districts of different sizes, classes, and characteristics. Our measure, for example, enables us to compare different districts' potential for providing the same quality education with the same tax burden on each district's residents. Second, because it excludes political and management factors, as well as the residents' preferences for education, our measure can serve as an objective guide for state assistance to school districts. Finally, our measure enables us to investigate the fiscal effects of consolidation, such as its impact on differences in fiscal condition among school districts.

Our measure of a school districts' fiscal condition is called the need-capacity gap and is the difference between a district's expenditure need and its revenue-raising capacity, both expressed in per student terms. A school district's revenue-raising capacity is the amount of money per student it can raise at an

average tax burden on its residents. A district's expenditure need is the expenditure per student that is required in order for it to provide an average-quality education to its students.

Revenue-Raising Capacity

Our measure of revenue-raising capacity does not include state and federal aid, nor is it a measure of the revenue districts actually raise. Instead, it is a measure of the revenue that the school district could generate from its own resources if it imposed the state-wide average tax burden on its residents. The revenue that a district actually raises is influenced by the management skill of school administrators and the educational preferences of the district's residents. Our measure of revenue-raising capacity, as we explain below, depends on the school district's income and economic structure, which are outside the direct control of school officials. The technical details of our calculations are explained Ratcliffe, Riddle, and Yinger (1988).

Most of the literature on the fiscal condition of school districts assumes that a district's revenue-raising capacity is the same as its property tax base per pupil. Moreover, this view is implicit in the use of a district power-equalizing grant or the search for wealth neutrality. Although revenue-raising capacity as we measure it is strongly correlated with the property tax base, its conceptual motivation is different because it explicitly holds the tax burden constant across residents. Comparing the property tax base does not do this because it does not consider the extent to which property taxes are paid, directly or indirectly, by nonresidents. Our approach also differs from the so-called representative tax system approach developed by the U.S. Advisory Commission on Intergovernmental Relations (see ACIR, 1986). As shown by Ladd and Yinger (1989, Ch. 3), capacity calculated by the representative tax system approach can involve very different tax burdens in different districts.

General Principles

As we use the term, a tax burden indicates the magnitude of public sector claims on private incomes, such as a property tax payment as a percentage of income. Revenue-raising capacity is calculated with the same tax burden, namely the state-wide average tax burden, in every school district. Because we hold the tax burden constant, variations in revenue-raising capacity across school districts can arise for only three reasons: differences in income per student, in the ability of school districts to export taxes to nonresidents, or in the extent to which districts must share their taxable resources with other school districts. Cohen (1983) develops a measure of tax capacity based on income and the property tax base, but does not explicitly account for income or attempt to hold tax burden constant.

School districts with high resident incomes can raise more revenue at a given tax burden than other districts. As shown in Table 3, income per student varies widely across school districts in Nebraska. The smallest districts have the highest average income per student, and income per student tends to decrease as the number of students increases. In addition, income per student is particularly high among

class 1 and class 6 districts, and particularly low among class 2 and class 3 districts. Within each enrollment group and district class, however, income per student varies widely.

The second component of revenue-raising capacity is the ability of a district to export its tax burden to nonresidents. A school district's tax burden is "exported" whenever its taxes are paid by nonresidents, either directly or indirectly in the form of higher prices or lower wages. Exported tax burdens increase a school district's revenue-raising capacity because they allow the district to raise more revenue with no added burden on residents. As explained below, a school district's ability to export its property tax burden to nonresidents depends on the composition of its property tax base.

We observe an overlap of school districts in Nebraska because some classes of districts are responsible for educating all of their school age children whereas others are responsible for educating only high school or only elementary students. For example, class 6 districts and affiliated class 1 districts overlap and both collect taxes from the same residents. Class 1 districts not affiliated with a class 6 district provide only elementary education, and a separate tax, called nonresident high school tuition, must be levied to finance payments to the districts that provide education to the secondary students who live in these class 1 districts. Another form of overlap arises when a district sends some or all of its students requiring special education (along with the appropriate tuition payments) to another district. In addition, Nebraska has established 19 Educational Service Units (ESUs), which provide a variety of services to the participating school districts, including special education and audio visual services. During the school year 1985-1986, all school districts in 85 of the state's 93 counties received services from ESUs, which levy separate taxes on all participating districts.

To account for overlapping taxes and inter-district payments, we focus on the capacity of each district to raise revenue for the students it actually educates, holding constant across districts the burden of all school-related claims on the incomes of district residents. Under this approach, a district's total revenue-raising capacity is reduced when it makes tuition or transportation payments to another district or when overlapping districts collect taxes from its residents. Moreover, a district's revenue-raising capacity is increased when it receives payments from another jurisdiction for tuition or transportation. In making these adjustments, we do not use the revenue actually raised by an overlapping district or the payments actually exchanged between districts. Instead, we use the revenue that would be collected at the relevant state-wide average tax burden or the state-wide average payment. This approach insures that a district's net revenue-raising capacity does not depend on the actual revenue raised by other districts to which that district sends students, just as it does not depend on the actual revenue raised by the school district itself.

Revenue-Raising Capacity Through the Property

The property tax is the single most important source of revenue for school districts in Nebraska. To calculate revenue-raising capacity through the property tax, we estimate the average property tax burden in the state for the provision of education services to elementary, secondary and special education students. This burden, expressed as the ratio of total property taxes collected to aggregate

income, is called the baseline tax burden. As we discussed earlier, this burden is adjusted to reflect taxes collected by overlapping districts. Interdistrict payments are considered in a later section.

In order to determine the extent to which property taxes can be exported to nonresidents, we combine an analysis of the incidence of the property tax with data on the composition of the property tax base. Data on the composition of property within school districts are not available, so we estimated school district property composition on the basis of the composition of property within the district's county and the share of the district that is within a city or village. See Yinger (1988).

Using data and analysis presented by Bradbury and Ladd (1985), we assume that the tax on commercial and industrial property is borne primarily by company owners and land owners and that many of these owners are nonresidents stockholders. To be specific, we assume that 50 percent of the tax burden on commercial real estate and 25 percent of all public utility and personal property taxes are paid by nonresidents.

A school district's pre-exporting revenue-raising capacity per student equals the baseline tax burden (adjusted for the taxes collected by overlapping districts) multiplied by the income per student in the school district. The export ratio is defined to be the share of taxes exported to nonresidents divided by the share of taxes paid by residents. To adjust for export potential, we multiply pre-export capacity by one plus the export ratio.

Export ratios, which are presented in Table 4, range from zero to 0.21. The export ratio in the average school district is 0.03; that is, only $0.03 of tax burden are exported for every dollar of taxes paid by residents. On average, as districts increase in size their capacity to export grows. Because of the severe limitations on data concerning school district property composition, our approach is conservative and probably understates exporting, at least in the most urban districts.

Moreover, export ratios vary widely among the smaller districts, but not among the largest districts. Table 4 also reveals that export ratios are especially high in Lincoln and Omaha (classes 4 and 5) and in district classes 3 and 6.

Revenue-raising capacity from the property tax, expressed in index form, is presented in Table 5. For convenience, the average district has an index of 100. A school district with a capacity of 150 has 50 percent more capacity than the average school district. Capacity through the property tax is highest in the smallest and largest districts. It is also higher in classes 4 to 6 than in classes 1 to 3. As before, however, capacity varies widely within each enrollment group or district class. Note that class 1 districts, with an average size of only 26 students, have a relatively low average capacity, whereas districts with fewer than 10 students have relatively high average capacity; among the class 1 districts, the smallest districts apparently have the greatest capacity per student.

Revenue-Raising Capacity From Other Sources

School districts also collect revenue from charges and fees. According to Table 2, charges and miscellaneous revenues account for 18.6 percent of total own source revenue.

The average burden across the state for charges and miscellaneous income equals total revenue from these sources divided by aggregate income. Because miscellaneous charges and fees apply mainly to residents, we assume that these revenue sources have no export potential. One exception to this rule arises when non-resident students pay charges for services in the receiving district, such as school lunch or activity fees, or when non-resident adults pay to attend activities such as athletic events. This export potential, however, is extremely small and is unlikely to significantly affect the revenue-raising capacity of a district.

As a result, a district's revenue-raising capacity per student from charges and miscellaneous income equals the average burden multiplied by the income per student in that district.
Because it depends only on income per student, revenue-raising capacity from other sources has the pattern of variation shown in Table 3. This type of capacity ranges from $11 to $1,072 per pupil.

On average, the smaller the district, the larger its capacity from these sources. In addition, this capacity is highest in district classes 1 and 6. As in the case of income, however, this capacity also varies widely within each enrollment group and district class.

Overall Revenue-Raising Capacity

To find overall revenue-raising capacity, we first add capacity from the property tax and capacity from other sources. We then adjust this sum to reflect capacity gained or lost through interschool district payments of tuition and transportation fees, which are commonly made in Nebraska. Many school districts in the state either send some of their students to other districts or receive students from other districts; in some cases they both send and receive students. Although the reasons for these student exchanges vary, a district's capacity is affected by each student sent or received. When a sending district makes a tuition payment the dollar amount of that payment directly reduces the capacity available to that district to educate the remaining students. Likewise, when a district receives a student, its overall capacity is enhanced by the dollar amount of the payment.

The overall revenue-raising capacity of Nebraska's school districts, expressed in dollars per student, is summarized in Table 6. In Table 6 the average capacity per student is set equal to the average current spending per student in Nebraska. This standardization does not change the relative position of one school district to another; it simply facilitates comparison of capacities and needs later in our analysis.

The variation in overall revenue-raising capacity for school districts is quite substantial. The range is from zero up to $29,967 per student. Six school districts, very small in population and income, have capacities of zero. The correct interpretation of this result is that these districts would not have any revenue left over to educate their own students if they imposed the baseline tax burden upon their

residents and paid the tuition and transportation charges they owe other districts. In a few cases, a district makes payments to other districts, which are in excess of their calculated revenue-raising capacity from property taxes and charges. No district has a calculated capacity very far below zero, however, so for ease of interpretation we set minimum capacity to zero.

In contrast, some districts have dramatically high revenue-raising capacity. Because of a very high income per student, one school district has a revenue-raising capacity per student of almost $30,000. The average capacity per student is $3,504, so this district could raise over 8-1/2 times as much revenue per student at the baseline tax burden as the average district.

For districts with enrollments greater than 20, capacity per student tends to increase as enrollment rises. The enrollment size groups with the highest overall revenue-raising capacity are districts with more than 9,999 students and districts with fewer than 10 students. Districts with enrollments between 20 and 29 students have, on average, the least ability to generate revenue. Overall capacity is also highest in district classes 4 to 6. Within each enrollment size group and district class, however, there is substantial variation in capacity.

Expenditure Need

A school district's expenditure need is the amount it must spend to provide an education of average quality to each of the children enrolled in its schools; in other words, a district's expenditure need is the inverse of its costs for providing public services. The concept of expenditure need, like the concept of revenue-raising capacity is designed to facilitate comparisons across school districts by holding constant educational quality and focusing on factors outside the control of local officials. Comparisons based on actual education spending can be misleading. Some high-spending districts may be poorly managed or may face relatively high costs and may therefore receive very little education for their money. Moreover, actual spending is controlled by school officials and therefore cannot be an objective basis for comparison.

Our method for estimating expenditure need was developed by Bradbury et al. (1984), Yinger (1986), and Ladd and Yinger (1989). Although this method was designed to estimate the cost of municipal services, it can readily be applied to the cost of education. At least since the work of Bradford, Malt, and Oates (1969), scholars have recognized that the cost of public services depends on the characteristics of the jurisdiction as well as on the wages of public employees. The problem is that the relationship between community characteristics and public service costs is difficult to estimate. This method provides one way to solve this difficulty.

Some school district characteristics outside the control of school officials influence school costs because they are part of the technology of producing school outputs; schools with harsh or unfavorable characteristics must spend more to obtain the same output. Thus, one way to determine the role of district characteristics is to examine the technology of public production, that is, to look at the relationship between some public output, such as school test scores, and both inputs, such as teachers, and school district characteristics. This is the approach of the literature on educational production

functions, which is reviewed by Hanushek (1979, 1986). Many of the studies in this literature find support for the important role of district characteristics on the technology of local schools. See, for example, Summers and Wolfe (1978) and Henderson, Mieszkowski, and Sauvageau (1978).

The problem with this approach for our purposes is that it requires a measure of public output, again such as school test scores, that inevitably leaves out many of the services provided by a school district. As is widely recognized in the literature, neither test scores nor any of the other output measures that have been used adequately summarize all the services a school provides. To measure fiscal condition, however, we must be comprehensive, that is, we must estimate the cost of providing all school outputs. As a result, we use an alternative approach that is less precise but more comprehensive.

Our approach starts by recognizing that, by definition, school spending equals the level of school output multiplied by the cost per unit of output. According to an extensive literature on local public choice (see Inman, 1979, or Rubinfeld, 1986), the level of school output selected by voters depends on a school district's income, tax-price, intergovernmental grants and a variety of other factors. As just explained, the cost per unit of output depends on teacher wages and various school district characteristics. As a result, one can estimate the impact of wages and school district characteristics on costs by estimating the relationship between the relationship between these variables and school spending, holding constant income and other determinants of the level of school output. For a detailed explanation of this method, see Ladd and Yinger (1989, Chs. 4 and 10). The set of variables we use to hold the level of school output constant is presented in the appendix.

Several studies have examined economies of scale in public education, which is one aspect of public school costs. These studies are reviewed in Cohn (forthcoming) and Kenney (1982). Some of these studies explain school spending per pupil as a function of the number of students in the school, holding school quality constant. School quality is held constant by including an output measure, such as a test score, as an explanatory variable in the analysis. In contrast, we control for school quality indirectly by including variables that influence voters' decisions about school quality. Although our controls are indirect, our approach has the advantage that it builds on the extensive literature on public expenditure determination and that it can readily be extended to aspects of school costs other than economies of scale.

We find five factors that are largely outside the control of school officials and that influence the cost of public education in Nebraska. Because of data limitations, we were unable to estimate the impact of local area wages on the cost of providing education.

Our measure of expenditure need reflects the impact of each of these factors on the cost of education. The first factor is the number of handicapped students the district educates. The available data indicate the number of handicapped children who live in each school district. Because not all districts educate and transport the handicapped children that live within their boundaries, however, we make adjustments in the number of handicapped children by district to reflect the shifting of responsibilities of these students from district to district. We find that for every increase of 1 percentage point in the ratio of net handicapped students to total students the total operating costs per student of a district rise by $9. This

cost factor does not appear to operate in tiny school districts (fewer than 10 pupils), perhaps because they rarely educate severely handicapped students themselves.

The second factor that influences expenditure need is transportation cost, as determined by the number of students that the district is required to transport and the number of miles these students must be transported. We do not have an exact measure for the latter variable but we are able to closely estimate its impact by including the total route miles traveled in each district into our analysis and by controlling for other factors. See the appendix.

Our analysis reveals that, controlling for other factors, a district must spend an additional $84 dollars for an increase of 1 percentage point in the ratio of students eligible for transportation to total students. Districts that either are not required to transport students, such as Class 6 districts, or districts that are not spread out and have few students to transport do not have to spend as much as other districts to achieve average-quality education.

The third factor is the proportion of secondary students to elementary students in the district. Not surprisingly, we find that, on average, it costs more for school districts to provide an average quality education to secondary students than to elementary grade students. Normally, additional services and activities are provided for secondary students, such as more extensive curriculum and sport programs. To be specific, we find that for every increase of 1 percentage point in the ratio of secondary to elementary students a district must spend $8 more per enrolled student.

The fourth cost factor is that larger school districts in Nebraska apparently can take advantage of significant economies of scale. We find that the cost of education per pupil declines as the total number of students in a district increases. This relationship is not linear, however. In the case of small changes in enrollment, for every increase of 1 percent in enrollment a district needs to spend roughly $5.39 less per student. Large increases in enrollment can have an even more dramatic impact on costs per pupil. If district enrollment is increased by 10 times, for example by combining 10 districts with 10 students each into a single district, then the cost per student will decline by $1,241. These economies to scale reflect the fact that larger districts can spread out the cost of administration, libraries, and other system-wide activities over a larger number of students. As noted earlier, several other studies have examined economies of scale using a different methodology. Some, but not all of these studies also find that economies of scale exist. See Cohen (forthcoming) and Kenney (1982).

These results concerning economies to scale are complicated by a fifth factor, namely unexplained spending differences across classes of school districts. After controlling for all identifiable cost (and other) factors, including district scale, we find that some classes of school districts spend less per pupil than others. Compared to either class 2 (small, with elementary and secondary students) or class 6 (secondary only) districts, class 1 (elementary only) districts spend $2,810 less per student and class 3 districts (large, with elementary and secondary) spend $345 less per pupil. These Class 3 results also apply to Omaha and Lincoln.

We cannot determine whether these differences in spending across classes of school districts reflect cost differences or differences in educational quality. Nevertheless, we assume that these "left-over" spending differences reflect differences in cost across districts. For example, class 1 districts may have lower costs than other districts, all else equal, because they may not have to pay as much as other districts to attract teachers. We regard this assumption as conservative in the sense that it makes the current system, with its predominance of class 1 districts, look as favorable as possible.

When these left-over spending differences between classes are interpreted as cost differences they offset, to some degree, the economies of scale described earlier. The total enrollment variable indicates that costs per pupil decline as district enrollment increases, but the spending differences by class indicate that class 1 districts, many of which contain less than 10 students, have lower costs than other districts. In other words, we discover strong economies of scale within any given class of district, but also find that many class 1 districts would have to be consolidated for the cost-savings through economies of scale to be large enough to offset the potential cost-increases from eliminating class 1 districts. By combining these two results, we find that the cost per pupil is about the same for a class 1 and a class 3 district that is 100 times as large. To place this result in perspective, note that consolidating several tiny class 1 districts with a large class 6 or class 3 district could easily result in a single district that was more than 100 times as large as the individual class 1 districts--and could therefore lower per pupil costs. In most cases, for example, a single county-wide district would contain more than 100 times as many students as the individual class 1 districts currently in the county, and would therefore face lower costs per pupil than the class 1 districts. To the extent that the left-over spending differences across district classes reflect differences in educational quality instead of costs, the economies of scale that can be captured by combining class 1 districts with each other or with other districts are larger than these examples suggest.

We combine these five cost factors (handicapped students, transportation costs, elementary vs. secondary students, economies of scale, and interclass cost differences) into a single cost index for each school district in the state. A district with favorable cost conditions, such as few handicapped students or low transportation costs, will have to spend less than the state-wide average per pupil, $3,504, to obtain educational services of average quality. A district with unfavorable cost conditions will have to spend more than the average per pupil to obtain an average-quality education.

District expenditure needs, expressed in dollars per student, are presented in Table 7. A district's expenditure need is the dollars per pupil that it must spend to provide an average-quality education. Expenditure needs range from a low of $1,285 (or 35 percent of the average) to a high of $6,116 (or 175 percent of the average). The average expenditure need of districts with fewer than 10 students is relatively high compared to that of districts with enrollments between 10 and 100 students, but districts with 100 to 499 students have the highest average expenditure need of all. As enrollment increases above 500 students, the average expenditure need falls. Table 7 also indicates that expenditure need is highest, on average, in district classes 3 and 6 and lowest in Lincoln and Omaha. The single district with the greatest need is a high school in a rural county. This high school has a need of over $6,000 per student because it educates secondary students only and has high overhead costs in providing this education to its small enrollment.

Need-Capacity

The need-capacity gap is the difference between expenditure need and revenue-raising capacity. For ease of interpretation, this gap is standardized to be zero in the average school district. This standardization technique, which does not alter any district's ranking, allows us to readily see how each district's fiscal capacity compares to the average. A positive gap means that a district cannot provide an average-quality education to its students at the average tax burden; it either must lower its service quality below the average or raise its tax burden above the average--or both. A need-capacity gap of $50, for example, indicates that a county would have to receive $50 per student from outside sources to be able to provide the same service quality at the same tax burden as the average school district. Conversely, a negative gap indicates that the school district could provide the average service quality at the average tax burden and still have money left over to finance higher service quality or to lower the tax burden on its residents.

Need-capacity gaps, expressed in dollars per student, are presented in Table 8. These gaps vary dramatically from one district to another, with a minimum of -$27,159 to a maximum of $4,346. For reasons outside the control of school officials, some districts could provide education of average quality at an average tax rate and still have an enormous amount left over, up to $27,159 per student, for higher quality education or a lower tax burden. Other districts could not provide education of average quality at an average tax burden without a large infusion of revenue, up to $4,346 per student, from outside sources.

The enrollment group with the largest average gap is the one with 100 to 500 students. The groups ranging from 500 to 999 students and from 20 to 29 students also have positive average gaps. All other groups have negative average gaps; these districts are able to generate more than enough revenue, with an average tax burden, to cover the expenditure need associated with providing an average quality education. In addition, need-capacity gaps are positive for district classes 2 and 3, but negative for all other classes.

State Policy

In this section we describe the existing state aid programs in Nebraska and present evidence that these aid programs do not help to offset disparities in fiscal condition among school districts. We also show the potential of consolidation to lessen fiscal disparities across school districts and to lower the cost of education in the state.

State Aid To Schools

The three main components of state aid in Nebraska are foundation aid, incentive aid and equalization aid. In school year 1985-1986, aid through these programs totaled $131,041,778. Of this amount, foundation aid constituted 72 percent, incentive aid 3 percent, and equalization aid 25 percent.

In Nebraska, "foundation" aid is a flat grant per pupil using an indexing system that is intended to reflect the higher costs of educating students in higher grade levels. This program is not a true foundation aid program. In other states, foundation aid is designed to insure that every district can provide some minimally acceptable level of education at a reasonable property tax rate. As a result, this aid, unlike the "foundation" aid in Nebraska, is higher for districts with relatively small property tax bases. Incentive aid is given in proportion to the levels of education achieved by teachers within each district and for offering summer school programs.

To determine a district's equalization aid, the state calculates each district's "need" using the enrollment weighted index in the foundation aid formula and additional factors, namely scarcity of population, an enrollment increase, an enrollment decrease, a program for gifted students, a program for special-needs students, and transportation. This "need" is compared to the estimated "capacity" of school districts. The "capacity" is the total amount of revenue that could be raised with a base levy ($0.42 per $100 valuation for K-12 districts, $0.28 for all other districts) added to total revenue from foundation aid, tuition payments received over 125 percent of per pupil costs, license fees, and transportation receipts. Finally, "need" is subtracted from "capacity" to arrive at the net need of the district. (This usage of "need" and "capacity" is similar but not identical to our own usage in this paper.) The equalization aid is then proportioned, based on individual "net need," among the qualifying districts. In school year 1985-1986, only 192 school districts qualified for equalization aid.

To evaluate current aid programs, we determine whether school districts in poorer fiscal condition, as measured by their need-capacity gap per pupil (as we define it), receive more total aid from the state. We find that the opposite is true; the better is a district's fiscal condition, the higher is the state aid it receives. To be specific, if District A's need-capacity gap is $1 lower than District B's, then District A can expect to receive $0.016 more state aid than District B, all else equal. These results come from a bivariate regression of total state aid on the need-capacity gap. The coefficient of the need-capacity gap is highly significant statistically, but the R-squared is very low, namely .014.

To some degree, this result reflects the fact that the bulk of state aid dollars are not allotted to equalization aid but are instead granted through the foundation and incentive aid programs. Foundation aid accounts for one aspect of a district's fiscal condition, the share of it students in secondary school, but does nothing else to direct funds to the districts in the poorest fiscal condition. Because it is based on teachers' educational levels, incentive aid is directed primarily toward districts in good fiscal condition, which can afford to hire the most educated teachers. In fact, relatively large and rich districts receive far more aid per pupil through this program than do districts in poor fiscal condition, such as medium-sized districts.

By focusing on the difference between "need" and "capacity" the equalization aid program helps direct aid to the districts in poor fiscal condition, but it is not large enough to offset the impacts of the other aid programs. Moreover, its formula contains several factors, such as enrollment changes, that do not appear to be related to a district's fiscal condition and excludes several factors, such as economies of scale, that have an important bearing on a district's fiscal condition. Overall, therefore, the current state

aid programs do a poor job of identifying and compensating school districts that are, through no fault of their own, in poor fiscal condition.

Fiscal Aspects of School District Consolidation

Perhaps the most unusual feature of public education in Nebraska is the large number of tiny school districts. This feature has been widely debated and many plans for consolidating school districts have been proposed. In this section we examine two key fiscal aspects of consolidation, namely the impact of consolidation on the fiscal condition of school districts and the impact of consolidation on the overall cost of educating students in the state.

We do not attempt a complete analysis of consolidation. We focus on fiscal issues and do not consider nonfiscal issues, such as the relative merits of various educational environments or the importance of local control over schools that are also important to any decision about consolidation. We also do not propose a particular consolidation plan, but instead analyze a consolidation "experiment" to determine the potential gains and losses from consolidation. In our original report (Ratcliffe, Riddle, and Yinger, 1988), we also present a second, more modest "experiment," namely to consolidate each Class 6 district with all its affiliated Class 1 districts. In other words, we make no attempt to resolve the consolidation debate but instead try to contribute to this debate some important information on fiscal issues.

As explained earlier, a school district's fiscal condition can be summarized by its need-capacity gap, which is the amount of money per student it would have to receive from outside sources to be able to provide an average-quality education at an average tax burden on its residents. This gap, which is standardized to be zero in the average district, varies widely across districts. Although the gap equals zero in the average district, it is below zero, -$1,017, in the district that contains the average student in the state, because the large districts, which contain most of the students, are in relatively good fiscal condition. Our principal objective in this section is to determine what might happen to these results with consolidation.

Our experiment is to consolidate all the school districts in a county, except in Douglas and Lancaster counties where we consolidate only those districts outside Omaha and Lincoln. We also consolidate the two districts in the city of Omaha, namely Omaha and Westside.

Thus, this experiment replaces the 865 school districts in our data set with 93 hypothetical county school districts, plus Omaha and Lincoln. We do not regard county-wide school districts as the best consolidation option in every county, but we believe that this experiment does provide insight into the fiscal impacts of large-scale consolidation.

In this experiment we recalculate expenditure need for each new consolidated school district on the basis of its pooled characteristics. Ratcliffe, Riddle, and Yinger (1988) present another version of this experiment in which consolidation simply pools the existing revenue-raising capacities and expenditure needs of all the districts in a county.

In other words, we use our analysis of school costs to calculate the cost of providing an average-quality education in a district with the share of handicapped students, share of students eligible for transportation, enrollment scale, and class of the hypothetical consolidated district. A large-scale consolidation plan might increase total transportation costs by cutting the number of school buildings. On the other hand, some current school districts are widely scattered not contiguous, so that consolidation might lower transportation costs in some places. We are unable to determine the impact of our consolidation experiments on total transportation costs.

The county-wide districts are treated as either class 2 districts or class 3 districts, depending on their population. This experiment accounts for potential economies of scale to be achieved through consolidation, such as spreading the costs of administration, libraries, and other system-wide functions over a larger number of students, and it accounts for gains or losses due to cost differences among classes of school districts. In particular, this consolidation experiment eliminates class 1 districts and therefore eliminates their special cost advantages. As explained earlier, we assume that interdistrict spending differences that are left over after controlling for all observable factors are cost differences, not differences in service quality. If this assumption is incorrect, then our calculations understate the gains from consolidation. Because these left-over spending differences are large, almost $2,500 per pupil between class 1 and class 3 districts, the degree of understatement could be substantial.

The results of this experiment are dramatic. First, we find that consolidation greatly lowers the fiscal disparities across school districts. The standard deviation in the need-capacity gap, a measure of the extent to which the gap varies across districts, is cut more than in half, from $2,621 in the current system to $1,107 with consolidation. Furthermore, the range in gaps also drops substantially, from $-27,159 to $4,364 under the current system (see Table 8) to $-$3,774 to $3,191 with consolidation. Thus without any new state aid or other resources, consolidation can greatly lower the unfair fiscal advantages enjoyed by some districts and lessen the fiscal disadvantages experienced by others.
Second, the decline in costs made possible by consolidation, largely due to economies of scale, lowers the need-capacity gap in the district serving the average student to -$1,864, a drop of $555 per student below the current system. Because our calculations hold educational service quality constant, this drop corresponds to an average cost savings of $555 for educating every student in this state. Thus, this consolidation experiment can be said to cut the cost of educating students in Nebraska by $555 multiplied by 266,000 students or over $147 million. This result should not be interpreted as an estimate of the cost savings from an actual consolidation plan; instead, it dramatizes the potential cost savings from consolidation, even with conservative assumptions.

Conclusions

Our analysis reveals two important facts about the fiscal conditions of school districts in Nebraska. First, and most important, school districts vary greatly in their revenue-raising capacities, in their expenditure needs, and in their need-capacity gaps. This variation exists across all classes and all sizes of districts. Differences in income account for a large part of this variation, but other factors, including differences in the ability of districts to export taxes and in the costs of providing education (due to the

presence of handicapped students, economies of scale, and other factors) all contribute to the current fiscal disparities across the state's schools.

Second, the largest and the smallest districts are in much better condition, on average, than the districts with enrollments between 100 and 1000 students. These medium-sized districts, which are concentrated in classes 2 and 3, do not have the high per student income that the smallest districts have, nor can they take full advantage of economies of scale. As a result, these medium-sized districts have, on average, both a relatively low capacity to generate revenue and relatively higher expenditure need.

Despite the existence of an equalizing aid program, overall state aid in Nebraska does not offset existing fiscal disparities across school districts--and indeed even exacerbates it to a small degree. The foundation grant program, unlike foundation grants in other states, does not provide more aid to districts with low revenue-raising capacity, and the incentive aid program rewards the districts that are in the best fiscal condition. Moreover, the equalizing aid program does not consider many key aspects of a district's fiscal condition.

The predominance of tiny school districts in Nebraska has many fiscal consequences, perhaps the most important of which is the existence of enormous fiscal disparities across districts. Taxpayers in some districts must either accept much higher tax burdens or much lower educational quality than taxpayers in other districts. A major consolidation plan would greatly lessen these fiscal disparities and might save taxpayers in the state a great deal of money by creating districts that can take advantage of economies of scale.

Appendix

The Determinant of School District Spending

As explained in the text, we estimate the cost of education by examining the relationship between spending and various cost factors, holding constant the variables that influence school quality. This appendix presents the results of our regression analysis of school district spending in Nebraska, which draws on the large literature on local public spending (see Inman, 1979, or Rubinfeld, 1985). Detailed variable definitions and regression results are presented in Tables A1 and A2. Data sources are listed in Ratcliff, Riddle, and Yinger (1988).

The sample for our regressions consists of 865 school districts. We eliminated a few districts for which we had insufficient information as well as districts that contract all of their students. In addition, we excluded 4 districts with expenditures per student vastly greater than the average (in excess of $10,000 per student). These districts are all very small and including them yields highly misleading results.

Voters' demand for public services increases with their income and decreases with the "price" of those services. The "price" of public services is the amount a voter must pay in taxes for another unit of services. This so-called tax price is inversely related to the property tax base in the school district; the greater the tax base, the lower the taxes each voter must pay to raise a given amount of revenue.

We find that both income and tax price have a statistically significant impact on school district spending. Our measure of income, as mentioned previously, is the aggregate household income of a district divided by the number of students in that district. We observe that as income rises, expenditure on education also rises. When income is small say, $10,000 per student, a $1,000 rise in income per student (a 10 percent gain) will create a $23 increase in spending per student. When income per student in a district is much higher, say $50,000 per student, income must rise by $5,000 (also a 10 percent gain) in order to obtain the same $23 increase in education spending per student. We also find that a district with a tax price one standard deviation above the average spends about $244 less per student than a district with an average tax price. In other words, for every 10 percent increase in tax price, a district will spend about $40 less per student.

We also found that districts with a larger ratio of residents to students tend to spend more per student, presumably because they can spread the cost of educating each student over more adults. To be precise, spending per student increases approximately $24 for every 100 percent increase in this ratio. For example, if two districts both have 10 students but one has a total population of 30 whereas the other has a total population of 60, the second district will spend $24 more per student than the first district, all else equal.

Certain social and economic characteristics that affect the cost of providing education also vary among districts. We estimate the impact of these characteristics on the cost of education by determining their impact on school district appending in Nebraska, controlling for other factors. The cost factors that prove to be statistically significant in Nebraska are the number of special education students, the number of students eligible for transportation, the overall size of the student population, the proportion of students in secondary school, and the class of district. As explained in the text these results were used to calculate each district's expenditure need.

We also looked at the impact of enrollment in private schools on spending for public education. We found that for every 1 percent increase in the number of children attending private schools in a county, all the school districts in that county spend $17 less per student for public education. This result has two possible explanations. First, voters in some districts may simply have a preference for sending their children to private schools and may therefore not support spending for public education. Second, the public schools in some districts may be providing a poor-quality education, so parents decide to enroll their students in private schools.

Aid from the state and from the federal government tends to stimulate spending by school districts. For every dollar of direct aid given by the state (not federal pass-through aid) school district spending increases by ~$1.26. For every dollar of federal aid, school district spending increases by $1.06. The response to aid varies from school district to school district, but these results imply that, on average, school districts are inclined not to reduce the tax burden when aid is received, but instead spend the aid on education. These spending impacts are not significantly different from $1.00, so we do not conclude that districts match a small portion of their aid with additional spending generated from their own

revenue. When aid is received from other local governments, the school district spends $0.89 of every dollar in local aid received and passes the remaining $0.11 on as tax savings.

We also find that some interschool receipts and payments for tuition, transportation, and special education have large impacts on spending. For example, $1.00 of special education payments to another district cuts own spending by $0.89. In contrast, our analysis also finds no systematic variation in spending between districts that participate in an Educational Service Unit (ESU) and districts that do not. ESUs collect fees from participating districts but also receive separately collected property taxes and federal and state aid. The revenue that ESUs collect in addition to the school payments averages $50 for every student enrolled in districts that participate in ESUs. One might have expected that the districts that participate in the ESU system would spend, all else equal, $50 less per student than the schools providing ESU-type services on their own. The evidence does not support this expectation. The services provided by ESUs do not appear to be substitutes for services previously provided by school district themselves.

Footnotes

The authors are, respectively, Governor's Fellow, Department of Natural Resources, State of New Jersey; Academic Computing Specialist, Metropolitan Studies Program, Maxwell School Syracuse University; and Professor of Economics and Public Administration and Senior Research Associate in the Metropolitan Studies Program, Maxwell School, Syracuse University. This paper is based on a report for the Nebraska Comprehensive Tax Study (Ratcliffe, Riddle, and Yinger, 1988), which was commissioned by the Nebraska Legislature. The authors thank Tim Kemper at the Bureau of Business Research, University of Nebraska at Lincoln; John Clark and Mert Smith, Nebraska Department of Education; Deborah Thomas, the Revenue Committee Council for the State Legislature; and Eric Will, a legislative aide to Senator Vard Johnson.

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