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## Cost-Based School Finance Formulas: Assuring an Adequate Education for All Students

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In our increasingly complex world, the receipt of a high-quality education is the key to both economic success and to intelligent participation in our political system. Although most children in Wisconsin receive a high-quality education, there is ample evidence that the system of public education fails to provide all children in the state with an adequate education.

Educational adequacy is defined in terms of a minimum acceptable level of educational outcomes. For example, state policymakers may decide that children are adequately educated if they achieve certain levels of proficiency in reading and writing, and acquire certain specified knowledge of mathematics, science, and history.

In Wisconsin, the primary focus of the school finance system has been on achieving *equity* rather than educational adequacy. The goal of the state's equalization aid formula is to reduce the linkage between a school district's per pupil property tax base and its expenditures per pupil. The existing aid formula has in fact been quite successful in guaranteeing that all school districts that choose the same property tax rate will have approximately the same amount of money available to spend on education.

Although the achievement of equity is an important goal, equity as it is commonly defined ignores completely school outputs, or more specifically, student performance. This is because equal spending per pupil does not necessarily guarantee equal student performance. Thus, even if Wisconsin achieves a high degree of equity in school finance, there is no reason to believe that it will have provided an *adequate* education for all its students.

One of the primary reasons why equal spending doesn't necessarily result in equal educational outcomes is that the *costs* of providing any given level of education may well differ among school districts.

When I use the word *costs*, I mean something quite different from the general use of the term in discussions of educational finance. In Wisconsin, when we talk about the cost of education, as in "shared cost" in the aid formula, we really mean the amount of *spending* on education.

When business people and economists talk about costs, they are generally referring to the *value of the resources* necessary to produce a given amount of a particular good or service. Thus, when we talk about the cost of producing a hundred-weight of milk, we realize that costs may differ both over time and among farmers for reasons that are largely outside the control of individual farmers. For example, a rise in the price of feed grains will increase costs, as can the severity of the weather.

What does the cost of milk have to do with education? Whereas milk production is easily measured, education is a complex process that is hard to assess and measure. Nevertheless, there should be little question that school finance is a means to an end, and the end is a system of public education that produces well-educated children. Some school districts clearly provide more and higher quality education than other districts.

Here the milk analogy is useful. The cost of education refers to the amount of money a school district must spend to achieve any particular educational outcome—providing all children with an equal opportunity to read at the fourth-grade level by the end of the fourth grade, for example. Some school districts, due to factors over which they have no control, must spend more money than other school districts to achieve this, or any other, educational goal.

Costs differ across school districts for reasons outside the control of local school boards. For example:

- Children who are disabled, have limited knowledge of English, or come from single-parent, low-income families need special attention (i.e., lower class sizes) and specialized programs to bring their educational performance up to a level equal to that of other children. Thus, districts with heavy concentrations of these students will have higher costs than other districts.
- School districts in high-cost-of-living areas will have to pay higher salaries to attract good teachers than will school districts in parts of the state with a relatively low cost-of-living.
- Because they are unable to take advantages of economies of scale, very small, generally rural school districts will have to spend more per pupil to achieve any given level of student achievement than school districts with larger enrollments.

For these reasons and perhaps others, the costs of providing any given level of education vary across school districts, just as the cost of producing milk may vary among farmers.

Districts with below-average costs will be able to provide more education—for example, a more diverse set of courses or larger improvements in reading and mathematics—for each dollar spent than districts with higher costs.

To help clarify the role played by cost differences, let us compare two hypothetical school districts, Alphaville and Betaburg. Both districts have the same number of students, spend the same amount per pupil, and have the same property wealth. Assume, however, that 25% of the public school students in Alphaville live in families with income below the poverty line, whereas only 5% of students in Betaburg come from poor families. Furthermore, assume that the cost of living in Alphaville is 15% above the state average, whereas the cost of living in Betaburg is 10% below the state average.

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It is reasonable to conclude that it will cost more money to achieve any given level of educational outcome in Alphaville than in Betaburg. Teachers will have to be paid more to live in high-cost-of-living Alphaville, and Alphaville will have to devote more teaching resources than Betaburg to meet the needs of the large number of poor children.

In my view, the most serious problem with Wisconsin's equalization aid formula is that it takes no account of the cost differences among school districts, where costs are due to factors outside the control of local school boards. It is important to note that districts with high levels of spending per pupil do not necessarily have high costs. In some districts, high spending may reflect the desire of local taxpayers to provide a very high quality education. Conversely, low spending doesn't mean that costs are low. A low-spending district may have decided to accept low-quality education for its students.

Until now, my discussion of costs has been abstract. From a policy perspective, the important question is what factors lead to cost differences among school districts in Wisconsin, and how important, in quantitative terms, are these cost differences? I have recently completed a statistical study (funded by the Office of Educational Research and Improvement of the U.S. Department of Education) in which I set out to answer these questions. My approach was to use detailed student information, test score data, and financial statistics from all 368 of Wisconsin's K-12 school districts to estimate a *cost function* for public education in Wisconsin. A cost function allows one to statistically identify the characteristics of school districts and their student bodies that contribute to the costs of providing any given educational outcomes.

To determine the educational outcomes in each district, I used two measures. First, as a *value-added* measure of improvements in student achievement, I calculated the difference in scores from the Knowledge and Concepts Exam taken by eighth graders in 1993-94 and scores from the tenth-grade exam taken by the same students 2 years later. Second, as an indicator of the richness of each district's course offerings, I counted the number of advanced courses.

The results of my statistical analysis indicated that costs are higher in districts in high-cost-of-living regions of the state that must pay higher salaries to attract teachers. Costs are also higher in districts with heavy concentrations of students from poor families and in districts with large numbers of students with disabilities, especially when the disabilities are severe. Finally, costs are relatively high in districts that are either small or large. Average costs are lowest in districts with about 5,700 students.

The cost functions allow us to quantify the importance of various factors in determining the costs of achieving specified levels of educational output. To summarize all the information contained in a cost function and to use this information in a school aid formula, we need to calculate a *cost index*. A cost index allows us to isolate the variation in school spending attributable to cost factors that are out-

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side the control of local districts (such as the proportion of the student body from poor families), while holding constant things that are under the control of local school boards.

The results of my analysis show clearly that costs vary tremendously across school districts in Wisconsin. The district with the lowest costs could achieve an average level of achievement by spending about 40% less per pupil than the district with average costs. With the exception of two districts, the district with the highest costs must spend about 90% more than the average cost district to achieve an equal educational outcome for its students.

As an example, Madison's cost index is 1.27—this means that Madison will have to spend 27% more than the district with average costs to provide an adequate education as measured by performance on test scores. Madison's higher costs are primarily attributable to the fact that the cost of living in the Madison area is relatively high and the proportion of students from low-income families is considerably above the state average. In contrast, the cost index for Stevens Point is 0.89, meaning that costs there are 11% below average. Stevens Point's relatively low costs are due to the fact that the city is located in a portion of the state with a modest cost of living and the city has a below-average proportion of children who are disabled or come from poor families.

The existing system of school finance in Wisconsin largely ignores cost differences between districts. Although the state government provides nearly \$400 million in categorical aid, primarily for students with mental, physical, or emotional disabilities, this amount is probably insufficient to cover the full cost of educating these students. In addition, categorical aid provides almost no money to reflect the higher costs of educating students from economically disadvantaged families. The revenue caps in place in Wisconsin further penalize districts with above-average costs. Because annual revenue increases are limited to \$206 per pupil in most districts, this dollar amount will provide fewer resources and will finance less education in districts with above-average costs as compared with districts with below-average costs.

How could Wisconsin reform its school finance system so as to account for cost differences? If the goal of the finance system is to achieve fiscal equity by guaranteeing that districts with equal school tax rates can provide equal education regardless of per pupil property wealth and regardless of cost differences, the state should reform the existing equalization aid formula by adjusting "shared costs" for real cost differences among districts.

If the goal of state policymakers is to achieve educational adequacy, the state should turn to another type of formula—a *cost-adjusted foundation formula*. Under a foundation formula, the state defines what it considers to be an adequate level of education. The dollar value of the average *foundation level* would then be set equal to the amount of spending necessary to achieve state-determined adequacy in districts with average costs. Each district would have its own foundation level of spending, depending on whether it had above or below average costs

(as determined by the value of its cost index). Thus, the foundation levels in districts where costs were 10% above average would be 10% above the foundation level in the district with average costs. Districts with below-average costs would have below-average foundation levels.

The state would also determine a property tax rate that all districts would be required to levy. For each district, state foundation aid would then be the difference between that district's foundation level and the amount of property tax revenue the school district could raise using the state-imposed rate. Thus, under this type of formula, the largest per pupil grants would go to districts with the smallest per pupil property tax bases and districts with the highest costs of providing an adequate level of education.

The acceptance of the goal of educational adequacy and the implementation of a cost-adjusted foundation formula does not necessarily require the state to increase its expenditures on K–12 education. The total expenditures necessary to achieve adequacy depend on how state officials choose to define adequacy. My UW colleague Professor Allan Odden has argued that it is likely that Wisconsin could provide all its students with an adequate education without spending substantial additional amounts of money. My own research supports this conclusion. If the state chose to define the standard of adequacy as the average level of current student performance on the tenth-grade achievement test, and if the state reallocated the money it now spends on equalization and categorical aid using a cost-adjusted foundation formula, that amount of money should be sufficient to achieve adequacy for all students.

What if a district wants to spend more than its foundation level? One possibility is to let districts remain free to supplement spending above the cost-adjusted foundation, but to provide no additional aid. The fiscal discipline of having to pay for the last dollar of spending should discourage extra spending. On the other hand, it would be possible to provide more state aid on a matching basis for spending in excess of the foundation level, with such aid targeted to low-property-value, high-cost districts.

I would like to conclude by emphasizing that providing school districts with enough resources to achieve educational adequacy does not in itself guarantee that students will be provided with an adequate education. Additional financial resources must be accompanied with strict accountability standards. Wisconsin will need to develop financial incentives and/or penalties plus other administrative mechanisms to assure that local school districts actually improve educational outcomes and meet their goals of educational adequacy.

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