

# **Modeling School Finance Reform**

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## **Introduction**

Many states have attempted to reform their public school funding systems in recent years. Whether the impetus for reform has been mandated by the courts, or arises from dissatisfaction on the part of educators, parents, or legislators, school finance experts are often called upon to suggest changes to existing school funding formulas. There exists a large literature on formula design and after several decades of reform efforts in many states, there is widespread agreement among experts about the kind of school funding formula most appropriate to achieve various school funding objectives such as access equality and educational adequacy. The standard policy prescriptions have been described in detail by Yinger (2004) and by Picus, Goertz, and Odden (2008).

While school finance experts have been active in designing formulas and crafting reform proposals, in general they have paid much less attention to the process of moving a set of school funding reforms from the proposal stage to actual enactment and implementation. Although the political environment in which reforms are considered obviously plays a critical role in determining their success or failure, in any reform effort there are a set of analytic questions that must be addressed in order for the process of reform to move forward. At a minimum these questions include the following:

- What is the budgetary cost to the state government of implementing the reforms?
- How will the allocation of state education aid to individual districts change? Which school districts would gain and which districts would lose as a result of the funding reforms?

In a typical state, the analysis of funding proposals necessary to provide answers to these questions is conducted by the state's department of education, the governor's budget office, and/or a legislative agency charged with the fiscal analysis of proposed legislation. While the analysis needed to answer these questions is necessary and important, it does not provide answers to an additional set of questions, the answers to which may well be needed in order to both build support for any proposal, or to point to changes to an initial proposal that will enhance the chances that a funding reform measure will be enacted. These questions include:

- Will the reform proposal be successful in achieving the adequacy or equity goals it was designed to achieve?
- How will local school districts respond to changes in state aid, matching requirements, or various revenue or expenditure limitations under which they operate? Specifically, by how much will education spending change if the funding reform proposal is enacted? Will spending responses vary systematically by school district property wealth or by other school district characteristics? Will school districts use additional state resources to reduce their reliance on the local property tax? If so, by how much?
- How can a reform proposal be modified so as to minimize annual reductions in state aid to individual districts without dramatically increasing the budgetary cost of the proposal?

In this paper, we discuss the development of a multi-year dynamic school funding simulation model and illustrate how the model can be used to answer a range of questions including those listed above. This paper is a case study of our experience working with a coalition of groups in Wisconsin that are interested in school funding reform. We describe the development of a school funding model that includes a number of elements that we believe are important in assessing the impacts of any funding proposal. In addition, the model also provides a powerful tool for comparing the effects of a range of alternative funding proposals. We suggest that the probability of moving successfully from an initial school funding proposal to an enacted reform will be enhanced if the interested parties have access to an analytic tool that allows them to quickly consider modifications and amendments to any initial proposal.

Wisconsin provides a particularly interesting environment in which to study school funding reform. There is widespread agreement among the education community, from the media, and even among elected officials that school funding reform is needed. Although a few minor changes in school funding have been enacted over the past few years, there has been no legislative discussion of major reforms, in large part because there has been no consensus among those parties interested in school finance on the type of reform that is needed. Members of the legislature have in effect challenged those interested in school funding reform to agree on a single proposal.

In response to this challenge from the legislature, leaders of the Wisconsin Association of School Boards (WASB), the Wisconsin Association of School District Administrators (WASDA), and the Wisconsin Education Association Council (WEAC), the state's largest teachers' union, were instrumental in

bringing together various interest groups broadly representing the “education community” in Wisconsin with the goal of developing a single reform proposal that they could all support.

This coalition of groups, chaired by the dean of the School of Education of the University of Wisconsin-Madison, established itself as the *School Finance Network* (SFN).<sup>1</sup> After many months of often heated debate, the members of the SFN came to tentative agreement on a school funding proposal. At that point, we agreed to assist the members of the SFN by building a simulation model of the school funding system with the goal of providing answers to the kind of questions raised earlier in the introduction.<sup>2</sup>

In order to provide appropriate background for a discussion of the modeling of school finance reform, in the next section of the paper, we describe Wisconsin’s current school funding system. We then explain why the current system is widely recognized as being seriously flawed. In the following section we describe our approach for modeling the initial reform proposal developed by the SFN. This is followed by a discussion of how the results of the simulation model helped the SFN make changes to their initial proposal that in their view would enhance its chances of enactment. We then discuss the challenges of predicting by how much individual school district spending will increase in response to changes in state aid allocations. We conclude the paper with a brief discussion of lessons that can be drawn from our Wisconsin experience about the role that policy modeling can play in enhancing the prospects for school funding reform.

### **Wisconsin’s Current System of School Funding**

Public education is provided by 426 independent school districts, each governed by an elected school board that has the authority to levy a school property tax. In fiscal year 2006, local school districts raised 41.7 percent of the total operating revenue of school districts, the state government contributed

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<sup>1</sup> In addition to the three organizations mentioned above, the coalition includes the School Administrators Alliance, the American Federation of Teachers-Wisconsin, and several citizens’ groups with a long history of interest in funding reform, including Wisconsin PTA, the Fair Aid Coalition, the Southeastern Wisconsin Schools Alliance, and the Wisconsin Alliance for Excellent Schools.

<sup>2</sup> It should be noted that neither author has any formal relationship with the School Finance Network. Our modeling efforts are being done on a *pro bono* basis, with the Lincoln Institute of Land Policy, a think tank based in Cambridge, MA, providing financial support for our efforts.

52.3 percent, and the federal government the remaining 6 percent. The state's share of school revenues is somewhat above the national average (46.5 percent).

There are three key elements to Wisconsin's school funding system: state aid to local school districts allocated through an equalization grant and a set of categorical grants, a limit imposed by the legislature on the amount of property tax that individual school districts can levy without requiring a vote by local residents in an "override" referendum, and a commitment by the state legislature to provide a specified share of education revenue. We describe each of these elements in the next few paragraphs.

Since 1973, about 90 percent of the state's financial contribution to public education has been distributed to school districts using a complex equalization aid formula. Total equalization aid is the sum of *primary*, *secondary*, and *tertiary* aid. In FY 2008, primary aid provides minimum aid to all but 10 K-12 districts with per pupil property values per student in excess of \$1,930,000.<sup>3</sup> For most districts, secondary aid is distributed using a foundation-type formula, however for a few low-spending districts, secondary aid is allocated using a guaranteed tax base formula, with the guaranteed tax base for FY 2008 set at \$1,330,187 for K-12 districts. All districts that receive secondary aid through the foundation formula also receive tertiary aid calculated using a guaranteed tax base formula, with the tertiary guarantee set at the value of state's average per pupil property tax base, \$528,306 in FY 2008.<sup>4</sup> In that year, 275 school districts received positive tertiary aid, while 150 districts were allocated negative tertiary aid. While negative tertiary aid has the effect of reducing a district's total equalization aid, negative tertiary aid is limited to the amount of the district's secondary aid allocation, thereby guaranteeing that these districts receive at minimum the full value of their primary aid allocation. Table 1 provides a more detailed description of the structure of Wisconsin's equalization aid system.

The remaining 10 percent of state aid is allocated to school districts through over 30 different categorical aid programs. The largest categorical grant, accounting for over 60 percent of the total, is for

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<sup>3</sup> The tax base per student above which no equalization aid is given is higher for K-8 and union high school districts. Although Wisconsin has 56 non-K-12 districts, together they educated only 4 percent of all public school students. In FY 2008, 7 of these non-K-12 districts received no equalization aid.

<sup>4</sup> The tertiary guarantee is set at 1.5 times the average base for K-8 districts and at three times the average for union high school districts.

special education. Other categorical grant programs that account for more than 4 percent of total categorical aid are for pupil transportation, school libraries, and for SAGE, a program that supports smaller class sizes for kindergarten through third grade in schools serving heavy concentrations of students from poor families.

Over the years, the legislature has generally increased the amount of money appropriated annually to equalization and categorical aid. A review of legislative history makes it very clear that many legislators supported increased education aid because they believed that it was an effective way of providing taxpayers with property tax relief. In 1993, frustrated that local school districts were not more aggressive in using state aid to lower property taxes, the legislature imposed *revenue limits* on local school districts. A limit of \$190 per student was placed on annual increases in revenues from the sum of equalization aid and property taxes. The legislation specified that the tax cap would increase by the rate of inflation. For the 2007-08 school year, the annual limit was \$264. A special provision targeted to low-spending districts allows them to increase revenues by a somewhat larger amount than other districts. Districts may exceed their revenue caps only with the approval of their voters in a referendum.

In the absence of successful revenue cap override referenda, any increase in state equalization aid leads automatically to a dollar-for-dollar decrease in allowable school property tax levies. In 1996, the legislature increased equalization aid by nearly \$1.2 billion as part of its commitment to provide “two-thirds” of public education revenue. We have put the “two-thirds” in quotes because the legislatively-mandated formula used to calculate “two-thirds” includes in the numerator a *school levy credit* that provides property tax relief directly to residents, but no additional financial resources to school districts, and excludes from the denominator, referred to as *partial revenue*, some sources of total school revenue, such as federal aid. As a result, the actual state share of total school district revenues as calculated by the National Center for Educational Statistics (NCES) has never risen above 54 percent. In 2003, faced with a large budget deficit, the legislature suspended its commitment to “two-thirds” funding. For fiscal year 2007, the state’s share of education revenue calculated using the “two-thirds” formula was 64.5 percent.

**Table 1****The Calculation of Equalization Aid in Wisconsin**

For most school districts, total equalization aid per student ( $A_i$ ) is equal to the sum of primary aid ( $A_{Pi}$ ), secondary aid ( $A_{Si}$ ) and tertiary aid ( $A_{Ti}$ ). Aid allocations to school district  $i$  depend on the *shared cost* per student in  $i$  ( $F_i$ ), and the equalized property value per student in district  $i$  ( $V_i$ ). Shared costs refer to district spending in the previous year funded by the property tax and general aid. Spending funded by categorical aid or federal aid is excluded from shared costs.

**Primary aid** is calculated using the following formula:

$$(1) A_{Pi} = \left(1 - \frac{V_i}{V_p^*}\right) F_p^*$$

In recent years,  $F_p^*$  has been set equal to \$1,000 and  $V_p^*$  to \$1,930,000 (with higher values for non-K-12 districts). Using these values, district  $i$ 's primary aid allocation can be expressed as

$$(2) A_{Pi} = 1,000 - 0.000518V_i, \text{ if } V_i < V_p^*, \text{ and} \\ A_{Pi} = 0, \text{ if } V_i > V_p^*.$$

Equation (2) is thus equivalent to a foundation formula with the primary foundation level of \$1,000.

For school districts with shared costs per student below a *secondary cost ceiling* ( $F_s^*$ ) set at 90 percent of the previous year's average shared costs, **secondary aid** is allocated with the following formula:

$$(3) A_{Si} = \left(1 - \frac{V_i}{V_s^*}\right) F_i, \text{ if } F_i < F_s^* \text{ and } V_i < V_s^*, \text{ and} \\ A_{Si} = 0, \text{ if } V_i > V_s^*,$$

where the value of  $V_s^*$  is set each year so that the sum of equalization aid allocations to all districts just matches the amount of money the legislature has allocated to state equalization aid.

For the vast majority of school districts with shared costs ( $F_i$ ) greater than  $F_s^*$ ,  $F_i$  in equation 3 is replaced with  $F_s^* - F_p^*$ . This replacement allows us to rewrite the formula as a foundation formula:

$$(4) A_{Si} = (F_s^* - F_p^*) - r_s^* V_i \quad \text{if } V_i < V_s^*, \text{ and} \\ A_{Si} = 0, \text{ if } V_i > V_s^*.$$

For the 2008-09 academic year  $F_s^* = \$8,252$  and  $r_s^* = 0.0054786$ , and  $V_s^* = 1,323,702$ .

Each school district's **tertiary aid** allocation ( $A_{Ti}$ ) is defined by equation (5):

$$(5) A_{Ti} = \left(1 - \frac{V_i}{V_T^*}\right) * \text{MAX}[(F_i - F_s^*), 0].$$

$V_T^*$  is defined as the average property value per student. For the 2008-09 academic year it has a value of \$528,306. Note that tertiary aid can be either negative or positive.

Finally, to determine the total equalization aid for school district  $i$ , we add up primary, secondary and tertiary aid using equation (6):

$$(6) A_i = \text{MAX}[\sum(A_p + A_s + A_t), A_p].$$

## **The Crisis in School Funding**

Although Wisconsin had had a long tradition of high quality public education, in recent years there have been growing signs of a brewing educational funding crisis. In 2005, the School Board of Florence, a 600 student rural school district in Northern Wisconsin, voted to dissolve after failing to secure voter approval for a revenue cap override in several successive elections. In September 2008, the School Board in the state's largest district, Milwaukee Public Schools, facing the prospect of large budget cuts combined with large property tax increases, voted to study the possibility of dissolution.<sup>5</sup> The fiscal problems are not however restricted to a small number of school districts. In a recent survey of school districts, 75 percent of responding districts reported that they increased class sizes in the past year, 63 percent reduced programs for gifted students, and 57 percent cut the number of academic courses they offered (Wisconsin Education Association Council, 2008).

Although causality is not clear, there are troubling indications that in general the quality of public education in Wisconsin is suffering. While student performance on the National Assessment of Educational Progress (NAEP) has improved nationwide, Wisconsin scores have risen more slowly than average. The latest data show that nearly a quarter of Wisconsin students score "below basic" in both the 8<sup>th</sup> grade reading and mathematics tests (National Center for Education Statistics, 2008). The state's gap between the academic performance of white and African American students is among the largest in the country. While about 18 percent of white students score "below basic" on the 8<sup>th</sup> grade NAEP reading and math exams, 60 percent of black students score below basic in reading and 70 percent below basic in math.

The primary reasons for the state's funding crisis are overly restrict revenue limits and school funding formulas that do not account for differences in educational costs across districts. First, for nearly 15 years the revenue caps have limited the growth in school district revenues, and consequently spending. The revenue cap has allowed school district revenues to grow at about the rate of CPI growth for school districts with average spending. The revenue limits restrict the growth of school district revenue to a rate less than inflation in school districts that had above average spending levels when the revenue limits were

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<sup>5</sup> The School Board later reversed its initial decision.

enacted. As many of the input prices faced by school districts, notably employee health insurance and energy, have been growing at rates substantially in excess of the CPI, school districts have been forced to repeatedly cut other parts of their budgets. Evidence that the revenue caps have been binding comes from the fact that almost all districts choose to levy property taxes at or very close to their maximum levy allowed by the revenue controls. Over the past six years, only 6 school districts set their property tax levies at less than 95 percent of their allowable levies, with 10 more districts averaging between 95 and 99 percent of their allowable levies. Attempts to gain voter approval to exceed revenue limits have been quite infrequent. Between the beginning of 1995 and November 4, 2008 only 750 revenue limit override referenda have been held. Because some school districts have called multiple referenda within a given year, the number of school districts attempting to exceed their revenue limit in any given year is quite small. Of the revenue limit referenda that have taken place, most (56.4 percent) have failed.<sup>6</sup>

A second reason why many of Wisconsin's school districts have severe fiscal problems has to do directly with the school funding formulas. The equalization aid formula described above was designed primarily to achieve *taxpayer* or *access equality*, which is achieved when, after the receipt of state equalization aid, property-poor and property-rich school districts that choose the same property tax rate have available equal amounts of per pupil funding. In fact, the equalization aid formula is quite successful in achieving this goal.<sup>7</sup> This success occurs because for most districts the marginal dollar of aid comes from tertiary aid, which is allocated using a guaranteed tax base formula that allows negative aid.

Access equality is only one goal of school funding systems. By itself, achieving this goal does nothing to assure that all school districts have enough resources to provide their students with a quality (or adequate) education as defined by the state's student performance goals. In fact, the state's education department (formally called the Department of Public Instruction) emphasizes its *New Wisconsin Promise* which calls for "a quality education for every child, raising achievement for all students, and closing the

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<sup>6</sup> Detailed data on school district referenda are available on the Wisconsin Department of Public Instruction website at [http://www2.dpi.state.wi.us/sfsref/ref\\_Home.aspx](http://www2.dpi.state.wi.us/sfsref/ref_Home.aspx).

<sup>7</sup> One way to measure the success of the equalization aid formula in achieving access equality is to note that in fiscal year 2007, while the coefficient of variation of the property tax base per student among all K-12 districts is 1.13, the coefficient of variation of per student spending per mill is much smaller, 0.31.

achievement gap between economically disadvantaged students, students of color, and their peers” (Wisconsin Department of Public Instruction, 2006).

There exists a great deal of evidence that individual schools and school districts require different amounts of money in order to meet the student performance goals mandated by both state and federal statutes and regulations. The literature contains a substantial number of studies that attempt to measure the costs of meeting various educational goals using an array of different methods.<sup>8</sup> Although the dollar amounts vary across studies, there is wide agreement that the costs of meeting any student performance goal are higher when more students come from economically disadvantaged households, when they enter school with limited English proficiency, or have various mental or physical disabilities; when schools and school districts are particularly small; or when some school districts must pay higher than average salaries to compensate for higher costs of living or particularly difficult working conditions.

Note that Wisconsin’s equalization formula, spelled out in Table 1, takes no account of the various factors that lead to differences in costs across school districts. In contrast to equalization aid formulas used in many other states, Wisconsin does not use “weighted” pupils to reflect cost differences associated with disabilities, poverty, and other “at risk” factors. School districts do receive some aid reflecting certain high-costs students through various categorical aid programs. Although the SAGE program finances lower class sizes in the first few grades in some schools with heavy concentrations of students from poor families, the school funding system provides no categorical aid for low-income students in higher grades. Although there is categorical aid for special education and for students with limited English proficiency, in FY 2007 these categorical aid amounts accounted for only 28.7 and 11.4 percent, respectively, of the cost associated with these students.<sup>9</sup> Like the equalization aid formula, the revenue caps take no account of differences in costs across school districts. Because the per-student allowable increase in revenue is

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<sup>8</sup> For excellent discussions of the methodology issues involved in the measurement of the costs of education see Duncombe and Yinger (2008) and Downes and Stiefel (2008).

<sup>9</sup> These percentages were calculated using data from the Wisconsin Department of Public Instructions on “aidable” special education costs and “eligible” limited English language costs and detailed data on categorical aid allocations.

specified in nominal terms, the revenue caps are more restrictive in school districts with above average costs.

### **Development of the School Finance Network's Proposal**

The School Finance Network is a coalition of organizations. Each member organization appointed several members to represent it at the regular meetings of the SFN. The actual work of developing a school funding proposal was delegated to a 6-person sub-committee. With the exception of one presentation to the entire SFN group, our interactions were entirely with the sub-committee. Our primary contact with the sub-committee was through Dr. Jeff Leverich, a research analyst employed by WEAC. We consulted with him regularly about the details of our modeling strategy, he assisted us in obtaining needed data, informed us about the decisions made by both the sub-committee and the larger SFN group, and, most importantly, he explained the results of the simulations of the SFN proposals to the members of the SFN. Although we submitted long memos, usually filled with a large number of distribution tables to the sub-committee, Dr. Leverich played a critical role in helping the group understand and interpret the tables.

The authors' initial contact with the School Finance Network occurred more than a year after the SFN had begun its deliberations. In that period the basic outline and many of the details of their proposal had been worked out and agreed upon. The group had decided that their final proposal needed to include the following four elements:

- The basic structure of the existing equalization aid formula would be retained, and equalization aid distributed through the formula would remain the single most important form of state aid to education.
- The preamble to the SFN proposal states that "revenue controls undermine the state's long history of local control in schooling, are not aligned with educational goals and outcomes, and contain structural flaws that produce ongoing deficits in public education." However, the SFN decided that to make their proposals politically viable, they would have to include some form of revenue controls.
- The SFN proposal would include a major expansion of categorical aids. Revenue from categorical aids would not be included under the revenue limits and would be targeted to school districts that tend to face higher than average costs of education.

- Regardless of the exact specification of equalization and categorical aid, the state government's share of education funding would be increased above its current level.

Consistent with these four points, the SFN's initial draft proposal retained the basic structure of equalization aid, as described in Table 1, but would increase the secondary cost ceiling ( $F_s^*$ ) from 90 percent to 100 percent of statewide shared cost per member in the previous year. In subsequent years, the secondary cost ceiling would increase annually by the 5-year growth rate of personal income in Wisconsin. The impact of this proposal would be to eliminate tertiary aid for all districts whose shared costs were now below the new secondary cost ceiling. For all of these districts, the tax price of education spending would decline, and in the case of districts that were receiving negative tertiary aid, quite dramatically.<sup>10</sup>

While retaining revenue controls, the initial SFN proposal substantially increased the per pupil amount by which revenues are allowed to grow from year to year. The new annual increase would be linked to the annual dollar increase in the secondary cost ceiling, which under the proposal would increase annually at the growth rate of personal income. If the proposal had been implemented for fiscal year 2008, the annual increase in the revenue cap would have been \$350 per pupil instead of \$257 per pupil under current law. In addition, low-spending districts are given looser revenue limits to allow them to increase spending further. The initial SFN proposal would expand the existing low-revenue ceiling by setting it equal to the secondary cost ceiling. Thus in fiscal year 2008, the revenue limit of any school district with base revenue below \$9,169 would be allowed to increase by either \$350 per pupil or the amount needed to reach \$9,169 per pupil, whichever is larger. Finally, to help school districts adjust to declining enrollments, the proposals would phase-in over three years reductions in a district's total revenue limit due to a shrinking number of students.

The initial SFN proposal included the creation of two new categorical aid programs. The largest new program is targeted to economically disadvantaged students. It would provide school districts with a categorical grant equal to \$2,000 for each student eligible for the Free and Reduced Price Lunch program,

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<sup>10</sup> In fiscal year 2007, 152 of the 369 districts that received tertiary aid in the previous year would be ineligible for tertiary aid because of the SFN's proposed increase in the secondary cost ceiling.

with the per pupil amount growing each year at the same rate as the consumer price index. A second new program provides a categorical grant of \$300 per student to help compensate for diseconomies of scale in districts with few students but covering a large physical area. To be eligible for these so-called, *small but necessary district* grants, a district must have enrollment of fewer than 750 students and fewer than 10 students per square mile.

The SFN proposals also called for the expansion of existing categorical programs that provide grants for special education, for students with limited English proficiency (in Wisconsin called English language learners), and for student transportation. The proposals call for converting existing grants into sum-sufficient allocations that would reimburse school districts for 33 percent of their spending on these programs, a substantial increase from current funding levels. The proposals also call for the expansion of an existing categorical grant for students with severe disabilities.

Finally, the initial SFN proposal included a provision that state aid would fund two-thirds of “partial revenue”, using the statutory formula for determining “two-thirds.”

### **Construction of a School Funding Simulation Model**

The primary goal in building a simulation model was to assist the SFN in both developing and evaluating their school funding proposals. In consultation with the SFN we made several initial decisions. First, we decided that it was important to build a model that would allow us to trace the impacts of reform proposals over a number of years. The experiences of other states that have undertaken school funding reform suggests that the political acceptability of any major reform proposal requires that the proposal be phased in over a period of several years in order to avoid large one-year changes (positive and negative) in state aid. In order to limit the amount of data projections that would be required, we structured the model “as if” the state aid proposals went into effect in fiscal year 2007 and the revenue caps changes in fiscal year 2008. We then modeled the impacts of the reform proposals for three additional fiscal years, through FY 2011.

In order to assess the impact of various reform proposals we needed to compare outcomes, in terms of state aid, property tax levies, and per pupil spending in each year to the levels of these variables if no school funding reforms were enacted. To accomplish this we built a parallel model based on current law. Actual data were used for FY 2007 and FY 2008 and projections for the three subsequent fiscal years.

Wisconsin has a long history of high quality policy analysis provided by the Legislative Fiscal Bureau (LFB), a non-partisan service agency of the state legislature.<sup>11</sup> Given its role as a legislative service agency, it is not surprising that in evaluating public policies related to intergovernmental finance, the LFB always includes in their memos tables that provide information on the impact of proposed legislation on individual school districts, municipal governments, or counties. Although members of the legislature clearly need to know the impact of proposed legislation on individual school districts and municipalities, it is extremely difficult to assess whether a proposal achieves various public policy goals by studying impacts on individual local governments because of the large number of local governments and school districts in Wisconsin.

In building a simulation model, the SFN agreed that we would first provide them a set of distributional tables that would allow them to assess the impact of various proposals in terms of broad distributional goals. We will describe below the type of distributional tables we constructed. Only after the SFN had tentatively agreed on a final set of reform proposals, would we provide them with tables that displayed the impact of their proposals on individual school districts.

In building a model we realized that the process of agreeing on a final school funding reform proposal would involve a great deal of experimentation. Ideas would be proposed, we would be asked to determine both their cost and their distributional consequences, and on the basis of the findings the SFN would debate whether to include a proposal, reject it, or consider an alternative or variant of the original proposal. As we describe in more detail below, the process of agreeing on a final proposal was lengthy,

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<sup>11</sup> The long-time director of the Legislative Fiscal Bureau, Bob Lang, was awarded the Steven D. Gold Award in 2007.

with a number of specific proposals being made and subsequently rejected. In fact, the SFN document describing the funding proposals has to date gone through 16 drafts. In order to be able to respond quickly to new proposals, the simulation model is heavily parameterized. The model contains a *parameter page* that allows us to very quickly include or exclude various elements of the reform proposal and to change the numerical values of parameters that reflect policy decisions, e.g. the value of the per student poverty categorical grant, or changes in data, such as the projected growth rate in personal income.

### *Simulation Model Description*

Table 2 describes in detail how the various elements of the Wisconsin school funding system fit together. The process starts with decisions by the legislature related to the overall share of “partial revenue” to be funded by the state and the specific amount to be allocated to state aid. These decisions interact with the revenue controls to determine the total amount budgeted for equalization aid. For each individual district, the formula described in Table 1 determines equalization aid, which, given each district’s revenue limit, determines the maximum allowable property tax levy in each district. Decisions about how much to levy in property taxes made by school districts in one year affect aid allocations and revenue limits in the following year. In constructing our simulation model, we have attempted to accurately reflect all the complexities of the school funding system described in Table 2.

Our model consists of two large linked Excel files, one used to calculate state education aid for each of Wisconsin’s 425 school districts and the other to calculate each district’s revenue limits. The two files each have separate data spreadsheets (technically Excel worksheets) for each year in the simulation.<sup>12</sup> As indicated above, a separate version of the model describes the allocation of aid and the determination of revenue limits through fiscal year 2011 under current law. For each district, the spreadsheet includes data used in the various formulas and data used solely to describe each district for purposes of constructing distributional tables. For example, district-specific data used in the formulas include information on property values, enrollment, the number of special education students, and transportation

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<sup>12</sup> The spreadsheet files are large; each state aid worksheet includes roughly 125 columns and the revenue limit worksheets have about 80 columns.

**Table 2****The Structure of the SFN School Funding Model****Determining Equalization Aid (EA<sub>i</sub>), Categorical Aid (CA<sub>i</sub>), Allowable Property Tax Levy (T<sub>i</sub>), and Spending (F<sub>i</sub>) in School District i**

Step 1: The revenue limit for each district (RL<sub>i</sub>) is calculated by the state Department of Public Instruction (DPI) based on the previous year's values of T<sub>i</sub> and EA<sub>i</sub> and the allowable annual revenue cap increase as determined by statute.

Step 2: As part of the state budget process, the Wisconsin legislature determines total categorical aid in year t (∑CA<sub>i</sub>), total school levy credits (∑SLC<sub>i</sub>), and the share of *partial education revenue* to be financed by the state (assumed here to be 2/3).

Step 3: ∑EA<sub>i</sub> in year t is determined by solving the statutorily determined state share formula:

$$\frac{2}{3} = \frac{\sum EA_i + \sum CA_i + \sum SLC_i}{\sum RL_i + \sum CA_i} = \frac{\sum EA_i + \sum CA_i + \sum SLC_i}{(\sum EA_i + \sum T_i) + \sum CA_i}$$

Using values determined in steps 1 and 2 for ∑RL<sub>i</sub> and ∑CA<sub>i</sub>, determine the value of the denominator, and multiply by 2/3 to determine value of the numerator. Solve for ∑EA<sub>i</sub> using the values of ∑CA<sub>i</sub> and ∑SLC<sub>i</sub> determined in step 2.

Step 4: Set the value of the *secondary guarantee* in the equalization aid formula (V<sub>s</sub><sup>\*</sup> in Table 1) so that the sum of equalization aid allocations (∑EA<sub>i</sub>) to all districts just matches the amount of money allocated to state equalization aid (as determined in step 3). Use the formulas described in Table 1 to determine EA<sub>i</sub> for each school district.

Step 5: Calculate categorical aid for each district (CA<sub>i</sub>) based on formulas and funding levels determined by the legislature.

Step 6: Determine the *maximum* allowable property tax levy in district i by subtracting EA<sub>i</sub> from RL<sub>i</sub>. In our initial simulations, we assume that every district sets its property tax levy equal to the maximum amount allowed under the revenue controls. Alternative levy assumptions are discussed later in the paper.

Step 7: Calculate maximum allowable spending in district i (F<sub>i</sub>) as the sum of EQ<sub>i</sub>, CA<sub>i</sub>, and T<sub>i</sub>.

Step 8: Use EA<sub>i</sub> and T<sub>i</sub> to determine the revenue limit base for the next year (return to step 1).

spending for each district. Data used only to characterize districts include variables such as an urban/rural indicator and a measure, to be described below, of the fiscal health of each district. The formulas in the model combine district-specific data with SFN policy parameters to calculate state aid and revenue limits. For example, the formula to calculate special education categorical aid includes a district's spending on special education (district data) and the percent of special education costs that are reimbursed by the state (a policy parameter). Finally, each data spreadsheet includes a set of columns that compare each district's state aid, property tax, and total spending under the SFN proposal and under current law. The data in these columns are then summarized in the distributional tables produced for the SFN.

In order to construct a multi-year model that covers future years, it was necessary to project future values of all data variables used in the calculation of equalization aid, categorical aid, and revenue limits. Enrollment plays a crucial role in almost every formula in the simulation. We assume that a district's enrollment history provides a reasonable predictor of future changes in enrollment. Thus, we projected the number of pupils separately for each district based on trend line enrollment changes in each district over the FY2000 to FY2007 period.

To project the district data used in state aid and revenue limit formulas, we first calculated average statewide growth rates in each variable for the FY2000 to FY2008 period. To project changes through fiscal year 2011 we used these average rates weighted by each district's projected enrollment changes over this period.

Given the dramatic upheavals in real estate markets over the past few years, we decided that it would be inappropriate to use the pattern of change in the property tax bases of individual school districts during the first part of this decade as a basis for projecting changes over the next few years. Current economic uncertainties, especially in the housing market, make any projections of future trends in property values in Wisconsin extremely difficult. As a default strategy, we made the assumption that the nominal equalized property value in each district in 2007 would remain unchanged through fiscal year 2011.

As described in Table 2, equalization aid and property taxes are interdependent because of revenue limits. To reflect this interdependence, it is thus necessary to link the state aid file and the revenue

limit file. The state aid file includes a link to prior year shared costs from the revenue limit file, so that changes in a district's shared costs (i.e. total spending excluding categorical aid and federal aid) will impact its equalization aid in the following year. The revenue limit file links to both prior year and current year equalization aid. Prior year equalization aid is included in the formula that calculates a district's revenue limit in the current year. Current year equalization aid has a dollar-for-dollar impact on a district's property tax levy in that year since the sum of equalization aid and property taxes are capped under the revenue limits.

### *Model Output*

The model has been constructed so that the results of any changes in data, projections, policy parameters, or in the funding proposals, are immediately reflected in a series of summary tables. Because of the difficulties involved in making comparisons across types of school districts, all the distributional tables are based on data from Wisconsin's 368 K-12 school districts.<sup>13</sup> In total, the model produces close to 60 tables. Several tables indicate the total budgetary impact of any proposal in each year, and the aggregate impacts of the proposal on maximum allowable property tax levies and on school district spending. The other tables all show the distributional impact of the SFN proposal on different types of districts, with each table dividing districts into groups based on one of six characteristics: property tax base per pupil, enrollment, percent of students eligible for Free and Reduced Price Lunch, a locational indicator reflecting the urban, rural, or suburban nature of the district, the percentage change in enrollment between 2002 and 2007, and a summary measure of the fiscal health of each district. As an example of the distribution tables, Table 3 characterizes the distribution of state equalization aid and categorical aid by school districts' per pupil property tax base. Table 4 compares the distribution of total aid in fiscal year 2011 by property tax base per student under current law with the distribution

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<sup>13</sup> In 2007 K-12 districts educated 95.8 percent of all public school students in Wisconsin. Although classified as a K-12 school district, Norris, a residential school, is excluded from our distributional analyses.

Table 3

<b>Current Law - FY2007 School Aid Per Member by EQV Per Member, K-12 Districts</b>						
<b>Equalized Property Value Per Student</b>	<b>Number of Districts</b>	<b>Number of Students</b>	<b>Percentage of Students</b>	<b>General Aid per Student</b>	<b>Categorical Aid per Student</b>	<b>Total Aid per Student</b>
Less than 250,000	6	9,509	1.1%	\$7,180	\$739	\$7,919
250,000-324,999	60	146,895	17.7%	6,930	773	7,703
325,000-400,000	87	139,473	16.8%	6,429	535	6,964
400,000-499,999	65	215,801	26.0%	5,809	590	6,399
500,000-749,999	98	224,175	27.0%	4,717	478	5,195
750,000-999,999	23	61,864	7.4%	2,733	737	3,470
1,000,000-1,999,999	20	29,310	3.5%	1,106	555	1,662
2,000,000 and over	9	4,201	0.5%	254	627	881
Total	368	831,228	100.0%	\$5,409	\$595	\$6,004

Table 4

<b>FY2011 - Impact of SFN Proposals by School District Property Value, K-12 Districts</b>						
<b>Equalized Property Value per Student</b>	<b>Total State Aid per Student</b>		<b>SFN Proposal FY2011 Compared to FY07 Actual</b>		<b>SFN Proposal FY2011 Compared to FY11 Current Law</b>	
	<b>Current Law FY2011</b>	<b>SFN Proposal FY2011</b>	<b>Dollar Change per Student</b>	<b>Percentage Change per Student</b>	<b>Dollar Change per Student</b>	<b>Percentage Change per Student</b>
	Less than 250,000	\$9,301	\$11,104	\$3,185	40.2%	\$1,803
250,000-324,999	\$8,406	\$10,688	\$2,985	38.8%	\$2,282	27.1%
325,000-400,000	\$7,865	\$9,328	\$2,364	34.0%	\$1,463	18.6%
400,000-499,999	\$7,286	\$8,683	\$2,284	35.7%	\$1,397	19.2%
500,000-749,999	\$5,800	\$7,165	\$1,970	37.9%	\$1,366	23.5%
750,000-999,999	\$3,732	\$5,390	\$1,920	55.3%	\$1,658	44.4%
1,000,000-1,999,999	\$1,504	\$2,914	\$1,252	75.4%	\$1,410	93.8%
2,000,000 and over	\$991	\$1,996	\$1,115	126.5%	\$1,005	101.5%
Total	\$6,683	\$8,270	\$2,266	37.7%	\$1,587	23.8%

Table 5

<b>FY2011 - Impact of SFN Proposals on Maximum Allowable "Limited" Property Tax Levy by EQV per Student, K-12 Districts SFN Proposal FY2011 Compared to Current Law FY2011</b>				
Equalized Property Value per Student	Maximum Tax Levy Per Student		SFN Proposal Compared to Current Law	
	Current Law FY2011	SFN Proposal FY2011	Dollar Change per Student	Percentage Change per Student
Less than 250,000	\$1,771	\$1,838	\$68	3.8%
250,000-324,999	\$2,633	\$2,569	-\$64	-2.4%
325,000-400,000	\$2,957	\$2,871	-\$85	-2.9%
400,000-499,999	\$3,300	\$3,266	-\$34	-1.0%
500,000-749,999	\$5,072	\$4,898	-\$174	-3.4%
750,000-999,999	\$8,326	\$8,063	-\$263	-3.2%
1,000,000-1,999,999	\$10,054	\$9,931	-\$123	-1.2%
2,000,000 and over	\$13,069	\$13,792	\$723	5.5%
Total	\$4,247	\$4,146	-\$101	-2.4%

under the final SFN proposal. To make comparisons across years possible, the six descriptors, say enrollment, always reflect 2007 values. Table 5 compares the fiscal year 2011 maximum allowable property tax levy under current law to the distribution under the SFN proposal for school districts categorized by per pupil property tax base.

One goal of many members of the SFN was to create a school funding system that would assure that all school districts had enough financial resources to meet the student performance standards imposed by the state. To achieve such a goal, generally referred to as *adequacy*, requires that the allocation of state aid among school districts accounts for the capacity of school districts to raise revenue (primarily from the property tax) **and** for differences across districts in the minimum amount of money required to achieve the state's student performance goals. As a means of evaluating the success of any proposal in meeting this goal, we developed a measure of the fiscal health of school districts prior to the receipt of state aid. The fiscal health measure accounts for both the fiscal capacity of each district and the different costs each district faces in meeting the state student performance standards. Our measure of fiscal health is based on research on the fiscal condition of schools in Wisconsin conducted by Reschovsky and Imazeki (1997). In order to determine the amount of resources needed by each district, they estimated a cost function for Wisconsin's K-12 school districts based on data from the 1994-95 school year.<sup>14</sup>

The conceptual foundation of estimating a cost function rests on the assumption that decisions on education spending depend on the preferences of the residents of each school district. The fact that spending levels in nearly all Wisconsin school districts have been largely determined by a set of strict revenue controls since 1994 makes it difficult to interpret current spending levels as a reflection of the preferences of residents.<sup>15</sup> Rather than attempting to estimate a school district cost function using current data, we used the coefficients from the cost function regression equation estimated in Reschovsky and Imazeki, combined with data from the 2006-07 school year to develop a measure of the expenditure needs of each

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<sup>14</sup> See Duncombe and Yinger (2008) for a discussion of the methodological issues involved in estimating the costs of education.

<sup>15</sup> Bradbury and Zhao (2007) use Massachusetts data to estimate a cost function for municipal government services by accounting explicitly for the ability of local governments in Massachusetts to override the state's property tax limitation measure, Proposition 2½.

K-12 school district in 2006-07.<sup>16</sup> We then calculated the fiscal health of each school district as the gap between the expenditure needs and the revenue-raising capacity of each district, where revenue-raising capacity is measured as the average property tax rate among all K-12 districts multiplied by each districts' per pupil property tax base, plus the per pupil federal aid received by each district.

Using this measure of fiscal health, all school districts were placed in one of five groups: very weak, weak, average, strong, and very strong. Fifty-seven school districts, collectively educating about 15 percent of all K-12 students were classified as very weak, while 40 districts, educating 12 percent of students were classified as having very strong fiscal health. Table 6 shows the distribution by fiscal health of total state aid per student in FY 2011 under the SFN proposals compared to FY 2011 under current law.

### **Using the Model to Develop a Final Funding Proposal**

The SFN developed their initial school funding proposals in the absence of any information on the budgetary costs of their proposals or data on the proposals' impact on the receipt of state aid or on property tax levies of individual school districts. The members of the SFN realized that they needed the results of a simulation model before they could finalize any proposals. In this section we provide several examples of how the SFN proposals evolved as the impacts of their initial proposals were revealed.

Even before any simulation results were available, the very process of modeling the SFN proposals forced the SFN to refine or reconsider some elements of their initial proposal. The list of initial proposals included a number of items that were imprecisely defined. For example, the list included a revenue limit exemption for "school security expenses" and a relaxation of revenue limits for districts with particularly high special education costs. After a discussion about the difficulties involved in both modeling and implementing these proposals, they were dropped by the SFN.

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<sup>16</sup> The outcome measures used by Reschovsky and Imazeki (1997) were a value-added measure of student performance on a standardized test and the number of advanced courses offered in each school district. Cost factors included a teacher salary index, the percentage of students eligible for Free and Reduced Price Lunch, the percentage of students with disabilities, the percentage with severe disabilities, the percentage of total students enrolled in high school, the number of students in each district and the number of students, squared. The coefficients of their regression equation were multiplied by current data on the cost factors and used to develop a cost index. Each district's cost index value was then multiplied by average "shared costs" in 2006-07 to determine each district's expenditure needs.

Table 6

<b>FY2011 - Impact of SFN Proposals by District Fiscal Health, K-12 Districts</b>						
<b>Relative Fiscal Health</b>	<b>Total State Aid per Student</b>		<b>SFN Proposal FY2011 Compared to FY07 Actual</b>		<b>FY 2011 SFN Proposal Compared to Current Law</b>	
	<b>Current Law FY2011</b>	<b>SFN Proposal FY2011</b>	<b>Dollar Change per Student</b>	<b>Percentage Change per Student</b>	<b>Dollar Change per Student</b>	<b>Percentage Change per Student</b>
	Very Weak	\$8,316	\$10,815	\$3,125	40.6%	\$2,499
Weak	\$7,824	\$9,386	\$2,516	36.6%	\$1,563	20.0%
Average	\$6,992	\$8,479	\$2,304	37.3%	\$1,487	21.3%
Strong	\$6,128	\$7,428	\$1,945	35.5%	\$1,300	21.2%
Very Strong	\$3,699	\$4,959	\$1,608	48.0%	\$1,260	34.1%
Total	\$6,683	\$8,270	\$2,266	37.7%	\$1,587	23.8%

Once the modeling effort had been completed, the results led the SFN to both add and drop some provisions. In particular, the simulation results of the initial proposals raised two red flags for the SFN. The first was the high budgetary cost of the proposals and the second the relatively large potential property tax increases that many school districts would face. The model predicted that if the proposals had been implemented in fiscal year 2007, the state would have to immediately increase spending on school aid by 13.4 percent relative to actual state spending in fiscal year 2007. By fiscal year 2011, the model predicted that state spending on elementary and secondary education would be \$7.1 billion, \$443 million higher than state spending under current law projections in that year. Reflecting the loosening of revenue limits as proposed by the SFN, the model predicted that in fiscal year 2008, 179 of the state's 425 school districts would be allowed to raise property taxes higher than under current law. By fiscal year 2011, 419 districts would be able to increase property taxes by more than would be allowed under current law. While we emphasized to members of the SFN that the fact that school districts would be allowed to raise property taxes does not mean that districts would actually use this increased taxing authority, many SFN members were convinced that large increases in the maximum allowable property tax increase would prove to be politically unpopular.

The SFN's concern about the first-year budgetary cost of their proposal and its impact on allowable property tax levies, led them, over a period of several months, to propose a series of major changes to their initial proposal. Several of the changes involved tightened revenue limits. First, and quantitatively most important, was the dropping of a so-called "low-revenue adjustment" proposal that would have allowed 227 low-spending districts to increase spending (technically shared costs) up to the state's secondary cost ceiling ( $F_s^*$ ), which under another SFN proposal would be raised to 100 percent of districts' average shared costs per member (\$9,169 in FY 2007).

Several months before dropping the low-revenue adjustment, the SFN removed a provision that would have provided one-time funding for low-spending districts so they could increase their revenue up to the level of the secondary cost ceiling without raising property taxes any more than they would have under current law. This provision was dropped once it became clear that not only would it increase state

costs by \$200 million, but the benefits of lower property taxes would only last for one year. On the other hand, after seeing that some school districts would receive less general equalization aid in the first year of the proposal than they received in the previous year, the SFN decided to add a one-year hold-harmless provision for equalization aid to their proposal.

In order to reduce the large budgetary impact of the proposal in the first year of its implementation, the SFN decided to phase in the new poverty categorical aid program over a five-year period. Under the initial proposal, districts received a \$2,000 grant for each student eligible for Free or Reduced Price Lunch, with the per pupil amount to be indexed for inflation. Using CPI projections published by the Wisconsin Department of Revenue, we calculated that the poverty categorical would provide a per student grant of \$2,245 in FY 2011. Under the phase-in proposal, the \$2,000 amount would be reached in five equal \$400 increments. Thus, the poverty categorical would be \$400 per eligible student in FY 2007, \$800 in the second year, and so on. Over five years, this phase-in proposal would save the state \$870 million.

The original SFN proposal mandated that each year the state's share of education funding be set at two-thirds of "partial revenues." As a means of reducing allowable increases in property tax levies in fiscal years 2010 and 2011, the final proposal set the state's share of "partial revenues" at 65 percent in FY 2007 and raised it by one percentage point until it reached 69 percent in FY 2011. Although this change did reduce allowable property tax increases, it also raised the budgetary cost to the state in FY 2011 by 15.5 percent.

The impact of all the changes made between the initial and the final SFN proposals on state budgetary costs and on allowable property tax increases (or required tax cuts) are summarized in Table 7. The final SFN proposal substantially reduced the first year state budgetary costs of school funding reform. Whereas the initial proposal called for 21.3 percent growth in total state spending compared to current law in the first year, the final proposal increased spending by 12.0 percent. By FY2011, the two proposals would result in similar spending increases relative to current law spending in that year: 23.9 percent for the original proposal versus 23.7 percent for the final plan.

Table 7

	<b>Differences Between the Initial and Final SFN Proposals</b>			
	<b>Fiscal Year 2007-08</b>		<b>Fiscal Year 2010-11</b>	
	<b>Initial Proposal</b>	<b>Final Proposal</b>	<b>Initial Proposal</b>	<b>Final Proposal</b>
Total State Education Aid (in millions of dollars)	\$6,288	\$5,804	\$7,116	\$7,100
Percent Increase Relative to Current Law	21.3%	12.0%	23.9%	23.7%
Maximum Allowable Property Tax Levy (in millions of \$)	\$3,525	\$3,378	\$4,076	\$3,695
Average Percentage Change Relative to Current Law	0.1%	-4.1%	7.9%	-2.2%
Tax Cuts Required				
No. of Districts	246	357	6	120
Percent of total students	64%	80%	2%	23%
Tax Increases Allowed				
No. of Districts	179	68	419	305
Percent of total students	36%	20%	98%	77%

The data in Table 7 also demonstrate that while the initial SFN proposal would have led to substantial property tax increases, the changes made in the final proposal resulted in property tax reductions for the most school districts.

While the overall cost of the final proposal was significantly less than the initial proposal, the final proposal was not quite as successful at targeting this aid to districts with the weakest fiscal health. Primarily because the poverty categorical aid program is phased in over five years in the final proposal, the initial proposal does a notably better job targeting aid to needy districts in the first year of the simulation. By fiscal year 2011, when all elements of the proposal are fully phased in, the differences between the initial and the final proposal in targeting aid to districts in the weakest health is relatively small. In the original proposal, state aid to districts in very weak fiscal health increased by 42.7 percent between FY 2007 and FY 2011. In the final proposal, the aid increase to that group of districts was 40.6 percent. Also,

districts in very strong fiscal health would receive a larger share of state aid in the final proposal than they did in the original proposal.

### **Measuring the Responses of School Districts to the Reform Proposals**

Revenue limits have been imposed on school districts in Wisconsin since 1994. With only a few exceptions, school districts have chosen to take full advantage of their ability to levy property taxes, each year raising property taxes up to their revenue limit. The SFN proposal would dramatically change the fiscal environment. It would result in substantial increases in state aid to many school districts and loosen the revenue limits.

The question we address in this section is how would local school districts respond to the new aid and to the new freedom to levy additional property taxes. Will local school districts respond to additional categorical grants by increasing overall spending by the full amount of the grant, or would they choose to increase spending by less than the value of the grant, thereby freeing up some funds that could be used for property tax relief. The empirical evidence suggests that in general a dollar increase in a grant results in less than a dollar of additional education spending. Fisher and Papke (2000) in a recent survey of the literature on local government responses to education grants cite a number of empirical studies that find that even highly specific categorical grants are fungible, with spending on education increasing by less than the full amount of the grant. There is anecdotal evidence that in the late 1980s and early 1990s many legislators in Wisconsin expected school districts to utilize legislated increases in state aid to finance property tax relief. The fact that substantial portions of the aid were used to increase school spending may well have motivated the Wisconsin legislature to enact the revenue caps.

In FY 2007, Wisconsin allocated \$508 million in categorical aid to its local school districts. Under the final SFN proposal this amount would increase by \$437 million, (86 percent) in FY 2008. By FY 2011, categorical aid would increase by 174 percent compared to FY 2007 under current law. General aid would also increase, but by only 3.6 percent between FY 2007 and FY 2008 and by a cumulative 20.5 percent by FY 2011. For most districts the marginal dollar of general aid is allocated through a matching

formula. Although most general aid increases will be modest, under the final SFN proposal, many districts would experience large matching rate, and hence, tax-price changes. Overall, the reform proposals would raise tax-prices for a small number of districts and result in tax-price reductions for about 150 school districts. Finally, the final SFN proposal would increase the aggregate revenue limit by \$391 million (5 percent) between FY 2007 and FY 2008. By FY 2011, the revenue limit would increase by an additional \$1.14 billion, or 13.8 percent.

Both the theoretical and the empirical literature on responses to grants suggest very strongly that school districts will not use every dollar of available grant money to increase education spending. As a result most school districts will choose property tax levies that are below the amount allowed by the revenue limits. We have struggled to develop a tractable method for predicting the property tax levies that individual districts will chose if the SFN school funding proposal were to be enacted.

A standard way to assess how school districts will respond to additional school aid would be to estimate a grant elasticity (for categorical aid) and a tax-price elasticity (for matching aid) and utilize these estimated elasticities to predict both spending increases and tax reductions in response to the SFN proposals. Unfortunately, the fact that school district fiscal behavior has been severely constrained by the revenue limits for the past 14 years makes it impossible to directly estimate these elasticities using Wisconsin data.

Even if we could determine a tax-price elasticity, the complexity of Wisconsin's system of equalization aid and its interactions with the revenue limits make it difficult to determine the extent to which members of local school boards would be aware of the tax-price changes that would emerge as a result of the SFN funding proposals.<sup>17</sup> Because of this complexity and because tax-price elasticities associated with education grants have generally been found to be quite low (Fischer and Papke, 2000), in this paper we will make no attempt to predict school district behavioral responses to changes in tax-prices associated with changes in the equalization aid formula.

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<sup>17</sup> Maher and Skidmore (2008) present evidence from school bond referenda in Wisconsin that voters may be aware of changes in tax-prices due to changes in state aid formulas.

Our simplified approach is based on the assumption that a dollar increase in categorical grants will lead to an increase in education spending of less than a dollar. Specifically, we assume that a dollar increase in categorical aid will be reflected in an 80 cent increase in spending and a 20 cent reduction in property taxation in a school district with the state median income. Although this assumption implies a grant elasticity on the high end of the range of elasticities reported in the literature, we assume that after years of spending restrictions imposed by the revenue limits, school districts will be under great pressure to increase spending, in effect facing considerable pent-up demand. Thus, for each year and for each school district we predict a smaller increase or a larger decrease in property tax levy than that calculated in the “baseline” model discussed above. The actual predicted change in levy is calculated by subtracting 20 percent of the dollar change in categorical aid from the maximum allowable change in property tax levy under revenue limits.

The empirical literature on the demand for education provides clear evidence of a positive income elasticity of demand for education (Fisher and Papke, 2000). This would be consistent with the hypothesis that a dollar increase in categorical aid in a high-income school district is likely to lead to greater spending (and a smaller property tax reduction) than in a low-income school district. To reflect the likelihood that the response to an increase in categorical aid may differ in school districts with different levels of average household income, we assume that school districts with above average median incomes will increase education spending by an above average amount while school districts with below average median incomes will increase spending by a below-average amount.<sup>18</sup> In the school district with the lowest median income, we assume that a dollar increase in categorical aid will result in a 71 cent increase in education spending and consequently a 29 cent decrease in property taxes, while in the state’s highest median income district, we assume that property taxes are only reduced by 8 cents per dollar of increase in categorical aid.<sup>19</sup>

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<sup>18</sup> The data on median household income was provided by the Wisconsin Department of Revenue.

<sup>19</sup> The exact percentage of the increase in categorical aid used for property tax relief depends on the ratio between a district’s median income and the state median income. Using this ratio, we adjust the percentage in each district so

Modeling school district spending and taxing behavior based on the assumptions listed in the previous paragraphs results in \$279 million, or 1.9 percent, lower school property tax levies over the FY 2008 to FY 2011 period compared to the “baseline” model in which we assumed that all school districts levied taxes up to the maximum allowed under revenue limits. There is also a dramatic decline in the number of districts that would face increases in their allowable levies in FY 2011; 305 districts in the baseline model compared to 91 districts once we account for school district responses to increased aid. Because the formula used to determine the state’s share of education funding includes property tax levies in its definition of “partial revenue,” lower property tax levies result in less required state equalization aid. Accounting for school district behavioral responses to aid, over the FY 2008 to FY 2011 period, state equalization aid would be \$359 million, or 1.7 percent, lower.

Adopting the behavioral assumptions described above instead of the initial SFN assumption that every dollar of increased categorical aid will lead to a full extra dollar of spending on education has the largest impact on school district in relatively weak fiscal health. This is because these school districts generally receive larger than average increases in categorical aid under the SFN proposals and have lower than average median incomes. Although, as indicated in Table 6, districts in the weakest fiscal health would receive relatively large infusion of state aid under the SFN proposals, they would be more likely than districts in better fiscal health to devote a larger share of this new funding to property tax relief.

To explore the impacts of our assumption that a school district with state median income would utilize 20 percent of any increases in categorical aid for property tax relief, we studied the effects on total tax levies and equalization aid of lowering the 20 percent figure to 10 percent and raising it to 50 percent. The results of this exercise are shown in Table 8. As expected, increasing the percentage leads to larger property tax cuts and smaller increases in equalization aid, and decreasing the percentage has the opposite effects. The magnitudes of the changes, however, are quite modest. For example, in fiscal year 2008,

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that a district with a median income twice the state median will use 10 percentage points less for property tax relief, and a district with a median income half the state median will use 10 percentage points more for property tax relief.

Table 8

<b>Percent of Categorical Aid Used for Property Tax Relief The Impact of Different Assumptions</b>				
	<b>Baseline</b>	<b>Low</b>	<b>Middle</b>	<b>High</b>
Percent of Increased Categorical Aid Used for Property Tax Relief	0%	10%	20%	50%
<b>FY 2008</b>				
Property Tax Levy (\$ Millions)	\$3,378	\$3,338	\$3,316	\$3,247
Percent Change Relative to Current Law	-4.1%	-5.2%	-5.8%	-7.8%
State Equalization Aid (\$ Millions)	\$4,858	\$4,830	\$4,801	\$4,714
Percent Increase Relative to Current Law	4.9%	4.3%	3.6%	1.8%
<b>FY 2011</b>				
Property Tax Levy (\$ Millions)	\$3,695	\$3,640	\$3,613	\$3,531
Percent Change Relative to Current Law	-2.2%	-3.6%	-4.4%	-6.5%
State Equalization Aid (\$ Millions)	\$5,707	\$5,644	\$5,583	\$5,400
Percent Increase Relative to Current Law	12.3%	11.1%	9.9%	6.3%
<b>FY2008-FY2011 Four Year Total</b>				
Property Tax Levy (\$ Millions)	\$14,348	\$14,162	\$14,071	\$13,792
Percent Increase Relative to Current Law	-2.3%	-3.6%	-4.2%	-6.1%
State Equalization Aid (\$ Millions)	\$20,986	\$20,805	\$20,627	\$20,092
Percent Increase Relative to Current Law	8.7%	7.8%	6.8%	4.1%

assuming that districts on average use 50 percent of categorical aid increases for tax relief instead of 20 percent results in a \$69 million decrease in estimated property tax collections and an \$87 million decrease in state equalization aid. Although large numbers, both changes are only about 2 percent of tax levies and equalization aid, respectively.

### Conclusions

In most states, the system of education funding is extremely complex. The actual school funding systems generally bear little relationship to the textbook versions of school funding systems which describe a system relying on one or more relatively simple formulas used to allocate state aid to local school districts. In reality, the school funding systems in many states rely on complicated formulas that include various mechanisms for protecting districts from losing aid from one year to the next, and often include

features designed to benefit a handful of politically powerful school districts. Reforming such complex systems is never easy. Starting with a clean slate is almost never possible; reform efforts are almost always constrained by the necessity of building upon an existing system.

Our efforts working with school reformers in Wisconsin suggests that having an analytic tool that is capable of providing answers to a range of questions about the impacts of alternative reform proposals can play an important role in facilitating the development of serious school funding proposals.

Although computer simulation models of school funding formulas have been constructed in many states, the model we built for the School Finance Network in Wisconsin has several features that are, to our best knowledge, not present in other models. We emphasize the following features of our model:

- The Wisconsin model includes all elements of the state’s school funding system. This includes the state’s major equalization aid formula plus a long list of categorical grants. We also model the impacts of a legislatively-imposed limit on annual revenue increases by local school districts, and a statutory formula used to determine the state’s annual financial commitment to the funding of public education as a share of total revenues across all school districts (excluding federal aid).
- As any major reform will almost certainly include elements that are phased in or phased out over time, we have modeled the Wisconsin school funding system over a five-year period. Although a multi-year model requires that we must forecast the values of important variables, such as student enrollment per district, into the future, the ability to predict impacts of reform measure over time greatly enhances the usefulness of any modeling effort.<sup>20</sup>
- To accurately isolate the impact over time of adopting any school funding reform proposal, it is important to be able to compare the impacts of the reform—in terms of grant amounts, property tax levies, and spending—in future years to the situation in those years if the reform had not been adopted. To accomplish this comparison, we constructed two parallel models, one of current law over the five-year period, and one of alternative reform proposals.
- Given the importance of the property tax in the funding of public education in the U.S., it is not surprising that many school funding reform proposals include efforts to reduce school property taxes. In our Wisconsin model, we assess the impact of any reforms on school property tax levies and rates in each local school district.
- The impact of any change in state aid on education spending and property tax levies depends on choices made by local school districts. In the Wisconsin model, we have taken initial steps to model the choices made by local school districts in response to increases in categorical aid. We hypothesize that higher income school districts will use a larger share of increases in categorical aid to increase spending as opposed to reducing property tax levies.

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<sup>20</sup> In a recent paper, Zhao and Bradbury (2009) analyze municipal grant formulas using a five-year model.

- Although any school funding model must be able to provide information on the impact of any reform proposal on individual school districts, in our view it is important that models also provide an easy assessment of whether reform proposals achieve broad policy goals in terms of equity and educational adequacy. To accomplish this, our Wisconsin model generates a series of summary tables and statistics that allows policymakers to quickly determine the extent to which any proposal enhances equity and/or adequacy.
- To assist in the assessment of alternative funding reforms, the Wisconsin model includes an estimate of the *fiscal condition* of each local school district. School districts are in relatively weak fiscal health if there exists a large gap between the costs of providing their students with an adequate education and the amount of property tax revenue they can raise at a standard property tax rate. Adequacy is measured in terms of state student performance goals. School funding reforms are most likely to be successful in closing achievement gaps if they target aid to school districts in the weakest fiscal health.
- Our experience in Wisconsin demonstrated that developing a school funding proposal is a long and complex process. We constructed the Wisconsin model to be a highly flexible tool able to analyze a wide set of alternative school funding proposals. Switches were created so that it is very easy to include or exclude any given elements in a reform proposal. In addition, all numerical values, such as dollar values per student of various categorical grants, were parameterized. The model was also constructed so that any changes are automatically reflected in all descriptive tables and summary statistics. It is thus possible to provide policymakers with information about the impact of any proposed changes in a timely fashion.

This paper is about designing and facilitating school funding reform. Although it is too early to know whether reform efforts in Wisconsin will be successful, we are confident that our ability to provide members of the School Finance Network with detailed information and analysis about the impacts of various school funding proposals enabled them to develop a set of credible reforms. The details of school funding systems vary across states. However, similar efforts to construct school funding models in other states can provide powerful tools to assist in the development and analysis of school funding reform efforts.

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