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Adequacy Approach in School Finance

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ABSTRACT

In many parts of the world, the focus of school financing has been on fiscal equity. However, school finance in the United States has been repositioning itself to provide for fiscal adequacy as well as improving equity since the 1990s. This article reviews adequacy in school finance, both from the conceptual and methodological perspective. Conceptually, adequacy is framed around the notions of adequacy of educational inputs, adequacy in school processes, and adequacy of educational outputs. From empirical perspective, four different methods are applied to quantify adequacy. Policy makers in developing countries should shift to fiscal adequacy which emphasizes on adequate per student funding for schools to deploy successful educational strategies in educating students to high performance standards.

Keywords: **school, finance, adequacy.**

INTRODUCTION

In many parts of the world, the focus of school financing has been on fiscal equity. There are two alternative definitions of equity in school finance. Horizontal equity emphasizes on equal funding across schools and school districts. Schools and school districts are considered to be similar to each other with respect to the cost of providing basic education, such as wealth, size and socioeconomic status (Toutkoushian & Michael, 2007). On the other hand, vertical equity states that for education funding to be equitable, school districts that comprise of students that are more costly to educate (such as student from lower socio economic groups or indigenous populations) should receive more funding than their counterparts to compensate for such variance (Lefkowits, 2004; The World Bank, 2012). In other words, this means states will make adjustments in their funding formulas to allocate more money to schools with more needs. For example, Kansas increases per-pupil funding levels for students who are receiving free lunch by 10 percent (Toutkoushian & Michael, 2007).

However, the fiscal equity approach does not guarantee that funds would be channeled productively toward the goal of academic achievement. In other words, there is no assurance that students from advantaged and disadvantaged backgrounds would have equal opportunities, or that the educational opportunities for all students would be sufficient to accomplish the desired outcome of their full involvement in the civil and economic life of the community. Even though there have been initiatives to equalize funding allocations for disadvantaged students, people are disputing on the amount of educational funding that can be considered as sufficient for a state to meet its educational obligations (Ladd, Chalk & Hansen, 1999).

For most of the 20th century, the emphasis of school finance in the United States has been merely on fiscal equity. But, starting from 1990's, school finance has been repositioning itself to provide for fiscal adequacy as well as improving equity. Wise (1983) contended that the "adequacy" stems from a landmark federal case, San Antonio Independent School district v. Rodriguez (1973). However, three decades later, people are still disputing on the ways to operationalize this term. Guthrie (1983) also noted that it is difficult to define "adequate" with respect to education. An equitable financial system is one that reduces to a "reasonable level" the disparity in spending across a state's districts. In contrast, adequacy requires that spending reach some minimum threshold level in each district. This means an adequate school finance system is the one that provides sufficient funding for students in each district to achieve state standards of performance (Downes & Stiefel, 2008). The amount that is adequate varies from one district to another depending on the context in that state.

In many developing countries, the focus of educational financing is still to address equity issues. However, the benchmark of the new school finance is whether it provides adequate per student funding for districts and schools to deploy educational strategies that are successful in educating students to high performance standards. Thus, this article reviews the concept of adequacy in school finance, both from the conceptual and methodological perspective. Adequacy is framed in a holistic nature-that is adequacy of educational inputs, adequacy in school processes, and adequacy of educational outputs (Alexander, 2004). This article also describes various techniques applied by researchers and policy analysts to translate the concept of adequacy into quantitative measures. It is hoped that this article will provide a clear framework and empirical evidence for policy makers especially in developing countries to adopt the concept of adequacy in school finance.

The organization of this paper is as follows: Section 2 defines adequacy. Section 3 provides the conceptual mapping of adequacy in the literature. Section 4 discusses the four main methodological approaches, their strengths and weaknesses. Finally, section 5 concludes the paper.

DEFINING ADEQUACY

The term "education adequacy" seems to connote a very minimal sense of what a basic education should be. But, courts have arrived at an understanding of "adequate" that, in essence, means a basic "quality" education that provides students with the essential skills needed to function productively in contemporary society (Rebell & Wolff, 2006, p.19). Below is a virtual consensus among the many state courts that have dealt with this issue:

- The statutory standard for a basic quality education is an education that prepares students to (1) perform productively as capable voters, jurors and civic participants in a democratic society; and (2) compete effectively in the economy.

- The knowledge and skills that students require to be effective citizens and workers are (1) sufficient proficiency in English language and appropriate knowledge of fundamental mathematics and physical science to enable them to perform in a complex and rapidly changing society; (2) sufficient fundamental knowledge of geography, history, and basic economic and political systems to enable them to make informed decisions with respect to issues that affect their personal, communities, states and nation; (3) sufficient intellectual tools to evaluate complex issues and sufficient social and communication skills to work well with others and communicate ideas to a group; and (4) sufficient academic and vocational skills to enable them to compete on an equal basis with others in further formal education or gainful employment in contemporary society.

- The essential resources needed for students to acquire this knowledge and these skills are (1) qualified teachers, principals and other personnel; (2) appropriate class sizes; (3) high-quality early childhood and preschool services; (4) adequate school facilities; (5) supplemental programs and services for students from high-poverty backgrounds including summer and after school programs; (6) appropriate programs and services for English language learners and students with disabilities; (7) instrumentalities of learning including, but not limited to, textbooks, libraries, laboratories and computers; and (8) a safe, orderly learning environment (Rebell & Wolff, 2006, p.19).

CONCEPTUAL MAPPING OF ADEQUACY IN THE LITERATURE

Guthrie (1983) focused on political and market mechanisms used in defining adequacy. However, Alexander (2004) defined this notion in terms of adequacy levels in different aspects of schooling (p. 85) and this is consistent with the work by Miner (1983) in which, "adequate" is defined as the average level of resources used around the nation for key schooling processes, including transportation, food, administration and others. Alexander (2004) frames

the discussion of adequacy around the notions of adequacy of educational inputs, adequacy in school processes, and adequacy of educational outputs.

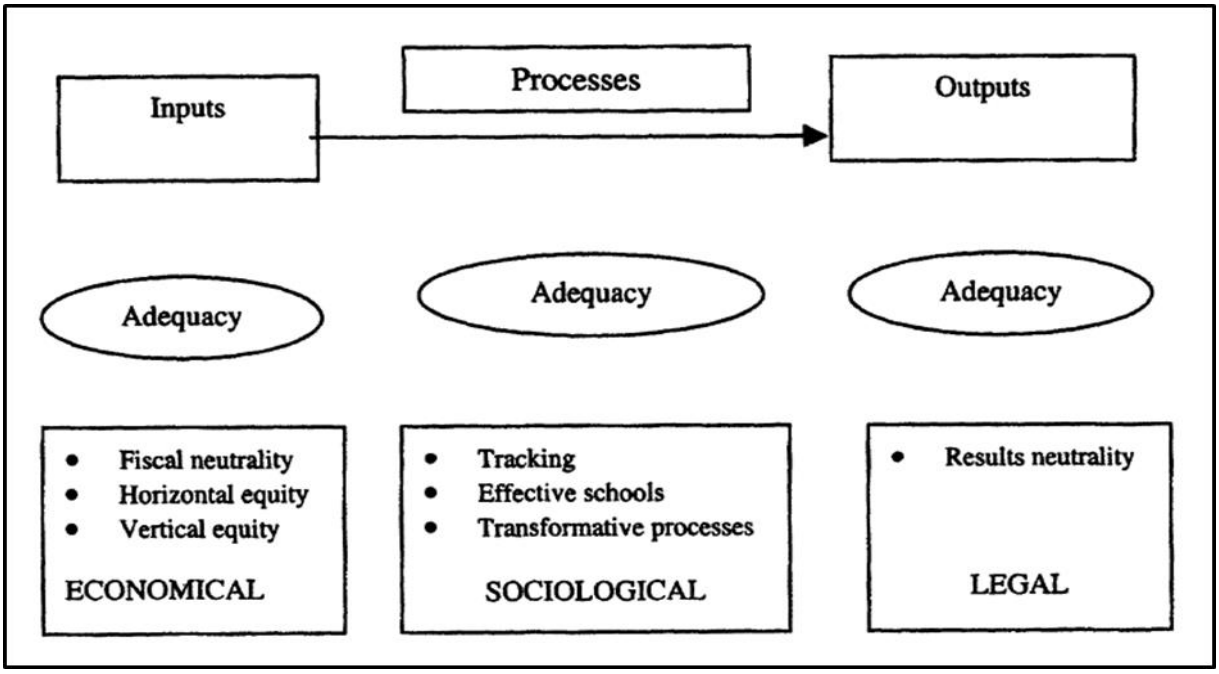

Figure 1. A Conceptual Mapping of Adequacy in the Literature (Source: Alexander, 2004; pp. 87)

Adequacy of Inputs

As illustrated in Figure 1, adequacy of inputs associated with past research on equity of resource allocations, in which fiscal neutrality, horizontal equity, and legitimate differences serve as important guidelines for policy makers who seek to be on the right equity path. In this case, the focus was to ensure equal distribution of resources or unequal distribution of resources with legitimate reasons.

Alexander (2004) argues that one way to view the issue of resource allocation is to identify the inputs of education process and to determine how these inputs can be translated into an educated adult. The assumption can be that the quality of output depends on both the quality and quantity of educational inputs. Various incentive plans such as merit pay, standardized testing and others can be initiated to ensure quality inputs.

For instance, Odden & Kelly (1997) advocated for a change in the teacher-compensation structures to provide the proper incentives to schools and teachers to produce adequate student output. Meanwhile, the quantity of inputs may be determined by the use of minimum foundation programs.

Adequacy in Schooling Process

In order to ensure an adequate level of education, it is important to determine how the resources are utilized in the context of schooling. Bishop (1996) argued that policy makers have the power to influence the quality of schooling, including student learning. Previous research indicates that the quality of curriculum to which a student is exposed also affects the quality of learning that takes place (Oakes, 1990). There are assumed linkages between processes and student performance, where some pedagogical approaches and curriculum can be effective in improving students' academic performance.

Alexander (2004) contends that the initial step for adequacy researchers is to document the status quo in terms of curriculum and performance standards of students. Then, initiatives are taken to change the status quo. This is because the status quo enables researchers to identify whether students are performing below the level required by the new standard. If the students' performance is below the required standard, then funding for adequacy might bring modifications to the budgetary bottom line.

Adequacy in Schooling Output

In an adequacy framework, the question is whether there is sufficient allocation to meet the cost of providing the standard guaranteed in the state constitution. The objective of school funding is to ensure that the funds are channeled to the educative events that results in high student performance. Within the context of test scores, the value-added measure helps to differentiate between students' achievements due initial ability and those affected by the level of schooling received. However, limiting the scope of schooling output to test scores undervalue additional functions carried out by schools (Herrington & Weider, 2001).

APPROACHES TO DETERMINE AN ADEQUATE FUNDING FOR SCHOOLS

Basically, there are four main methodological approaches that have been developed to determine adequate funding levels to achieve particular goals (Odden, 2000). The aim of any method of calculating adequate spending is to determine the cost of "achieving" a specified level of student performance that is the least amount of per pupil spending needed to achieve the targeted level of student performance.

The Professional Judgment Approach

It relies upon a panel of experts to determine on the level of resources required to attain a high quality learning environment. First, the decision is made with respect to the type and amount of required resources. Second, they are assigned costs. Resources that are priced include personnel, class size, materials, supplies, technology and

equipment. Third, the costs are then summed to produce a total spending amount. Forth, in order to estimate an overall cost per student, cost for elementary, middle, and high schools can be added up with district level costs.

The district level costs include those expenditures that are in addition to school site expenditures, such as district administration or those expenditures that cannot be disaggregated to school sites such as plant maintenance and operation. This approach allows user to determine a base cost and then adjustments can be made to the base in the case of special or high-cost programs (Odden, 2000; Downes & Stiefel, 2008).

For instance, in a recent research in New York State, Chambers et al (2004) used an enhanced professional judgment model to calculate the cost of an adequate education. There are three main features that differentiate the New York model from other recent professional judgment models (e.g., MAP, 1997, 2001; Augenblick, 1997, 2001; and Augenblick & Myers, 2003). First, the goals established for the professional judgment panels were based on learning standards determined by the states. In this case, the emphasis was on students' outcome. Second, the professional judgment panels started their deliberations by designing instructional programs for each level of schooling. Once the content and structure of the educational programs were determined, panels were asked to develop resource specifications that are required to deliver the desired services. The professional judgment process was organized in an integrated way to meet the needs of all types of students.

In another study, Chambers, Levin & DeLancey (2006) estimated the cost needed to provide an adequate educational program for California public schools. Two independent panels (blue panel and gold panel) consisting of highly qualified educators were selected to carry out a series of tasks over a three day meeting.

First, each panel developed a "base model" instructional program for elementary, middle and high schools reflecting demographic levels of "typical" California schools at each level (particularly a school with median percentages of students receiving free and reduced-price lunch, English Language Learners, and students receiving special education services and at the median school size). Second, each panel was asked to use input worksheets in MS Excel to indicate the resources necessary to deliver that program. Then, each panel need to make modifications for schools with varying demographic compositions and sizes.

The adjustments were made for schools with low and high poverty levels (based on the number of students receiving free or reduced lunch) for elementary, middle and high school levels. To ensure efficiency in the process, each of the full panels was divided into three independent sub-panels. Each sub-panel followed a similar series of tasks and modified the program design and resources based on schools with varying numbers of English learners, students receiving special education services, and of varying size. This is because there is high correlation between poverty and ELs. Thus, the demographics of schools addressed through the EL and poverty tasks were linked in order to provide schools that are more representative of those found throughout the state.

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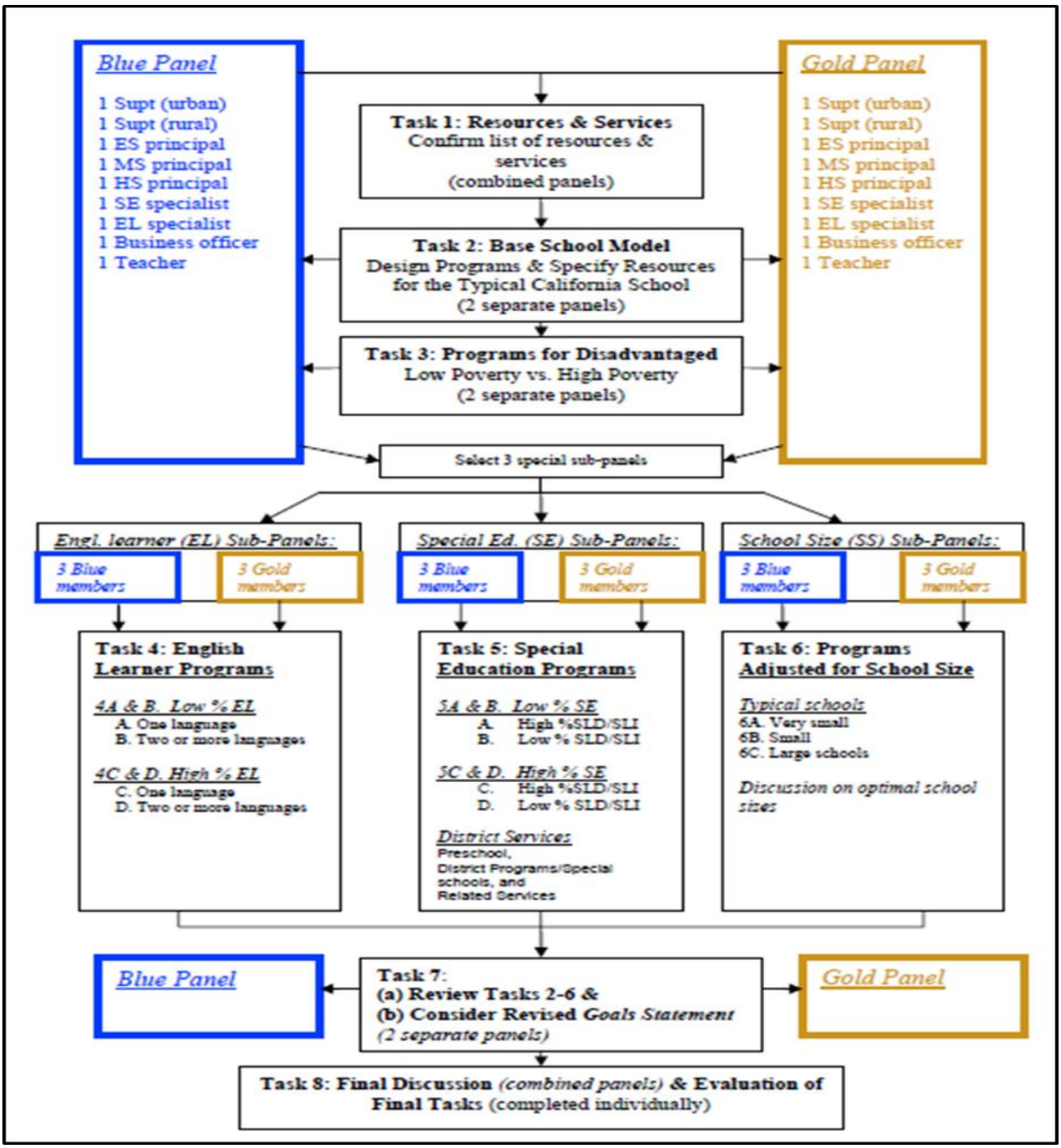

Figure 2. Flow Chart of PJP Tasks and Activities (Source: Chambers, Levin & DeLancey, 2006; pp. 12)

Elementary School Base Program

As seen in the Table 1, the main difference between panel specifications in the base model occurred in the level of funds allocated for support personnel and for non-personnel expenditures. While one panel specified the need for a full time social worker, school nurse, guidance counselor and technical assistant, the other panel contends that these services could serve as part-time positions or that their responsibilities could be subsumed by other personnel. This difference accounts for a large proportion of the difference in cost between the two panels (Chambers, Levin & DeLancey, 2006).

Table 1
Breakdown of Expenditures for Elementary School Base Model Programs developed by Professional Judgment Models

Resources	Blue Panel		Gold Panel	
	Per-pupil Cost	Proportion	Per-pupil Cost	Proportion
Instructional Personnel	$5,682	0.59	$5,768	0.78
Instructional and Pupil Support	$1,667	0.17	$280	0.04
Administrative and Support	$693	0.07	$559	0.08
Maintenance and Operations	$85	0.01	$212	0.03
Non-Personnel Expenditures	$733	0.08	$482	0.07
Extended Day Program	$290	0.03	$91	0.01
Extended Year Program	$465	0.05	$0	0.00
Total	$9,614	1.00	$7,392	1.00

(Source: Chambers, Levin & DeLancey, 2006; pp. 28)

Middle School Base Program

Table 2 shows that the proportion of per-pupil expenditures for each of the instructional components (i.e., classroom teachers, non-personnel expenditures, etc.) specified by the two panels was almost identical. Similar to the elementary school programs, both panels increased the length of the school day and added additional personnel to reduce class size.

In addition, personnel for the elective classes was added to both instructional programs in order to provide opportunity for all students to obtain all content standards and provide release time to core teachers for planning, collaboration and work with small groups of students.

Table 2

Breakdown of Expenditures for Middle School Base Model Programs developed by Professional Judgment Models

Resources	Blue Panel		Gold Panel	
	Per-pupil Cost	Proportion	Per-pupil Cost	Proportion
Instructional Personnel	$6,175	0.69	$5,453	0.69
Instructional and Pupil Support	$868	0.10	$1,036	0.13
Administrative and Support	$557	0.06	$597	0.08
Maintenance and Operations	$44	0.00	$308	0.04
Non-Personnel Expenditures	$755	0.08	$475	0.06
Extended Day Program	$244	0.03	$30	0.00
Extended Year Program	$262	0.03	$0	0.00
Total	$8,905	1.00	$7,899	1.00

(Source: Chambers, Levin & DeLancey, 2006; pp. 29)

High School Base Program

Similar to the middle school instructional program, the proportion of per-pupil expenditures for each of the instructional components was almost identical between panels. However, the Blue Panel allocated a much higher levels of resources to create smaller class sizes, offer more electives to keep students engaged and facilitate smaller learning communities. In addition, this panel also allocated more academic coaches, technical consultants and other support personnel to achieve the desired outcomes. These increases in personnel are the main factors behind the differences in per-pupil costs between the two panels (Chambers, Levin & DeLancey, 2006).

Table 3

Breakdown of Expenditures for High School Base Model Programs developed by Professional Judgment Models

Resources	Blue Panel		Gold Panel	
	Per-pupil Cost	Proportion	Per-pupil Cost	Proportion
Instructional Personnel	$6,103	0.66	$4,905	0.70
Instructional and Pupil Support	$1,181	0.13	$545	0.08
Administrative and Support	$616	0.07	$550	0.08
Maintenance and Operations	$53	0.01	$289	0.04
Non-Personnel Expenditures	$947	0.10	$536	0.08
Extended Day Program	$165	0.02	$79	0.01
Extended Year Program	$219	0.02	$131	0.02
Total	$9,285	1.00	$7,035	1.00

(Source: Chambers, Levin & DeLancey, 2006; pp. 30)

Even though this approach seems sensible, it has at least three drawbacks. First, there are no clear selection criteria for the expert panel. Second, there might be conflict of interest among the experts. Third, the judgments made by these experts are likely to be subjective. Thus, there is possibility for the decision to be made at the expense of efficiency.

The Econometric Approach

The econometric or ''cost-function'' approach applies econometric modeling to investigate the relationship between costs and education outcomes. The outcomes are commonly reflected by students' achievement. Since the data on test scores are easily available in most circumstances, this measure becomes a popular measure of achievement.

However, it is important to take note that there are other important measures such as graduation rates, students or parents' satisfaction or delayed effects (arise from college attendance or employment rates). In the econometrics modeling, the costs are related in a statistical model to achievement and school characteristics. Then, the predicted costs are then calculated for a desired level of achievement. Researchers usually start with the concept of a production function to education, in which educational outcomes are function of inputs (X). Implicit in this production relationship is a cost function:

$C=pX=c(Q,p,A)$ ... 1

Where C is cost per pupil, p consists of input prices, X consists of input to the production process, and Q consists of output of the production process, A consists of variables that measure the attributes of the school district and its students that influence its cost, and c(.) is the functional form that relates costs to its determinants.

The cost function enables researchers to estimate the cost of obtaining each set of outputs conditional on input prices and district and student characteristics (Imazeki & Reschovsky, 2006; Imazeki, 2006).

In terms of regression analysis, a cost function can be represented by the following equation:

$Sit = h(Tit, Pit, Zit, Fit, \varepsilon it, uit),$ … 2

where per-pupil expenditures in district i in year t (Sit) are specified as a function of public school performance (Tit), a vector of input prices (Pit), the characteristics of the student body (Zit), other characteristics of the school district such as its size (Fit), a vector of unobserved characteristics of the school district (εit) and a random error term (uit). Once a functional form is chosen for equation (2), it can be estimated with district-level data for a given state.

The resulting coefficients indicate the contribution of various district characteristics to the cost of education, holding constant the level of performance. The cost function can then be used to predict the cost of any given level of performance. This is done by multiplying the cost function coefficients by the actual values of the student and

district characteristics while setting the performance variables equal to the desired level. Thus, for each district, we can predict the minimum amount of allocation that is needed to achieve numerous educational performance goals, given the characteristics of the school district and its student body (Imazeki & Reschovsky, 2006).

Base costs[1] are determined as the minimum costs predicted using the cost function. Marginal costs[2] are also easily determined since the coefficients reflect the additional spending required for higher values of a specific cost factor, holding others constant. Although the econometric model is regarded as more complex than other methods, this approach is the only methodology that directly quantifies the relationship between outcomes and costs for districts with various characteristics (Downes & Stiefel, 2008).

[1] Base cost refers to the cost for a district with relatively low levels of poverty, few English Learners, etc. to achieve the state standard. Base cost may differ across time or across states due to differences in standards (e.g., if states raise their performance standards, the base cost will increase) or differences in regional price levels (e.g., southern states may have lower base costs than northeastern states), but in a given year and state, the base cost represents the minimum level for per-pupil spending within that state (Imazeki & Reschovsky, 2006; Imazeki, 2006).

[2] Marginal costs reflects the additional costs needed due to specific student or district characteristics (such as poverty, English Learners and special education), above and beyond the base cost required in a district that does not have these special needs (Imazeki, 2006; Odden, 2003).

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Table 4

Education Cost Function, 2004/2005, California K-12 School Districts

Dependent variable: Log of expenditures per pupil				
Independent variables	API	API sub-groups[a]	CST	CST sub-groups[a]
2004-05 Performance[b]	0.339*	0.545**	0.308*	0.624**
	[2.29]	[3.65]	[2.63]	[4.72]
Teacher Salary Index	0.321**	0.234**	0.296*	0.226*
	[2.95]	[3.29]	[2.61]	[2.60]
Log of student enrollment	-0.286**	-0.218**	-0.266**	-0.236**
	[11.24]	[12.31]	[10.84]	[9.75]
Square of log of student enrollment [c]	0.014**	0.011**	0.013**	0.011**
	[12.31]	[13.39]	[11.88]	[11.12]
Percent of students eligible for free and reduced price lunch	0.283**	0.320**	0.344**	0.400**
	[3.78]	[4.71]	[3.60]	[3.96]
Percent of students Spanish-speaking English Learners	0.081	0.076	0.078	0.09
	[1.09]	[1.09]	[1.06]	[1.20]
Percent of students non-Spanish-speaking English Learners	0.237	0.236	0.204	0.17
	[1.27]	[1.46]	[1.08]	[1.14]
Percent of students in special education	1.070**	1.011**	1.351**	1.266**
	[4.40]	[4.58]	[5.30]	[5.04]
Percent of students with high-cost disabilities	6.506**	6.065**	5.685*	5.157*
	[2.98]	[3.31]	[2.47]	[2.55]
Percent of students enrolled in high school	0.247**	0.225**	0.232**	0.226**
	[7.89]	[7.43]	[5.03]	[4.81]
Herfindahl (efficiency) index	-0.02	-0.02	-0.06	-0.09
	[0.20]	[0.17]	[0.45]	[0.81]
2004-05 Performance, Economically Disadvantaged		-0.07		-0.236*
		[0.40]		[2.29]
2004-05 Performance, African-American		0.03		-0.11
		[0.28]		[1.96]
2004-05 Performance, Hispanic		-0.436		-0.217**
		[1.90]		[3.01]
Intercept	7.423**	8.912**	9.434**	9.403**
	[7.07]	[13.40]	[41.66]	[49.61]
Observations	937	937	808	808

* indicates statistically significant at the 5% level
[a] Also includes flags for missing sub-group test scores
[b] Log of API or Average CST passing rates
c Scale-efficient enrollment = 28,992

(Source: Imazeki, 2006; pp.37)

Table 4 presents the results of ordinary least-squares regression analyses. The model takes the specific log-linear form and it fits a cost function using data for all K-12 districts in California. The dependent variable is general fund per-pupil expenditures for 2004-05, excluding spending on transportation and food services, as these categories are not directly related to student academic performance. The Academic Performance Index (API) is the primary measure of student achievement. It is a weighted average of exams in all subjects and for all grades. For several years, California tested students in several grades, using the Stanford-9, a nationally-normed test, as well as exams tailored particularly to California Standards (CST). The model is also estimated with versions of cost function where the API is replaced with the percent scoring at the proficient level or above on the California Standards Tests in English Language Arts and Mathematics.

Further, the model is estimated with additional performance measurements for subgroups of White, African-American, Hispanic and economically disadvantage students. This is because performance among the African-American, Hispanic and economically disadvantaged subgroups is typically lower than the average, thus additional resources might be required to ensure that all of these sub-groups achieve their goals. It is important to note that inclusion of separate sub-group performance measures in the regression model can be problematic. High correlation between the sub-groups creates statistical noise that prevents precise estimation of the model. Other variables that are included in the model are teacher salary index, students' characteristics (such as students that are eligible for reduced or free lunch, students with various mental and physical disabilities, and students with limited proficiency in English and others). To measure public school competition, the researcher uses a Herfindahl index. This index, which is fairly standard in the literature on school choice (e.g., see Hoxby, 2000), is constructed on the assumption that metropolitan statistical areas can be used to define local "markets" for education. The index increases with the amount of competition so if district efficiency is correlated with the amount of competition that the district faces, then we would expect spending to be lower in districts with higher values of the Herfindahl index (Imazeki, 2006).

However, this approach also has several limitations. First, the data are based upon the existing use of resources, which might not be necessarily efficient. Second, the results are highly sensitive to model specifications (Guthrie, Springer, Rolle & Houck, 2007). Third, if desired achievement levels are much higher than those currently achieved in the sample of schools in the data, the equation must predict costs based upon small evidence. Thus, this may results in out-of-sample prediction bias. Lastly, the model can be misleading if the relationship between resources and achievement are weak. If the relationship is not strong, then the model will produce inflated estimates of the amount of funding needed to produce small desired increases in student's achievement (Hanushek, 2006).

The Successful Schools Approach

The successful schools approach examines actual expenditures in schools that are considered as being successful in achieving desired outcome levels, adjusting for factors that lead to bias, such as having students from high-income families. In this approach, high-performing schools are first identified, and average costs in these schools are then calculated and used as evidence of adequate spending levels. One advantage of this method is that it can examine

the use of several types of resources in high-performing schools and compare it with the use of these same resources in lower-performing schools. For example, per-pupil expenditures, pupil-teacher ratios, the ratio between administrative and instructional expenditures, etc., can all be examined. A disadvantage is that it requires that the most successful schools do indeed reach desired performance levels – if not, there will be no truly successful schools from which to gather cost data (Downes & Stiefel, 2008).

In a recent research in Missouri, the cost of an adequate education is determined using the successful school district approach (Augenblick & Myers, 2003). The researchers worked with the Missouri Department of Elementary and Secondary Education to identify successful school districts. Using the Annual Performance Reports, school districts were considered successful if they had 100 points on the report. This means that they met all of the performance indicators. Additionally, school districts that met all of the MAP indicators and all but one of the other performance indicators were also considered successful. (This means they had 93 points on the report).

To implement the approach for a base cost figure it is necessary to do three things: (1) specify the school districts that are successful; (2) examine the basic expenditures/revenues of those districts (basic expenditures exclude spending for capital purposes, transportation, special education, ELL programs, and programs and services for at-risk pupils as well as any adjustments for district characteristics, such as size or regional cost differences that will be applied to a base cost figure); and (3) calculate a base cost figure using the basic expenditure figures of all or some successful districts (Augenblick & Myers, 2003).

Evidence-Based Approach

Another major approach to determine an adequate expenditure level is to identify research-based educational strategies that are proven to be effective and then assign them costs. In other words, this is an alternative method to determining per student expenditure by looking at how much “best practices” cost. The evidence best model applies findings from experimental studies of effective schooling strategies as well as Comprehensive Schooling reform (CSR) models to model the resources needed so that all the schools in Illinois for example can be as effective as the schools that receive special attentions under CSR plans.

For instance, evidence from previous research indicates that class sizes of fifteen or fewer students in grades kindergarten through three are effective in increasing achievement (Finn & Achilles, 1990). However, it is important to note that merely lowering class size does not necessarily leads to achievement gains. Additionally, teachers should be provided the instructional support they need (Grane & Rauscher, 2009). Thus, the model should also incorporate instructional coaches with specific staff ratios. In the evidence based model, required resources and costs are determined through a combination of available researches, professional judgment and local context (Mangan & Purinton, 2010).

An example of services and ingredients needed in the evidence-based model for adequately funding an elementary school of 500 students (Odden, 2003; pp. 123):

- one principal;
- two instructional facilitators, coaches, or mentors;
- a preschool for 3- and 4-yearolds (at least for children from low income backgrounds), with a teacher and an aide for every 15 students;
- teachers for a full-day kindergarten program;
- teachers to provide for class sizes of 15 students in grades K-3 and 25 in all other grades;
- an additional 20% of teachers to provide for planning and preparation time and to teach art, music, physical education, and other noncore academic classes, with the requirement that a substantial portion of such time be used by regular classroom teachers for collaborative instructional improvement work;
- tutors (who are licensed teachers) for struggling students, at a rate of one tutor for every 20% of students from low-income backgrounds, with a minimum of one tutor for each school;
- sufficient funds for all severely disabled students;
- an additional $2,000 per teacher for the training component of professional development;
- about $250 per pupil for computer technologies, to cover purchase, upgrading, and repair;
- one to five positions for a pupil support/family outreach strategy; and
- other resources for materials, equipment, and supplies; for operation and maintenance; and for clerical support.

However, this approach also has some limitations. First, there is mixed evidence of success for many of the reform models. Second, there is also mixed evidence on transferability of program across districts. This means the educational strategies that are proven to be effective in one district might not be effective in another context (Odden, 2000, 2003).

Table 6

Comparison of Base and Marginal Costs using three different methodologies

Comparison of Base and Marginal Costs[a]

	California Cost Function	Professional Judgment Studies[b]	Successful Schools Studies[b]
Base Costs:			
Number of Studies	1	12	9
Mean	$5,163	$7,890	$6,210
Minimum		$5,636	$5,124
Maximum		$9,757	$7,093
Marginal Costs: Pupil Weights			
Poverty	0.30	0.52 (range: 0.12 - 1.39)	
English Learners		0.74	
- Spanish-speakers	0.08		
- non-Spanish-speakers	0.24		
Special Education		1.47	
- All Disabilities	1.13		
- High-Cost Disabilities	6.68		

a) All costs are in 1999 dollars and adjusted for regional variation in wage costs using the National Center for Education Statistics' Comparable Wage Index; base year = 1999
b) Summarized from table in *Education Week*, 2005, and Baker, 2006

(Source: Imazeki, 2006; pp. 40)

Table 6 summarizes base costs for the twenty-one professional judgment and successful schools studies that report base costs. Base costs tend to be highest in professional judgment studies, and both professional judgment and successful schools estimates appear generally higher than the cost function estimates of base costs. However, there is certainly overlap among all the methods. In general, the California estimate of base costs appears to fall on the low end of the spectrum. Studies that only report average costs are not included in Table 6 (thus excluding two evidence-based, four professional judgment, and two successful schools studies).

However, cost function studies, which all report costs for a wide range of districts, generally find minimum costs that are thirty to fifty percent lower than average costs. Using this guideline, the costs estimated in the excluded professional judgment and successful schools studies fall well within the ranges of the other studies of the same type. The two evidence-based studies find costs that are on the low side, closer to the costs predicted with cost functions (Imazeki, 2006).

CONCLUSION

The shift in school finance from equity to adequacy requires a clearer linkage between the funding provided to schools and the outcomes produced in terms of student learning. Thus, in the process of designing adequate school finance, the state is responsible to identify an adequate expenditure level for a typical student in a typical district and to make sufficient adjustments to cater for different student needs. In addition, districts and schools are required to manage these resources so that students learn to the performance standards required by the state.

Odden (2003) contends that adequacy approach in school finance will also improve equity. This is because the level of resources in many districts and schools will be raised to an adequate level. Hence, this will increase educational opportunities and ultimately improve the equality of educational outcomes, as the number of students achieving beyond performance standards increase. As such, policymakers in developing countries should shift the school finance policy to adequacy.

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