

# *Determining the Cost of Providing an Adequate Education for All Students*

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*Great Public Schools  
for Every Student*



# *Determining the Cost of Providing an Adequate Education for All Students*

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American Institutes for Research



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## Foreword

The National Education Association has long had a keen interest in the cost of a quality education. From its earliest volumes, circa 1922, the NEA's *Research Bulletin* focused on school finance. Today, the NEA's key strategic goals include improving the funding of public schools and supporting quality public education on a foundation of equitable tax, economic, and fiscal policies.

The many elements of a quality education—from teachers and textbooks to chemistry supplies and computer networks—cost money. Yet exactly *how much* a quality education should cost, one that adequately educates *all* students, has been at issue for generations. Fortunately, as the public's focus has turned toward closing achievement gaps and ensuring accountability, several techniques for deriving the costs of K–12 education have matured through vigorous research and practice.

Over the past decade, a number of states have commissioned “costing out” studies at the request of legislatures, public advocacy groups, and the courts. These studies commonly involve extensive information gathering and sophisticated econometric techniques. Yet they differ significantly in methodology. As a result, each approach has strengths and weaknesses, and each has attracted plaudits and pointed criticisms.

To help sort out the details, implications, and competing claims of costing-out methodologies, NEA engaged Jay G. Chambers and Jesse D. Levin of the American Institutes for Research. Chambers and Levin are economists with a substantial record of practice and innovation in the field. In this working paper, they delve into the practical definitions of adequacy and equity; review the four principal methodologies; present their own “hybrid” methodology, which draws on the “best elements” of the four approaches; provide state case studies; and conclude with some recommendations.

From the NEA's perspective, Chambers and Levin's interests in broad learning goals, their emphasis on public engagement in defining those goals, and their willingness to adapt their approach to emerging research findings are exemplary and deserving of attention. Yet, as the authors themselves say, costing out is not an “exact science.” It is indeed vulnerable to distortion by researchers' assumptions and biases as well as by the politicized nature of education in these times. In addition, the authors' own market-based methodology for calculating school employee compensation raises some troubling ambiguities for the scope of unionism and collective bargaining in advancing the professional standing of education employees.

In all, this paper will generate new thoughts about costing out and about adequacy and equity in public education. It will certainly inform ongoing dialogues about school funding. NEA must continue to participate both critically and creatively in such dialogues and in the innovation process to ensure that changes benefit students, education employees, and communities alike. Our engagement is especially important during these difficult times, when we have many new opportunities to support and even reinforce the states' tax, economic, and fiscal capacities to provide the needed funding for education. We encourage NEA affiliates to continue to explore and cultivate innovative approaches to school finance to provide a great public school for every student.



Dennis Van Roekel  
President



## Preface

Over the past several years, policymakers, practitioners, and researchers have given significant attention to improving the outcomes of K–12 public schooling in the United States. Most notably, the passage of the federal No Child Left Behind (NCLB) Act in 2001 has put the focus of all these groups on ensuring that all public school students perform at a satisfactory level, as determined by each state’s accountability standards. This emphasis on standards and accountability has prompted continued development in the field of educational effectiveness. It has also stimulated numerous efforts to estimate the cost of a quality education for all students.

In this vein, the National Educational Association (NEA) has expressed a keen interest in the costs associated with providing educational programs that offer the opportunity for *all* students to perform at high levels of academic achievement. More formally, one of the NEA’s priority tasks, assigned to the New Products and Programs Department, is to

Determine the cost of school conditions and resources that lead to high academic outcomes for all students, develop a comprehensive knowledge base of all 50 states on the cost of

creating quality schools, and assist state affiliates to secure adequate and equitable funding for schools.<sup>1</sup>

The following working paper seeks to shed light on some of the issues surrounding the costing out of an adequate education and the relevant research in this area. Specifically, the intention is to make the methods most often used to cost out educational adequacy more accessible to policymakers, education advocates, and others who are seeking to remedy inadequacy and inequity in education funding.

The authors would like to thank the National Education Association (NEA) for its generous support and, in particular, Paul Wolman for his expert editorial support, and Barbara Frank, Jacques Nacson, and Bouy Te of the NEA New Products and Programs Department for their help in coordinating this effort. We are also grateful to Professor Bruce Baker of Rutgers University, who reviewed and provided thoughtful feedback on earlier drafts of the work. Finally, Karen Manship of the American Institutes for Research (AIR) provided excellent research support throughout the writing process.



## Executive Summary

The authors, researchers at the American Institutes for Research (AIR), have undertaken this study at the request of the National Education Association (NEA). The NEA's aim was to explore the cost of providing quality public education programs that will enable all students to perform at high levels of academic achievement. Toward that end, the NEA asked the authors to elucidate for an audience of policymakers and education advocates the various approaches to estimating the *cost of an adequate public education*. Such an effort is more commonly referred to as a *costing-out study*.

### The Two Fundamental Questions of Educational Adequacy

Rather than engage in an extensive history and literature review of “costing out” (available elsewhere; see main text for full references), chapter 1 of the paper poses two key questions, focusing on *adequacy* and *equity*, respectively:

- What does it cost to enable a public school system to provide students with an adequate education?
- How can school systems allocate their resources equitably, such that all students are afforded an adequate education regardless of their need or circumstance?

These questions are neither simple nor wholly independent. To begin with, state policymakers seldom, if ever, have a blank check for education. They must consider a myriad of competing demands for public resources, such as funding for healthcare, transportation, infrastructure, and public safety, as well as the willingness and capacity of the public to support these functions through taxes and other sources of revenue.

Even policymakers and education advocates who are interested exclusively in public school finance may find costing out public education complicated. Those who would cost out an education must make decisions about a complex array of factors, including school infrastructures, operating expenses, and salaries. Moreover, public

schools, as public institutions, must serve the entire public. Researchers conducting a costing-out study must therefore consider not merely the panoply of needs of students at *different* stages of their educations but also the requirements of students at *each* stage who arrive every day with specific constellations of abilities—typical and atypical students, students in poverty, students with disabilities, students learning English, and so on.

From the standpoint of *inputs* into school systems, costing out must consider both *horizontal equity* (treating similar students in systematically similar ways) and *vertical equity* (treating students with different needs in systematically distinctive ways). In addition to ensuring horizontal and vertical equity, the allocation mechanism stemming from a costing-out process must be designed to provide the means (adequate levels of resources) to achieve a common end for all schools (a consensus-based educational objective defining the *output* desired from the schooling system). That is, the allocation mechanism should provide all students with a similar, equitable opportunity for an adequate education, as defined by a process that explicitly includes the public's voice.

### Costing-Out Methodologies

As chapter 2 details, four principal costing-out techniques have recently come to prominence. Their description is a prelude to the authors' detailing of their own work, which attempts to draw on the best elements of each of the four techniques and aims to enhance efficiency, equity, and public engagement in allocating educational resources. The four established methodologies are as follows, along with the authors' assessment of their strengths and weaknesses:

- **Cost-function studies.** Cost-function studies have long been common in economics, but it was only in the last quarter of the 20th century that researchers began to estimate cost functions for the educational enterprise and only toward the end of this period that the

methodology has been applied to school finance. The approach uses data on educational expenditure and correlates these with measures of student need; scale (size) of district operation; measures of efficiency, if available; and educational outcomes based on achievement test results. The result estimates an education “cost function,” which measures the cost associated with producing a given level of “output” (i.e., students educated to a certain standard) under specific conditions defined by measures of student need and scale of operations. The cost-function approach allows derivation of the marginal costs of meeting *atypical* students’ needs—for example, the needs of students in poverty, with disabilities, who are designated as English-language learners, or who might have a combination of these needs.

As with all approaches, cost functions have certain weaknesses. First, cost functions require large amounts of input data. Second, the technique can be econometrically complex and relatively opaque to policymakers. Indeed, cost-function models are often seen as “black box” approaches to costing out that offer little insight as to what particular resources are being costed out.

In addition, it may be difficult to capture the full effect of an “adequate education” when the sole outcome measure is a single, standardized achievement test. A truly adequate education may include character building, critical thinking skills, appreciation of diversity, skill in music and art, physical development, and a host of other attributes that standardized tests do not measure.

Finally, given the prevalence of districts with atypical characteristics, the cost-function approach may be much less robust if the model is forced to make cost predictions for combinations of district needs and desired outcomes that are far outside of the sample (e.g., estimating the costs of high-needs districts attaining at levels that are far above those normally observed). That is, although cost functions might effectively determine the average cost of achieving at levels commonly observed for existing levels of need, the cost-function model may be far less reliable in projecting the costs of enhancing achievement, especially across a wide variety of settings.

- **Professional-judgment studies (panels and surveys).** In this approach, instead of initially deriving the cost

of providing adequate educational resources from data on existing expenditures, student needs, and scale of operations, the research team organizes comprehensive panels of educators (e.g., teachers, principals, and special education and English-language learner specialists). These professionals specify the resources (e.g., levels of administrative, student/instructional support; teacher staff, supplies, and materials) necessary to deliver a set of defined “adequate” educational outcomes at a minimal cost across a variety of settings defined by student needs and school size. The research team then uses these resource specifications to calculate the costs of the desired achievement outcomes across each setting. In this way, the model incorporates resource allocation data on serving various categories of high-need students, and analysis of these data permits one to estimate the marginal costs of adequately serving those populations.

This model has some advantages over the cost-function approach. These advantages are partly intrinsic to the method and partly dependent on how researchers who use the professional-judgment approach have chosen to carry out their studies. First, because it uses a panel of educators to specify the resources necessary to deliver an adequate education, the professional-judgment method is both more transparent to stakeholders and more sensitive to their viewpoints. Second, typical professional-judgment studies tend to have taken into account a broader range of outcomes than are revealed by standard achievement tests; these are outcomes extending into various cognitive and noncognitive dimensions of student development.

Rather than convening comprehensive panels, a variation of the professional-judgment approach administers surveys to individual teachers, principals, and superintendents to gather the same sort of input data on school resources. However, the panel and survey approaches have a fundamental difference. The panel method asks groups to specify resources that will achieve a given level of outcome at a minimum cost. In contrast, the survey-based studies have focused on educators specifying resources to maximize outcomes subject to a budget constraint and then revealing what the expected outcome would be. The survey studies have perhaps been more compatible with the viewpoint of

policymakers considering competing budget priorities, but they are also a less direct method of determining how much it will cost to achieve school finance adequacy. An additional difference is that although panel members can interact and therefore arrive at consensus-based specifications that make full use of the specialized knowledge of the individual panelists, survey respondents lack this opportunity and its advantage in “leveraging” their expertise.

A common critique of professional-judgment studies is that the costs of providing an adequate education may be overestimated if the practitioners are not efficient in specifying resources (i.e., they do not specify combinations of resources that will deliver an adequate program at a minimum cost).<sup>2</sup> If practitioner–respondents simply present a wish list of resources with little regard to delivering a prespecified adequate outcome in an efficient manner, the study may end up overstating the resulting calculated costs. However, several studies employing this approach acknowledge this pitfall and attempt to incorporate some safeguards to avoid it. For example, Chambers et al. (2004a, 2006a, and 2008a) provide in their process a system of checks and balances through which an external group of stakeholders critically reviews the panel’s resource specifications.<sup>3</sup>

- **Successful-schools/districts method.** The original version of this approach, articulated in the 1990s, looks at the spending of schools or districts that have achieved what the researchers consider appropriate, “adequate” educational outcomes. Like the professional-judgment approach, it is quite transparent and easy to understand. However, in contrast to the professional-judgment approach, the method pays little attention to exactly how these schools or districts use the funds.

It is important to note that the successful-schools/districts method, as originally applied, had a fundamental flaw. High-achieving schools, often located in wealthy communities, serve less needy students and may have distinctive patterns and totals of resource use. Yet the advantages (lower needs) of students in such schools may be very different from those in less wealthy areas, which tend to be the targets of needed improvements.

In an effort to remedy this flaw in the original application of the successful-schools/districts model,

researchers developed an alternative approach, the “beating the odds” method. It became popular in the first decade of the 21st century. It uses statistical techniques to identify schools that are doing better than expected given the demographic characteristics of the populations they serve. The beating-the-odds approach effectively conditions the identification of successful schools on the needs of the students being served. At the same time, however, accurately measuring whether such schools are really beating the odds requires collecting multiple years’ worth of data. Interestingly, investigations of this type have often shown that relatively few schools consistently beat the odds in the long run, especially across various subpopulations of students and multiple dimensions of measures of student achievement or other student outcomes.

- **Evidence-based approach.** Also introduced in the early 21st century, this method uses the research literature on educational effectiveness to specify the appropriate resources for successful schools. The published research is transparent and comparatively easy to use.

However, the evidence-based approach also has weaknesses, notably in that the research literature can provide conflicting answers about the impact of specific resources and educational techniques on student learning. Therefore, the selection of studies for use in the model can influence its results markedly. More fundamentally, the evidence-based approach assumes that the best practices identified in the research literature work equally well, with certainty, and under all circumstances. In essence, it assumes a one-size-fits-all educational model that is effective regardless of setting, which may vary greatly with respect to student populations and types of locale (e.g., rural versus urban). In addition, the model lacks flexibility in designing funding for a variety of schools and for measuring marginal costs (e.g., of educating various special-needs students), especially those schools for which little evidence exists in the literature describing comparable best-case schools.

This overall picture of the costing-out methodologies may well appear grim. Indeed, the costing-out methodologies seem to have as many shortcomings as they have advantages. Every approach requires a certain amount of

faith that the relationship between student needs, schooling resources, and outcomes is being modeled properly and that the subsequent costs are measured accurately. In the cost-function studies, the relationship is captured by a statistical model that is assumed to be specified properly (i.e., the assumption is that it accurately reflects all of the factors that determine educational costs). The professional-judgment approach assumes that educators are in the best position to determine the combinations of resources that will be most effective in delivering an adequate education. The evidence-based approach turns to the research literature to make this determination. The successful-schools/districts approach assumes that all schools should be capable of providing an adequate education at a cost equal to those deemed successful or to be “beating the odds” (i.e., they are successful relative to schools with similar needs).

In sum, each method involves human, and therefore disputable, judgments. Moreover, the limitations of the data and the potential for researcher manipulation suggest that at its present state of development, costing out is far from an exact science.

That being said, the authors suggest in this paper a framework to perform a comprehensive costing-out study that incorporates elements of the existing techniques with some innovations in an effort to improve on the traditional costing-out approaches discussed above. Such a comprehensive educational costing-out study requires three principal components or stages: (1) defining adequacy; (2) specifying and costing out programs and resources; and (3) developing a mechanism for distributing resources. These three components are detailed in the central part of the paper.

## **Comprehensive Costing Out, Component 1: Defining Adequacy**

Chapter 3 begins the discussion of the first component of a comprehensive costing-out methodology, defining adequacy. Almost all state constitutions contain clauses that hold the state responsible for providing all students with an “adequate” or “thorough and efficient” public education. However, the clauses are vague, and although many states have high-court decisions directing the state to implement “adequacy,” it is difficult to determine what the precise definition of this term is from the legislative clauses.

In the authors’ view, a comprehensive costing-out study goes beyond the existing methodologies by recommending the use of a public engagement strategy to define adequacy, for it is ultimately the public’s conception of what is “adequate” for its children that matters most in a democracy. These public-interest aspects of determining adequacy featured prominently in recent studies in New York and New Mexico. In each case, the researchers conducted town-hall meetings for public participants and later produced written educational goals statements based on that public input.

Employing a public engagement strategy serves several purposes. First, the process directly involves the public and thus promotes “buy in” from those with an interest in public education. Second, it provides a formal mechanism for capturing the public’s educational priorities in terms of both the outcomes they feel are important as well as the types of programs they think are most appropriate to deliver services. Finally, the process illuminates the public’s willingness to commit funding to public education and the types of revenue mechanisms (e.g., taxes, lotteries) they might support to achieve their vision of an adequate education.

How did the public engagement process work in practice? For the New York study, conducted in 2003 by the New York Council on Costing Out (CCO) in conjunction with the Campaign for Fiscal Equity (CFE), a series of 13 town-hall meetings were held at diverse urban, suburban, and rural locations around the state. The participants included teachers, administrators, school board members, parents, business leaders, policymakers, and the other members of the public. Extensive background materials were provided, and the meetings featured plenary and breakout sessions (the latter led by trained facilitators). The CFE team, independent of the research team that carried out the New York costing-out study, played a significant role in helping the participants focus on formulating goals statements that met federal and state (Regents) requirements and included consideration of the needs of at-risk students. The goals statement that resulted, created ultimately by the CFE team and based on the inputs from the public meetings, stressed providing the opportunity for success by offering access to resources and focused on helping students earn a quality high school diploma.



In the recently completed (2008) New Mexico study, the AIR research team held 23 town-hall meetings in diverse settings across the state. The New Mexico public engagement process differed slightly from that of New York in that it added three separate surveys to gather public input.

In the New Mexico town-hall meetings, a facilitator from the AIR research team queried the participants about their views on educational goals and program requirements. The facilitator provided the audiences with wireless voting “clickers” (an electronic Audience Response System) that allowed them to respond to questions in real time. Approximately 650 individuals attended the town-hall meetings. Unfortunately, this was fewer participants than the researchers had hoped. Moreover, the participants were mostly teachers and school-based educators—too narrow a sample to reflect full public engagement.

Therefore, the team disseminated two additional surveys online. One was for the public, which heard about the survey via the local media. The other was for policymakers and higher-level educators, such as principals and district superintendents. Both surveys aimed at capturing not only educational objectives relating to “cognitive” subject-area knowledge and skills but also “noncognitive” educational objectives such as developing personal qualities.

The results of the New Mexico study revealed the significant extent to which the public in that state expects the educational system to promote personal skills and qualities outside the usual cognitive learning and testing areas of reading and math on which NCLB has put exclusive emphasis. Using a 100-point scale, “citizens indicated that they would prefer to see a greater balance between Knowledge and Skills and Personal Quality items, with roughly a 60 percent emphasis on Knowledge and Skills, and 40 percent on Personal Qualities” (Chambers et al. 2008b).<sup>4</sup> The survey showed that the public considered each of the following elements of an education program as “critical to student success” (i.e., defined as receiving a rating of 9 on a 9-point scale from more than half the sample):

- Early childhood education and full-day kindergarten
- Access to educational technology
- Intensive early-grade reading and math interventions
- Tutoring and other individualized support for struggling students
- Opportunities for special education students

- Teacher quality
- A safe, healthy, and positive school environment.

Appendix A to the present paper provides the actual goals statements that emerged from the New York and New Mexico meetings as well as one from a separate adequacy study in California.

## **Comprehensive Costing Out, Component 2: Specifying and Costing Out Programs and Resources**

Chapter 4 treats the second component of the comprehensive approach described in the paper: specifying and costing out programs and resources. In this effort, three crucial cost factors require consideration: student needs, scale of operations, and geographic variations in input prices.

### **Three Key Cost Factors**

The first key cost factor is student needs. Among the needs requiring quantification in funding are the additional resources and subsequent costs of serving students in poverty, learning English, and enrolled in special education programs. In addition, it is necessary to take into account of the additional cost of compensating for student mobility, which can affect the outcomes of students entering or exiting classrooms, as well as those remaining in classes whose smooth operation may have been disrupted.

The second cost factor is the scale of district or school operations. Here, the considerations are analogous to economies of scale in manufacturing. That is, *diseconomies* of scale may put upward pressure on the per student cost of providing education in smaller remote districts that do not operate at an optimal size. Such diseconomies may arise in smaller districts for several reasons. They might reflect the requirement of minimum levels of administrative and support resources to oversee school and district functions, regardless of how small operations might be. Alternatively, they might stem from difficulty organizing students into more efficient learning groups specific to grade level or area of specialization. They could also come from increased costs of coordination and communication in more sparsely populated areas. Finally, diseconomies might arise from or from an inability to purchase supplies at a discount.

The third factor is consideration of geographic differences in costs. Chief among such differences are

variations in labor costs (i.e., educators' salaries). In response, researchers have developed the Geographic Cost of Education Index (GCEI), which enables them to calculate for each district or regional labor market the cost of hiring and retaining comparable staff. Although the costs of some nonpersonnel resources represent a smaller proportion of total costs, the general price levels of these inputs tend to reflect geographic variations that are similar to personnel inputs and can therefore be used accordingly to compare both types of costs across different districts, regions, or both.

### **The Hybrid Model in Practice**

Of considerable interest to teachers and other educators who might participate in the public engagement or other phases of a hybrid costing-out process are the paper's details of the model in practice—in studies costing out the resources to provide adequate educations for students in New York, California, and New Mexico.

#### *Rationale and Development*

The authors' hybrid model uses professional judgment as a centerpiece but draws on elements of the evidence-based and successful-schools/beating-the-odds methods as well by having panelists reflect both on best practices suggested in the research literature and on empirical findings of the resource usage of successful schools in their own state. In addition, the developed process reflects the importance of systematically including public engagement to determine an educational goal and taking into account the student needs, scale, and geographic cost factors discussed above.

In line with the strong reliance on professional judgment as the central approach used in the authors' costing-out process, the paper stresses the importance of directly involving education practitioners, who are most knowledgeable about the resources that are both necessary and feasible to integrate into an adequate instructional program.

One major strength the professional-judgment model brings to the hybrid methodology is that it provides a more open and flexible way of considering a broad range of outcomes. This is in part because professional-judgment panels bring a wealth of practical experience in education and are able to consider these broader outcomes when specifying the types of instructional programs and school-level

resources necessary to deliver an adequate education. In addition, the use of multiple, regionally balanced, professional-judgment panels provides more reliable costs that are representative of the diverse school settings commonly found across districts within a state.

However, as mentioned earlier, a fair criticism of professional judgment is that there is no guarantee educators will provide truly efficient resource specifications. To prevent this from occurring, the authors' hybrid model puts in place a system of checks and balances that includes a series of meetings where panelists are required to present and defend the instructional programs and subsequent resource specifications they have developed to an external group of stakeholders. The fact that the process publicly identifies individual panel members and therefore holds them accountable helps them remain mindful of their "ownership" of the results.

#### *Procedures*

The research team plays an important role in keeping the panel on track. It reviews the panel members' qualifications carefully before choosing members and provides them with an extensive package of materials. The materials incorporate elements of the other methodologies by including mainstream research literature on effective schooling practices and sets of average resource profiles (i.e., average staffing ratios, nonpersonnel dollars) derived from data on successful "beating the odds" schools. Using these materials and the goals statement developed during public engagement, the panels are then asked to design prototypical instructional programs to achieve the goals and then to specify the quantities and characteristics of the school inputs necessary to deliver those programs in several school settings that vary with respect to student needs and size. A member of the research team is present at the meetings of each panel only to help facilitate the deliberations. All decisions are those of the panel members, who are asked to achieve these decisions through a consensus.

The package of materials and the facilitators provided to the panels support their deliberations in two crucial ways. First, the materials assist the panels in developing instructional program designs that are supported by both mainstream educational research and empirical data. The materials help the panels in developing resource specifica-

tions by incorporating elements such as length of school day and year; full-time equivalents of staff; and non-personnel expenses for supplies, technology, and so on. The facilitators help ensure that the panels stay focused on achieving the goals at a minimum cost and develop realistic program-designs/resource-specifications that are appropriate to the conditions and realities of their state.

The research team then translates the final school-level resource specifications developed by the panels into dollar figures, aggregates them to the district level, and adds district-level costs (i.e., the costs of ancillary services, central administration, and maintenance and operations). Finally, these district-level figures are adjusted for geographic cost variations. As mentioned earlier, at a subsequent final meeting, a group of stakeholders (i.e., nonpanel members who engaged in the earlier public engagement process) interviews the panel members publicly about their choices, and the specifications are subject to final modifications.

### *Examples of Results*

The authors observe that the panels in their hybrid studies in New York, California, and New Mexico specified a number of common program elements that are contained in the evidence-based research literature. These included the following recommendations:

- Lengthen the regular instructional school day, year, or both.
- Lengthen the staff school day, year, or both for planning and professional development.
- Ensure that schools have an appropriately qualified teaching staff.
- Support professional development delivered by external providers.
- Provide academic coaches.
- Provide subject-matter specialists.
- Reduce class sizes, student–teacher ratios.
- Provide instructional support for special education programs, and promote greater inclusion in general education classrooms.
- Provide instructional support for English learning, bilingual, and multicultural programs.
- Provide programs for gifted students.
- Provide librarians and technology specialists
- Provide student support staff.
- Provide instructional experience outside of class (e.g., field trips, school-to-work programs).
- Provide early childhood education/preschool.
- Provide full-day kindergarten.
- Provide educational technology.
- Provide access to health and nutrition services.

Although the studies of New York, California, and New Mexico each made use of the same costing-out methodology and made similar program recommendations, their cost estimates differed because of the differences in panel program designs and resource specifications, as well as differences in price levels across the three years and between the states in which the work was conducted. However, even after compensating mathematically for cross-year and cross-state price-level disparities, the data still reflect differences in spending priorities between the three states (which ranked 5th, 47th, and 28th spenders, respectively, in the nation overall in 2003–04).

The data also reflect substantial differences between the actual per student spending within each of the states and the levels suggested as “adequate” by the panel resource specifications. Indeed, the recommended statewide increases necessary to provide an adequate education in New York, California, and New Mexico were 11 percent, 53 percent, and 13 percent, respectively. (For comparisons of the differences, see in the main text, Figure 4. Actual versus Adequate K–12 Spending per Student from New York, California, and New Mexico Adequacy Studies.)

Using the results from the New York study, Chambers et al. (2006b) further calculated the shortfall between the projected adequate funding and the actual funding—the *adequacy gap*—for each of the school districts in that state. They then sought to measure whether districts with larger adequacy gaps indeed had poorer performance. The model appears robust in demonstrating a correlation between adequate funding as defined by the costed-out resources specified by the New York panels and student performance as measured by tests. Specifically, the authors of the present study have found that districts with larger adequacy gaps exhibit lower attendance and pass rates for virtually every group of students including general education, minorities, and economically disadvantaged and disabled students at each of the three grade levels (4th, 8th, and 12th grades). (See the last section of

chapter 4, “Shortfalls in Adequate Funding and Student Performance.”)

The authors also report that Baker’s (2006) review of costing-out studies that make use of a variety of methodologies both within and across several states indicates that many of these have shown comparable results to those found for New York, California, and New Mexico. This finding should increase overall confidence in the efficacy of carefully designed costing-out methodologies in specifying the programs and funding needed to provide an adequate education for all students.

### **Comprehensive Costing Out, Component 3: Developing a Mechanism for Distributing Resources**

Chapter 5 describes the last component of a comprehensive costing-out study and seeks to answer the second of the authors’ thematic questions, as posed in chapter 1. Whereas the first question asks, “How much will it cost to provide an adequate education?” the second asks, “How can districts and states allocate resources to ensure that the distribution of school funding is equitable?” To address this second question, the authors begin by providing a list of criteria for evaluating a school funding formula. They then detail their development of an equitable statewide funding mechanism for New Mexico.

#### **Criteria for a School Funding System**

The authors suggest that a state school funding formula should be

- **Sufficiently funded and equitable on both horizontal and vertical dimensions.** The resource allocation system must provide sufficient funding for programs that meet the needs of the specific population of students. It must be horizontally and vertically equitable—distributed so that it serves students with like needs in like manner and students with different needs in systematically different ways.
- **Transparent, understandable, and accessible.** The system must be clear to all stakeholders, straightforward, and based on publicly available data.
- **Cost based.** The formula must carefully enumerate and justify the differential costs of providing programs to diverse student populations in different settings.

- **Capable of minimizing incentives.** The funding formula should guard against distortion caused by overidentification or misreporting of students in need, enrollment sizes, and so on.
- **Reasonable in its administrative costs.** These costs should be minimal at both local and state levels and not overburdened by excessive data and reporting requirements.
- **Predictable, stable, and timely.** The system should be robust and stable enough to allow policymakers to project future needs and to plan to allocate resources properly and systematically in advance.
- **Accountable for learning outcomes and spending.** The state will likely be involved in monitoring that resources are being used effectively and progress toward the educational goal is being realized, which will require an appropriate accountability structure in place that can support data-driven decision making. The system should also provide wide latitude to schools that are producing favorable results.
- **Politically acceptable.** Implementation should avoid any major sudden short-term loss of funding to schools.

#### **Developing a Funding Mechanism from Costing-Out Results: New Mexico**

The authors offer their recent work in New Mexico as an example of how to elaborate a funding mechanism using the results of their costing-out model. The goal of the AIR research team was to begin with the dataset that described, for each district in the state, total projected costs of providing an adequate education (i.e., the *adequacy* “deliverable” of component 2). From this, they devised a formula that equitably distributes funding based on student need and scale of operations (i.e., the *equity* “deliverable” of component 3).

Toward this goal, the AIR research team devised three types of weighting factors (*formula adjustment factors*) that would determine how resources were allocated. The first type aimed to get an equitable distribution of funds by student need (e.g., poverty, English-language learner, special education, and mobility). The second sought to account for the distribution of students by grade level (e.g., share of district enrollment in the elementary, middle, and high school grade ranges). The third would account for the scale of operations.

The district-level projections thus required multiplying a base per student cost by the seven formula adjustment factors specific to poverty, English-language learners, special education, mobility, middle and high school enrollment shares, and total enrollment (Equation E1).

### Equation 1. Formula for Adequate Costs Using Base Student Cost Multiplied by Student-Need and Enrollment Cost Factors

$$\text{Adequate Cost} = \text{Base Student Cost} \times \overbrace{\text{Poverty Factor} \times \text{ELL Factor} \times \text{SE Factor} \times \text{Mobility Factor}}^{(\text{Student Needs})} \times \overbrace{\text{Enrollment Grade 6–8 Factor} \times \text{Enrollment Grade 9–12 Factor}}^{(\text{Grade Range Enrollment Shares})} \times \frac{(\text{Total Enrollment})}{\text{Enrollment Factor}}$$

It should be noted that all factors except for enrollment demonstrated a positive relationship with adequate per student cost. Because of economies of scale, the estimated relationship between enrollment and adequate per student cost is negative. A district with 0 percent poverty, English-language learners, special education, or mobility would get a rating of 1.00 for that particular factor, resulting in no adjustment above the base student costs. However, higher levels of need result in larger adjustment factors (i.e., values above 1.00). For example, using the formula, a school with 80 percent of students in poverty yielded a poverty formula adjustment factor of about 1.25, meaning that to achieve adequacy, this school would have to spend 25 percent more per student compared with an otherwise identical district with no poverty.<sup>5</sup> Although this example is informative about how the formula operates, the final projected adequate per student cost in a given district is attained only by combining all of the adjustment factors (i.e., multiplying through the base per student cost by all of the need, grade-level share, and total enrollment adjustment factors).

The present authors go on to explain why they believe the system meets the criteria they have laid out for a funding formula under component 2 (e.g., that it is adequate and equitable, carefully cost based, transparent, minimizes incentives, and has a reasonable administrative burden). They also stress that the system needs to meet

standards of accountability: that the newly allocated money must be spent effectively to produce better outcomes. In both New York and New Mexico, they relate, the legislatures proposed a monitoring/accountability mechanism for exactly that purpose.

The authors recommend that the formula should provide the necessary levels of funding that will enable each local district to achieve the prespecified educational goals, but that the districts should have significant discretion over how to allocate and utilize the funds in order to achieve these goals, with the understanding that they will be held strictly ac-

countable for their results. The proposed accountability legislation in New Mexico mandates that districts receiving additional funds would need to provide formal, realistic plans approved by the state department of education that show how they would use the additional funding to meet specific goals in line with the state's educational objectives.

The authors also suggest that Congress consider some specific modifications to the reauthorization of the Elementary and Secondary Education Act (ESEA, currently referred to as NCLB) that would permit states to account directly for federal funds as long as the states provide (a) a substantial portion of the total dollars for education and (b) a guarantee that all districts will have access to adequate levels of funding as determined through a well-designed costing-out process.

### Concluding Remarks

In chapter 6, the authors recapitulate the highlights of their paper. They observe that concerns for improving student learning have stimulated federal legislation focusing heavily on school accountability (i.e., NCLB), along with much research into educational effectiveness. Recent school finance reform has emphasized adequacy over equity, but when we recognize the importance of providing high-quality school programs to all students, it becomes apparent that adequacy and equity are inextricably linked. Adequacy focuses the attention of policymakers

on the overall level of resources necessary to achieve certain goals for all children. Equity means treating similar children similarly and ensuring that all children regardless of their differential needs have access to high-quality programs directed toward the same goals.

Simultaneously, research has emerged that focuses on determining the costs of supplying this high-quality education to all students. Costing-out studies can thus assist state policymakers both in determining what levels of investment are necessary to provide an adequate education and in developing school funding formulas that equitably distribute resources to meet the needs of students with diverse backgrounds in different locations around a state.

For the future, the authors recommend enhancing the usability and transparency of the costing-out process and suggest that costing-out exercises need to keep in mind

the fiscal contexts of the state—that is, their resources and their tax and spending capacities—if adequacy studies are to be practical.

Although acknowledging that costing out remains far from an exact science, the authors believe that further practice and development, including efforts to ascertain and adopt the best practices of the existing methodologies, should make them increasingly reliable and useful to policymakers and the public. They further feel that an important advance in costing out has been the joint involvement of educational policymakers, practitioners, and stakeholders. Thus, the paper stresses the importance of both the public and policymakers in setting goals for public education in addition to the involvement of professionals—including researchers and members of the education community—in determining the programs and resources needed to achieve those educational goals.



# 1

## Introduction

Recently, educational policymakers, practitioners, and researchers have placed significant focus on improving outcomes of grade K–12 public schooling in the United States. Most notably, the passage of the Federal No Child Left Behind (NCLB) Act has drawn much attention to the importance of ensuring that all public school students perform at some satisfactory level determined by each individual state’s accountability standards. Although this focus on standards and accountability has prompted continued development in the field of educational effectiveness, it has been accompanied by numerous studies attempting to estimate the cost of a quality education for all students.

Over the past few decades, a burgeoning body of literature on the issue of *educational adequacy* has produced a series of *costing-out* studies employing various methodologies. These studies have most often been motivated by litigation or the threat of litigation. They have also been prompted by a broadening recognition among policymakers that adequate school funding needs to be linked to the standards-based reform movement in education.<sup>6</sup> Excellent reviews already cover the main costing-out methodologies (Taylor et al. 2005 and Chambers and Levin 2006) and the results of costing-out studies (Baker 2006). Critiques of this body of research are also available (Hanushek 2006). Thus, rather than discuss these individual works again, this chapter lays out the two fundamental questions that costing-out studies attempt to answer and provides a brief plan of a model of costing out educational adequacy that attempts to meet the criteria of adequacy and equity engendered by the questions.

### Fundamental Questions Addressed by Costing-Out Studies

Costing-out studies commonly address two questions:

- What is the cost of providing an adequate education to all students in the public school system?

- How should resources be allocated in order to achieve an equitable distribution of funding that is capable of providing an adequate education to all public school students, regardless of need or circumstance?

Regardless of the motivation behind a costing-out study (i.e., whether or not a study is driven by litigation), the primary purpose of this type of research has been to determine how much additional investment in education is required to provide the opportunity for all children to achieve some desired level of outcomes. Having some kind of estimate of what an adequate education costs helps inform policymakers’ decisions regarding the allocation of scarce resources over a variety of public investments such as education, healthcare, transportation and infrastructure, and public safety. It also helps policymakers assess how these investments will affect the welfare of taxpayers who must provide the necessary funding to support public education and who will arguably benefit from this investment. Beyond the potential for pure economic benefits, investment in public education also affects how a democratic society operates and is perpetuated (i.e., widespread participation of a literate and civic-minded population).

The second question above is also inherent in this work and represents the acknowledgement that children with different needs will require different quantities and types of educational resources to reach the same level of achievement. For example, it is widely accepted that students who are in poverty, who have disabilities, or who are designated as English learners (or any combination of these) will require additional or specialized services to have the same opportunity to achieve as students with no special needs and that these resources will require a larger investment. Moreover, students living in more remote and less densely populated regions will require different

configurations of resources to have the same opportunity to achieve the desired results.

As we ponder these two questions, we must acknowledge that although conceptually separable, the concepts of adequacy and equity are inextricably linked in school finance. From an *input* perspective, horizontal equity requires treating similar students in similar ways, whereas vertical equity requires treating students with different needs in systematically different ways.<sup>7</sup> However, from an *outcome* perspective, the goal is to provide all students with a similar opportunity to achieve some desired result. In the current context, *adequacy* is defined using this concept of providing a similar opportunity to achieve for all students.

In many ways, the state of the art in costing out adequacy is still relatively primitive despite several years of development. However, the authors feel an important advance in costing out has been the involvement of educational policymakers, practitioners, and stakeholders. To this end, the current paper stresses the importance of the public and of policymakers in setting goals for public education and the involvement of professionals, both researchers and members of the education community, in determining the types of programs and specific resources necessary to achieve those educational goals.

## Organization of the Paper

The remainder of this paper is organized as follows. Chapter 2 provides an overview and brief critique of the four principal methodologies used to cost out an adequate education. Chapters 3, 4, and 5 introduce three components the authors argue are necessary to provide a *comprehensive* costing-out study (Defining Adequacy, Specifying and Costing-Out Programs and Resources, and Developing a Mechanism for Distributing Resources) and show how these have been included in three previous costing-out studies. In addition, selected results from these previous studies are presented, including a cross-state comparison of the educational goals, the common programmatic elements deemed necessary to provide an adequate education, the estimated per-student costs of providing these programs, and an in-depth description of a recently developed funding formula based on costing-out results. Chapter 6 summarizes and discusses the direction of future research in this area.

The paper also includes two appendixes. Appendix A provides examples of goals statements from costing-out studies in New York, California, and New Mexico, and Appendix B gives an overview of the New Mexico school funding formula and a calculation using the formula to arrive at adequate per student costs for two hypothetical districts.



## 2

### *Methodologies for Costing Out*

To date, four basic techniques have been applied to costing-out studies: cost functions, professional judgment, successful schools, and evidence-based. We offer a brief description of the methodology of each and discuss how they address the two fundamental questions regarding the cost of adequacy and the allocation of resources to achieve it, as put forth above. It is important to note that each of the methods has advantages and disadvantages, and none provides a flawless approach to costing out educational adequacy. However, some of these methods are more amenable to capturing the subtleties of the educational production process and the real-world policy context within which educational resource allocation occurs.

#### **Sketches of the Four Main Costing-Out Techniques**

##### **Cost Functions**

Although production and cost-function studies of education have been performed since the 1960s, it was not until decades later that the first cost-function study was conducted for estimating the cost of providing an adequate education.<sup>8</sup> The cost-function approach uses statistical methods to estimate the relationship between educational costs, educational outcome(s), the price level of schooling inputs, and various measures of student need and scale of school or district operations. The approach has been credited for its use of real data on inputs, student needs, price levels, and outcomes to model educational production. It is also straightforward to derive the marginal costs associated with specific student needs (e.g., poverty, special education) and scale of district operations once an appropriate cost model has been identified.

However, the cost-function approach has been criticized for certain weaknesses. One is that cost functions

require large amounts of data pertaining to educational needs, input prices, and efficiency. A second criticism is that because of the econometric techniques and the complex models that form the foundation for this type of cost analysis, the cost-function technique may seem like a “black box” and is generally difficult to explain to nonresearchers such as legislators and policymakers.

A third argument is that the cost-function approach has little to say with regard to *how* resources are used. As Chambers and Levin (2006) state,

the approach does not provide a very transparent perspective on how the inputs are organized and utilized [and because of this] cost functions provide little information to help policymakers understand the factors underlying the differences in costs. (p. 39)

A fourth criticism of the cost-function approach is that it generally relies on a limited set of outcome measures—usually achievement on tests used for accountability purposes—and assumes, more or less, that the effect of an adequate education is captured entirely and accurately by these measures.<sup>9</sup>

A fifth criticism of the cost-function approach is that the cost projections can easily be based on combinations of outcomes and student demographics that are well beyond the sample from which the model was estimated. Again, from Chambers and Levin (2006):

For example, statistical models can be used to project the expected cost of producing a given high level of achievement for a student population facing extreme economic disadvantage or other characteristic needs (i.e., incidence of special education or English learner students),

in reality schools with such extreme need characteristics exhibiting such high levels of achievement might not exist! In this case, much faith must be put into the ability of the statistical model being used to predict what it will take to produce achievement well beyond what is currently observed in schools. (p. 40)

This view is corroborated by more recent research by Costrell et al. (2007):

The problem is that education cost functions do not in fact tell us the cost of achieving any specified level of performance. Instead, they provide estimates of average spending for districts of given characteristics and current performance. . . It is even more problematic to extrapolate to estimate the cost of achieving at higher levels. (p. i)

## **Professional Judgment**

### *Panels*

The traditional professional-judgment model involves organizing panels of educators to develop resource specifications necessary to deliver a set of desired results or outcomes for students across a range of grade levels and student-need characteristics such as poverty, English-learner status, and disabilities. The research team leading the study then uses the resource specifications derived from the deliberations of the professional-judgment panels (PJPs) to estimate the costs of achieving the desired outcomes and to explore the patterns of variation associated with student needs and scale of school or district operations.<sup>10</sup> Based on these patterns of variation, the professional-judgment model, as it has recently been applied (e.g., Chambers et al. 2004a, 2007, and 2008a), allows the direct calculation of the marginal costs associated with serving low-income students, English learners, high-mobility students, and students with disabilities.

The professional-judgment technique, first developed by Chambers and Parrish in the early 1980s (1982b, 1984) and later redesigned by others (e.g., Guthrie et al. 1997) relies on the practical experience and knowledge of panels of educators, who, although closest to the educational

production and delivery processes, also have a vested interest in the results, a criticism leveled by Hanushek (2005).<sup>11</sup> However, because the technique takes a bottom-up approach to costing out the resources, the process is transparent to policymakers and generally easy to explain.

Like the cost-function approach, it also generally necessitates projecting costs beyond the existing sample of schools primarily because there are often few schools serving high-need populations that are achieving the high standards of adequacy that could serve as the foundation for these studies. However, in contrast to the cost-function approach, the professional-judgment model offers the most flexibility in terms of the breadth of outcomes that can be taken into account. Although virtually all studies using the cost-function technique define educational adequacy based on average achievement-test scores or proficiency rates (percentages of students scoring at or above some certain minimum level on an achievement test) on one or a few standardized tests, professional judgment allows for a consideration of a broader set of student outcomes that define the adequacy objective, which may include a myriad of cognitive and noncognitive dimensions.<sup>12</sup>

Nevertheless, the linkages between the delivery systems specified by PJPs and the outcome goals may be tenuous at best. After all, the method does require relying on judgment, experience, and knowledge of whatever evidence of “what works” that may exist. Moreover, the common argument against the approach is that the method often leads to rather high cost estimates for adequacy because of the relative freedom of the panels to specify resources without being bound to a budget constraint (Taylor et al. 2005; Hanushek 2005).<sup>13</sup>

Later in this paper, we present some of the techniques that the AIR team (Chambers et al. 2004a, 2007, 2008a) has taken to address some of these concerns about PJP reliability and objectivity—that is, by using multiple panels and structured review processes that include stakeholders.

### *Survey*

Sonstelie et al. (2007) take another approach to the professional-judgment technique, one that uses a large-scale survey rather than PJPs—the Professional Judgment Survey (PJS). The survey includes large samples of teachers, principals, and superintendents. Respondents complete

resource specifications under budget scenarios that are specific to their own schools; that is, for schools that have the same demographics as the schools in which they are currently employed. They also specify, under the alternative budget scenarios, what kinds of student outcomes (i.e., achievement-test scores) they are likely to be able to achieve.

The PJS represents a novel approach to professional judgment by significantly expanding the number of educators who can participate in the process. However, in this approach, educators lose the opportunity to share their experiences and knowledge through collective deliberation, which is an integral part of the PJP technique.

Using the budget scenarios combined with the predicted outcomes derived from the surveys allowed Sonstelie et al. (2007) to estimate the costs of achieving the desired results, generally measured by achievement tests or an index of academic performance. The statistical model derived from this procedure again is subject to the limitation of trying to predict costs beyond the sample from which the statistical models are derived to the extent that the adequacy goals are generally beyond those observed for most schools.

The PJS approach also permits the research team to calculate marginal costs associated with various student-need characteristics easily from the model.

An important difference between the PJP and PJS models is that the PJS effectively changes the task of the professional judges from an exercise in cost minimization to one of output maximization. That is, instead of choosing the proper mix of resources that will achieve the outcome objective at a *minimal* cost, the professional judges are asked to create resource specifications that will *maximize* outcomes, subject to a budget constraint.

## Successful Schools

### *Original Approach*

The third method that has been commonly used to cost out educational adequacy is the successful-schools approach, introduced by Augenblick, Van de Water, and Myers (Augenblick et al. 1993).<sup>14</sup> The method attempts to identify the costs of adequacy by determining the average spending among schools that, through various processes, have been identified as being successful. It shares the transparency of the professional-judgment approach, but

it moves toward reliance on an empirical basis for determining the costs of an adequate education.

In addition to being simple to explain, the successful-schools approach is attractive in that it allows researchers to investigate further the types and quantities of resources being used at schools identified as successful and to see whether their organization of resources differs from that of schools not identified as successful.

Although this seems a logical approach to costing out adequacy (i.e., simply identify those schools or districts that are performing well and calculate what they are spending on average and examine their resource allocation profiles), it is not without a fundamental flaw. Namely, it does not control for factors related to student needs or resource usage. Therefore, the successful schools/districts identified are likely to be those serving the most affluent student populations that may very well have a higher demand for or greater access to resources compared with their less wealthy counterparts. In turn, the approach provides little guidance in determining how much an adequate education would cost for high-need students.

### *Beating the Odds*

The beating-the-odds (BTO) model improves on the original successful-schools approach by using a more sophisticated method to identify successful schools. The BTO model uses statistical techniques to identify schools that are doing better than expected (“beating the odds”), given the demographic characteristics of the students they serve (e.g., the proportions of students in poverty, who are English learners, who have high geographic mobility, or who have substantial disabilities).<sup>15</sup> One can then collect data on high-performing schools to ascertain whether they employ different types and levels of school resources. An additional practical value of the BTO approach is that it has the potential for going beyond simple measures of resources to explore the extent to which differences in organizational processes and leadership could explain the observed school success.

Although the BTO methodology seems to provide a more defensible way to identify high-performing schools, the typical application of this method also suffers from the frequent reliance of researchers on the limited set of outcomes that are at hand (average test scores or proficiency rates). Moreover, some research has questioned

whether the types of statistical models used in BTO analyses can reliably identify successful schools (see Bifulco and Duncombe 2002). Even if one does believe that the model used for a particular BTO analysis accurately identifies successful schools, appropriate application of the approach requires multiple years of data to discern schools that are consistently showing relatively higher performance. In turn, once the requirement of consistent success over several years is imposed, relatively few schools may be identified as being successful, especially among those serving high-need students.

### **Evidence-Based**

The evidence-based model was introduced by Odden et al. (2003a, 2003b, and 2006). This model draws on suggested resource allocations found in the education research literature on effective schooling practices as the foundation to estimate the cost of achieving adequacy in school funding.<sup>16</sup> Clearly, the notion of using the best available evidence on educational effectiveness has both intuitive and practical appeal. It is extremely transparent in terms of the types and quantities of resources used as the basis of costing out an adequate education. Moreover, the approach is quite simple to explain and is easy to understand for policymakers and stakeholders.

Although much can be said for the concept of an evidence-based approach to cost estimation, the educational research on which it is based is rather unclear regarding effectiveness. That is, a great deal of conflicting evidence exists on the impact on student performance of various resources and service-delivery models suggested by the research literature on which the approach draws. The method is therefore quite sensitive to the selection of literature chosen as a foundation for the cost analysis, and the expected impact of implementing the combination of suggested resources on outcomes is unclear at best.<sup>17</sup> Also, as Taylor et al. (2005) have noted, users of this approach are limited to the outcomes contained in the effectiveness literature on which the costing-out specifications are based, which may be quite different from those that are of direct interest to the client.

The evidence-based approach also tends to promote a prescriptive, “one size fits all” model that is contrary to a goal of providing local education agencies with increased flexibility in the way they allocate resources. Finally, the

approach does not lend itself easily to measuring the additional (marginal) costs associated with providing adequate educational opportunity across students with diverse levels of needs (i.e., at-risk, special education, English learner, and transient/mobile student populations) and hence offers little insight into how resources should be distributed to this end.<sup>18</sup>

### **Discussion: No Single Correct Methodology**

The preceding section briefly outlined the four main methodologies that have been used to conduct costing-out studies of educational adequacy. At this point it is important to acknowledge that costing out educational adequacy is not an exact science that yields precise cost estimates. Research on the effectiveness of educational practices and the resources necessary to deliver effective programs is simply not yet advanced enough to provide definitive evidence on what the best (most efficient) methods are to serve student populations with various needs.

Clearly, having unambiguous evidence on “what works” would make the costing-out process straightforward; one would simply apply the evidence-based technique with perfect confidence in the research being used. However, as we have suggested, we cannot be fully confident in the effectiveness literature on which the costed-out best practices are based.

Indeed, each costing-out technique requires a certain amount of faith on the part of the reader that the educational production process (i.e., the transformation of educational resources into outcomes) has been accurately modeled, and there is no one best method to perform a costing-out study. When evaluating adequacy using the cost-function technique, the assumption is that the statistical model accurately estimates the relationship between a limited set of outcomes and cost and, based on the estimates, is capable of predicting the cost of providing adequacy. For the professional-judgment technique, faith as to what types of programs and resources are necessary must be put into the judgment of qualified practitioners. The successful-schools model requires belief in the identification of truly successful schools or districts and a belief that the level of resources they employ will be sufficient for all schools to succeed at the same level. Finally,

as mentioned above, the evidence-based model requires the reader to be confident in the effectiveness literature on which the costed-out best practices are based.

Although no single approach may be adequate to the task, researchers working in this field have begun to adopt various combinations of these four basic approaches to

school finance adequacy. The subsequent chapters in this paper offer a description of how one might draw on some of the best elements of each of these four approaches to devise a reasonable and rational way to estimate the costs of an adequate education and use this analysis to develop a state school funding formula.



### 3

## *The Comprehensive Costing-Out Study* *Component 1: Defining Adequacy*

Ultimately, costing-out studies are done in response to the needs of state policymakers to link their school funding systems to the outcomes they are supposed to produce for all children. These studies are most often conducted at the request of the legislature or the governor or under mandates from the courts. Regardless of origin, a costing-out study requires the state policymakers to design a mechanism for determining how much funding needs to be invested in education to achieve the stated goals (What is the cost?—the first fundamental question from the previous chapter) and how these funds need to be distributed among the local agencies responsible for delivering the services across communities (What is an equitable allocation?—the second fundamental question).

The costing-out research has evolved greatly in response to increasing demand for studies to provide more detailed and in-depth analyses that not only sufficiently answer the two fundamental questions but also facilitate action by policymakers.

This chapter and the two that follow it outline what we believe are the three necessary components that constitute a *comprehensive* costing-out study. The components are comprehensive in the sense that they provide the several, key pieces of information that aid in the development of actionable policy. In addition, we show how various elements of the costing-out techniques described in chapter 2 have been woven together into a hybrid model.<sup>19</sup> The three necessary components considered are as follows:

1. Defining adequacy
2. Costing out adequacy
3. Developing a funding formula.

Defining what constitutes an adequate education is a critical first step in any costing-out study. Almost all state

constitutions contain notoriously vague clauses that hold the state responsible for providing an adequate education to all public school students. The majority of court cases have been based on these clauses. However, to go beyond such general statements, two recent studies conducted in New York and New Mexico (Chambers et al. 2004a and 2008a, respectively) developed formal *goals statements* through public engagement processes in which public input was solicited. The goals statements were then used as the foundation for the respective costing-out studies. This initial step of public engagement serves several purposes that are integral to the costing-out process and important for the success of these studies.<sup>20</sup>

First, the public engagement process provides a way to promote public buy-in to the process. It conveys to the public that policymakers are listening to them and care about what they think. Providing the opportunity for a wide range of public input helps establish the legitimacy of the study and underlines a willingness to include a broad range of perspectives in the process.

Second, public engagement provides a formal mechanism for developing the goals statement, which serves as a foundation for whatever costing-out technique might be applied. Developing a formal goals statement is a vital first step in the costing-out process. That is, in order to cost out an *adequate education*, one must begin with a sufficiently precise definition of what constitutes *adequacy*. First, the goals statement defines “educationally adequate” by stating those outcomes that the public feels should be produced by the public schooling system. Second, public engagement can help establish the priorities of various elements in the goals statement.<sup>21</sup>

Third, public engagement provides an opportunity to obtain input from a wide range of key constituencies about



the importance of various programmatic components or educational inputs necessary to achieve the goals. Fourth, the public engagement process also makes it possible to ascertain the general importance the public places on achieving an adequate education, can tell the investigators how much citizens would be willing to pay to support adequacy, and may offer some guidance on the types of revenue sources citizens feel should be leveraged to fund an adequate education.<sup>22</sup>

Last, determining the goals of an adequate education can also provide a more formal definition of educational adequacy in legal proceedings. In turn, establishing the formal outcome goals that an “adequate” education should provide has regularly been required in court-ordered studies.

### **A Note on Outcomes**

The emergence of the standards-based reform movement, the push for accountability, and the requirements established under No Child Left Behind have brought an increased reliance on standardized test scores as metrics for defining the goals of the public school system. It has been argued that this overreliance on test scores in relatively few subject areas (i.e., reading and math) has crowded out learning in other areas. Rothstein (2007) states:

Schools have many goals for students: basic math and reading skills but also critical thinking, citizenship, physical- and emotional-health habits, arts appreciation, self-discipline, responsibility, and conflict resolution. Schools threatened with sanctions for failure in only one goal will inevitably divert attention from others. One NCLB consequence has been less social studies, science, art, music, and physical education—particularly for low-income children, whose math and reading scores are lowest and for whose teachers the consequences of spending time on, say, history, rather than more math drill, are most severe. (p. 50)

Furthermore, it seems that this focus on test scores reflects a narrow view of what has traditionally been expected of public schools. Indeed, many states specify curriculum content standards that are far broader than the

NCLB accountability requirements and that encompass a variety of noncognitive skills and qualities that students should be expected to possess. Clearly, these can also be included in the definition of outcomes produced by an adequate education.

### **Examples of Public Engagement The New York Study**

A large-scale public engagement effort organized by the Campaign for Fiscal Equity (CFE) and the New York State Council on Costing Out (CCO) was conducted as the first stage of the New York adequacy study.<sup>23</sup> A series of 13 public forums took place at various locations across the state. These provided opportunities for teachers, administrators, school board members, parents, business leaders, policymakers, and other members of the community to share their insights about the unique challenges facing New York’s geographically and demographically diverse school districts in meeting the state’s Regents Learning Standards and the requirements of the federal No Child Left Behind Act.<sup>24</sup>

Each forum followed a standard format that began with an opening introductory plenary session, which introduced the costing-out study. Participants then broke into directed small-group discussions facilitated by a trained moderator who provided written materials that included a discussion guide and background book. All groups considered the same set of questions that focused on the following topics: (1) the specific challenges for local schools in meeting federal and state requirements; and (2) the programs and practices that work for students at risk of or not meeting these standards, including special education students and English-language learners. Many common themes emerged from these forums:

There was strong consensus among public engagement participants from around the state that if we take seriously the need to provide a real opportunity for all students to meet the Regents Learning Standards, then it is essential that schools be able to ensure the programs and practices meet the educational needs of students at risk of or not meeting standards. Participants statewide agreed that these included early childhood programs,



parent involvement, small classes, and ongoing collaborative professional development. (Public Engagement Report 2004, as quoted in Chambers et al. 2004b)

### The New Mexico Study

For the recent study in New Mexico, the AIR research team developed its own public engagement process that introduced a variety of new approaches to obtain public input. Similar to the public-forum approach taken for the New York adequacy study, the New Mexico study employed a series of 23 town-hall meetings in a wide range of rural, suburban, and urban communities throughout the state.<sup>25</sup> The format of the New Mexico meetings differed somewhat from the New York gatherings. Although the meetings in New Mexico included open-ended discussions on topics surrounding educational adequacy (i.e., what are the outcomes that define an adequate education, and what programmatic elements are most appropriate to deliver these outcomes), the New Mexico groups also received a set of survey questions.

Although every effort was made to publicize the meetings through local media (newspapers and public service announcements on radio), it cannot be said that the process achieved a random sample of the public at these meetings. Some parents and members of the business community did attend, but for the most part, local educators made up most of the participants. In part, for this reason, AIR also developed an online survey directed toward a more general audience, and again advertised in local media. This online survey offered any member of the public an opportunity to express views through the project Web site. More than 1,700 members of the public chose to participate.<sup>26</sup>

A third online survey was also directed toward a specific group of policymakers and practitioners, including all legislators, district superintendents, and school principals in the state.

The development of the three surveys for the town-hall meetings, the general public, and the policy/practitioner audience, was in part influenced by recent work in which Rothstein (2004, 2007) discussed the importance of more broadly defining educational goals to encompass noncognitive as well as a well-rounded set of cognitive skills (i.e., not just focused on the NCLB goals of math and reading).

To help develop a goals statement that could be used for the costing-out process, the AIR team designed the survey items in part to gauge the relative weight the public placed on various outcomes, as grouped into two major areas: *knowledge and skills* (cognitive) and *personal qualities* (noncognitive).<sup>27</sup> To facilitate data collection during the town-hall meetings, the research team made use of an audience-response system that was capable of recording responses to questions in real time by providing each individual in the audience with a wireless voting “clicker.” The system allowed for immediate display of survey results, which in turn enabled further discussion on the goals and priorities.

Interestingly enough, the public survey responses support Rothstein’s view that the goals of a public education should include a broad set of outcomes:

Citizens noted that the current education system emphasized acquisition of content knowledge in specific areas (specifically, reading and math) at the expense of the development of other content areas and the development of personal qualities. Citizens indicated that they would prefer to see a greater balance between Knowledge and Skills and Personal Quality items, with roughly a 60 percent emphasis on Knowledge and Skills, and 40 percent on Personal Quality items. (Chambers et al. 2008b)<sup>28</sup>

In addition, many of the same programmatic features thought appropriate to achieve the adequacy goals in New York also emerged from the New Mexico public engagement effort. In order to identify the elements that individuals felt were highly important, the AIR research team provided town-hall meeting participants and survey respondents with a categorized list of 80 common programmatic elements. Participants were asked to rank each on a scale from 1 to 9, where 1 indicated that the element was of “low importance” and 9 of “high importance.”<sup>29</sup> The respondents noted several elements as crucial to student success. Of the 80 elements grouped into the nine categories, the following items were rated as “critical” to student success in their school or district (i.e., receiving a 9 on a 9-point scale) by more than half the sample:

- Early childhood education and full-day kindergarten
- Access to educational technology
- Intensive early grade reading and math interventions
- Tutoring and other individualized support for struggling students
- Opportunities for special education students
  - Access to teachers with special education training
  - Access to supplemental supports (speech and physical therapy)
  - Opportunity for individualized academic support within special education classrooms
  - Intensive early interventions for students identified as possible special education candidates.
- Teacher quality
  - Teachers certified in subjects taught
  - Teachers knowledgeable of most current methods
  - Teachers with understanding of child development
  - Sustained professional development opportunities.
- School environment
  - Small classes
  - Learning environments characterized by respect, good communication, and positive interactions
  - Up-to-date school facilities
  - Safe, drug- and violence-free environment
  - An environment that seeks to improve constantly using input from parents, teachers, and the community. (Chambers et al. 2008b)

## Examples of Goals Statements

Appendix A of this paper presents the goals statements used for the New York, California, and New Mexico adequacy studies. In addition, the appendix includes a table that compares the three goals statements and highlights the elements they encompass with respect to student performance, curriculum and content standards, noncognitive skills, preparation for the student's future after school, and diversity of educational experience. The following paragraphs summarize and describe some of the differences in the three goals statements. The paper returns to this discussion in the next chapter, which presents the adequacy cost estimates from the three studies.

The New York goals statement was derived through a public engagement process and is simple and straightforward in concept. The goals statement was crafted by the Campaign for Fiscal Equity (CFE), based on the input

from the town-hall meetings, and approved by a stakeholder committee at the end of the process. It encompasses two paragraphs in total and places emphasis on students being able to meet the Regents Learning Standards and to earn a Regents diploma. The statement stresses providing the *opportunity for success* by offering access to adequate resources without a guarantee of achieving the outcomes.

The goals statement for the New York study came from a public engagement process. In contrast, the statement for California was developed directly from the state's Education Code. In addition, whereas the New York goals focus on the *endpoint* of the student educational experience, the California goals include specific measures of outcomes (e.g., test scores, attendance rates, and graduation rates) to be achieved *during* a student's schooling career. The California statement also stresses access to the resources necessary to deliver the curriculum content standards to all children.

The New Mexico goals statement was based on a comprehensive public engagement process that included 23 town-hall meetings, the two online surveys, and a culminating stakeholder meeting. The goals statement itself was crafted by a stakeholder committee that met at the end of the public engagement process. Members of the stakeholder committee were selected entirely by the Legislative Council Services (the client for this study) in consultation with the New Mexico School Finance Task Force and included a total of 50 representatives of the legislature; teacher unions; associations of educational professionals (e.g., administrators and educational specialists); school board association; citizens and taxpayers; parent associations; and the business community.<sup>30</sup> The draft statement was edited by the research team at AIR and then presented to the stakeholders for review, comment, and final adoption.

The New Mexico statement widens the range of significant outcomes beyond achievement test scores. Specifically, it includes knowledge and skills in certain subject areas in addition to personal qualities such as honesty, integrity, citizenship, and various life skills. With regard to achievement outcomes, the New Mexico statement stresses appropriate growth in test scores during each year but has a reduced focus on achieving specific test scores as such. In fact, the stakeholder committee was explicit about not including specific test scores in their statement.<sup>31</sup>

## 4

### *The Comprehensive Costing-Out Study* *Component 2: Specifying and Costing Out Programs and Resources*

Once adequacy goals are finalized, the focus of a comprehensive study turns to estimating the costs of achieving those goals. In this effort, the research team works with the educators on the professional-judgement panels to facilitate the development of adequate instructional programs and the specification of the resources necessary to deliver the developed programs in a variety of settings defined by student need and scale of operation. The research team then calculates cost estimates of providing an adequate program based on the resource specifications. In specifying and costing out programs and resources, three fundamental cost factors should be taken into account:

- Student needs
- Scale of school and district operations
- Geographic cost differences.

The objective here is to identify factors affecting the cost of providing an adequate educational program in different communities across a state. In this context, the term *cost factor* means a characteristic of the students served or the school or district itself that is outside the control of local district decision makers. Each of these three factors, with examples, is described in more detail below.

#### **Student Needs**

Student needs refers to characteristics of the student population that are associated with gaps in student learning. Any competent costing-out study needs to define with care what these needs are and ideally link resources thought necessary to meet those needs.

#### **Coping with Poverty**

Children in low-income households often do not have access to the learning experiences and resources that

permit them to take full advantage of what is offered to them in public schools. On average, students living in low-income households begin the school experience at a deficit relative to those in higher income households. Schools thus must provide resources to compensate for these deficits. This may mean more exposure to learning outside the home through smaller student–staff ratios (i.e., more intensive use of instructional and support staff), more qualified service providers, a longer school day or year, and increased years of schooling through early intervention programs.

#### **Learning English**

Children who live in households in which English is not the first language may have difficulty learning when English is the primary language of their schools. Learning difficulties may arise not only from a lack of a basic ability to communicate but also from cultural differences that inhibit understanding. This may necessitate some of the same additional resources as for a student from a low-income family, but it also requires staff members who are more qualified to work with non- or limited-English speakers. Thus, adequately serving English learners requires both higher levels as well as different types of resources. It is also important to recognize that often children who are language minorities within the United States also come from lower income families.<sup>32</sup>

#### **Compensating for Effects of High Mobility**

Students who move between schools are likely to find that the disruption in their educational experience affects their learning. That is, student-learning outcomes are affected by students' peer relationships, their need to negotiate the ambiance of a new classroom, their understanding of the

new school and its classroom rules, and their degree of comfort with a new set of classmates. Moreover, disruption to the learning environment extends not only to the students who move but also to the nonmobile students who must accommodate the newly entering or departing students. The nonmovers, too, must cope to some degree with the disruptions to the quality and stability of the learning environment. Higher levels of mobility therefore may require smaller classes or, more generally, lower student–staff ratios that will permit school personnel to respond more effectively to the individual needs of all their students.

### **Coping with Disability**

Perhaps more than any of the challenges affecting student learning, mental, emotional, and physical impairments call for additional resources if the affected students are to have the same opportunity to achieve as their non-disabled peers. Indeed, laws such as the Individuals with Disabilities Education Act (IDEA) explicitly recognize and address the needs of these students through a detailed process that identifies each individual’s specific needs in an Individualized Education Program (IEP).

### **Scale of School and District Operations**

Schools or districts located in relatively remote rural communities are often unable to operate at an optimal size, which results in higher per student costs. These diseconomies of small-scale operation result from four factors. First, certain minimum levels of administrative and support resources may be required to oversee school and district operations, regardless of how small operations might be. As enrollment declines, these resources are spread across fewer and fewer students, resulting in higher operational costs per student.

Second, schools in smaller districts have more difficulty in organizing children into efficient learning groups because they may lack a critical mass of students at any grade level or because not enough students are demanding instruction in certain specialized subject areas. For example, the reluctance to combine elementary students from different grades into individual classes often results in abnormally low student–teacher ratios in the single-grade classes, which then drives up per student cost. It is also more difficult to provide specialized elective classes

commonly offered in the secondary grades. When these are offered, the classes end up being smaller than those in a larger district.

Third, small school districts are generally located in rural communities where the student population density is lower and distances between schools, the central district office, and warehouses are further, requiring greater coordination and communication efforts.

Finally, large-scale purchase of goods and services is not available to smaller schools and districts. Thus, smaller districts have less ability to purchase at a discount.

### **Geographic Cost Differences**

Price levels can vary dramatically from one location to the next depending on a great many factors related to labor markets (for personnel resources) and geographic location (for nonpersonnel resources). The variation in personnel compensation (i.e., salary and benefits) reflects labor-market forces that affect the ability to hire and retain staff with comparable qualifications across different locations. These forces include the characteristics of both the district location (e.g., price of housing, availability of cultural amenities and other public goods) and work environment (e.g., caliber of student, crime rate at schools) that will affect the *reservation wage* of prospective staff (the level of compensation below which they will not accept a job).

To control for the variation in labor costs associated with a district’s ability to hire and retain comparable staff, researchers have developed geographic cost of education indexes (GCEIs; see Chambers 1998; Taylor, Chambers, and Robinson 2004; and Taylor 2005). The index values are most often calculated for each district or regional labor market in the state and represent the cost of hiring and retaining comparable staff relative to the state average.<sup>33</sup> For example, an index value of 1.05 indicates a relative difficulty in hiring and retaining staff in the given location that would require the district to spend approximately 5 percent more than the state average to compensate personnel. Similarly, index values below 1.00 reflect a relative ease in attracting and retaining staff, which would translate into a lower-than-average compensation costs.

The costs of nonpersonnel resources can also differ greatly across location. Examples of nonpersonnel resources commonly found at schools include instructional supplies and materials, textbooks, equipment and

technology, and funding for professional development. However, some more centralized district-level nonpersonnel costs—such as transportation, insurance, and utilities—are also associated with the continued operation of local education agencies. Nonpersonnel costs vary largely because of the differing distances over which goods (and students) need to be transported but also because of other district characteristics, such as climate. Although the costs of nonpersonnel resources are certainly significant, they tend to make up a much smaller share of the total costs of education.<sup>34</sup> In turn, the costing-out literature has put much more emphasis on controlling for variations in the costs of personnel that make up the bulk of total educational costs.

## **A Hybrid Model for Costing Out of Resources**

The following section provides a detailed explanation of how the authors have specified and costed out resources in studies they have conducted. In doing so, we describe a hybrid model that uses professional judgment as a centerpiece but also draws in elements from both the evidence-based and successful-schools / beating-the-odds methods to costing out. The discussion also highlights how the approach has directly involved educational practitioners and points out the way in which the approach has taken into account the three cost factors (student needs, scale of operations, and geographic cost differences) mentioned above.

## **Involving Practitioners in the Costing-Out Process**

The importance of including practitioners in the costing-out process should not be underestimated and is a major reason the authors have based their hybrid model on the professional-judgment technique. There are at least two important reasons to involve educational practitioners in this process.

The most important reason for practitioner involvement is the fact that practitioners are closest to the delivery of educational services and therefore may be the most knowledgeable as to what types of programs and services students need to succeed. In turn, not leveraging this knowledge base would seem to be a gross oversight. Interestingly enough, the U.S. Department of Education

has recently joined the authors (and the National Education Association) in realizing the value of practitioner involvement in policy:

By next fall—only months before she leaves office—U.S. Secretary of Education Margaret Spellings plans to have five teachers on her staff and set up a group of 20 ad hoc advisers still working in classrooms.

“It’ll be very useful in both directions for teachers to understand what the issues are at the macro level,” she said in a recent interview. “But it’s also hugely beneficial for us to make sure we know: Is this policy implementable, doable, realistic, and righteous by the classroom teacher?”

Teacher advocates applaud the effort, but they also wonder: Why did it take so long?

“Unfortunately, they waited until the last year of the administration to bring the voice of teachers back in,” said Segun C. Eubanks, the director of teacher quality for the 3.2 million member National Education Association. “They haven’t had any systemic way to put the voice of classroom teachers in any decision making role within the Department of Education or within the [Bush] administration.” (Hoff and Keller 2008)

Second, decisions stemming from the results of a costing-out study are almost certain to affect these individuals directly by affecting funding levels, the types of programs and resources available, and the flexibility with which to use resources, which largely define the educational work environment. As in other educational reforms, a key determinant of successful implementation of those policies stemming from costing-out study results is to obtain buy-in from the practitioners who will be expected to implement the reform and who are directly affected by it. If educators feel that their views are taken into account in the process, they are more likely to buy into the resulting reform and be better at implementing it.

## **Allowing for a Broad Range of Outcomes**

Allowing for consideration of a broad range of outcomes in the costing-out process is another important reason



why we based our hybrid model on the professional-judgment methodology. Although the cost-function, evidence-based, and successful-schools/beating-the-odds approaches could all potentially accommodate the use of multiple outcomes, they have tended to focus on only a limited set of goals usually measured by achievement test scores, most commonly English-language arts or mathematics. The use of limited outcome measures is a matter of practicality, as two of the approaches rely on statistical models that require readily available data, and test scores are most often the only measures that are regularly collected. In contrast, the professional-judgment model offers a more open and flexible approach in considering a broad set of educational goals.

### Using Professional-Judgment Panels

Cost analysis based on the professional-judgment technique relies heavily on resource specifications developed by panels of educators (professional-judgment panels, PJPs) selected from the state in which the study is being conducted. This method can rely on a single panel or multiple panels. However, the present authors have stressed the importance of assembling multiple panels whenever possible.<sup>35</sup> The use of multiple panels increases the reliability of the results by preventing the dependence of the findings on the judgment of a single panel. Multiple panels may specify different resource models for achieving adequacy. It is useful, moreover, to see the extent to which these different models result in differential cost estimates.

In addition, by selecting multiple panels, the research team provides an incentive for each panel to be as efficient as possible in the design of its educational programs to achieve adequacy. The notion is that no individual panel wants its resource specifications to stand out as overly rich, and no panel wants to be accused of omitting important design elements typical of successful schools.

In addition, to provide a representative account of what is necessary for an adequate education across the diverse range of districts commonly found in most states, the AIR research team encourages the creation of panels that are specific to geographic regions or district types (i.e., urban, suburban, and rural areas). This is because the program designs and resource specifications necessary to achieve the desired results in rural districts are likely to be quite

different from those in suburban and urban districts in which schools have the option of operating schools at optimal sizes.

A significant strength of using professional-judgment panels (PJPs) is that each panel brings together a wealth of experience from a comprehensive group of practitioners whose collective knowledge covers a myriad of functions (e.g., administrative, instructional, and student support services) and takes into account perspectives from the district and from various schooling levels. Each of the panels used in the AIR studies has included approximately nine members made up of the following types of individuals: one superintendent; three principals (one at the elementary, middle, and high school levels); a director of special education; an English-learner specialist; a school business officer; and two classroom teachers (one at the elementary level and one from a middle or high school). Care was taken to assemble panels comprising only individuals from districts within a particular geographic region and/or level of urbanization.<sup>36</sup> In addition, whenever possible, to prevent overrepresentation or negative group-dynamic effects (e.g., a superintendent influencing the judgment of a subordinate principal or teacher from the same district), no two individuals from any one district were placed on the same panel.

It is important that the participants in the PJPs be among the most knowledgeable and well-regarded educators from across the state. To accomplish this goal, AIR selected participants through an extensive process involving a statewide solicitation of nominations from associations of professional educators, the public education department, school boards, superintendents, and principals. Each nomination required the submission of a written rationale explaining why the individual was nominated. AIR sorts these by position and region of the state and asks the nominees to send an application form that indicates their interest in participating, their ability to participate, and extended information about their knowledge and experience in working with various special-needs student populations. Applications are reviewed carefully by the AIR research team, final selections are made, and the selected candidates are invited to participate in the scheduled PJP meetings.

The meetings last approximately three days. Participants are compensated for their travel and lodging, and

each receives a modest honorarium for their time. The honorarium serves as a signal to indicate that the participants' time and expert judgment are highly valued. In observing these processes over time, the present authors have found that participants take the deliberations quite seriously and give careful consideration to the tasks asked of them.

Prior to the panel deliberations, AIR provides each panelist with a package of materials to review. This package has been compiled to aid the panels in developing their instructional program designs and the resource specifications they believe are necessary to deliver these programs. The package of materials incorporates elements of the evidence-based and successful-schools / beating-the-odds techniques into the professional-judgment process. The materials included are as follows:

- **Evidence-based element.** This includes a balanced review of the educational literature on the programs and resources thought necessary to operate successful schools, for general as well as special-needs populations. The materials have taken the form of short literature reviews developed by the AIR research team or expert briefs written by leading scholars and practitioners on effective programs for at-risk, special education, English learner, and rural populations.<sup>37</sup>
- **Successful-schools / beating-the-odds element.** This includes an extensive set of average resource profiles for schools identified as beating the odds (i.e., those schools determined via statistical analysis to be performing significantly better than expected given the needs of the students they must serve). Each resource profile is simply a comprehensive list of staffing FTEs per student used by the average beating-the-odds elementary, middle, or high schools in urban, suburban, and rural districts, respectively.
- **Actual resource profiles.** A similar set of average resource profiles over all elementary, middle, and high schools is also provided as a reference that would help give panelists a grounded view of what schools are currently doing and as a point of comparison for the beating-the-odds profiles.
- **Task instructions.** This packet includes the instructions the PJPs will need to follow, including the format of the structured deliberations to take place during their three-day meeting, the individual tasks they will

be asked to perform, and a copy of the goals statement developed in the first component of the study (i.e., from the public engagement process).

Figure 1 illustrates how the AIR hybrid model, although based on professional judgment, incorporates elements of both the evidence-based and successful-schools / beating-the-odds techniques. The diagram includes the major components the authors believe are necessary for a comprehensive study to address the adequacy and equity of school funding.

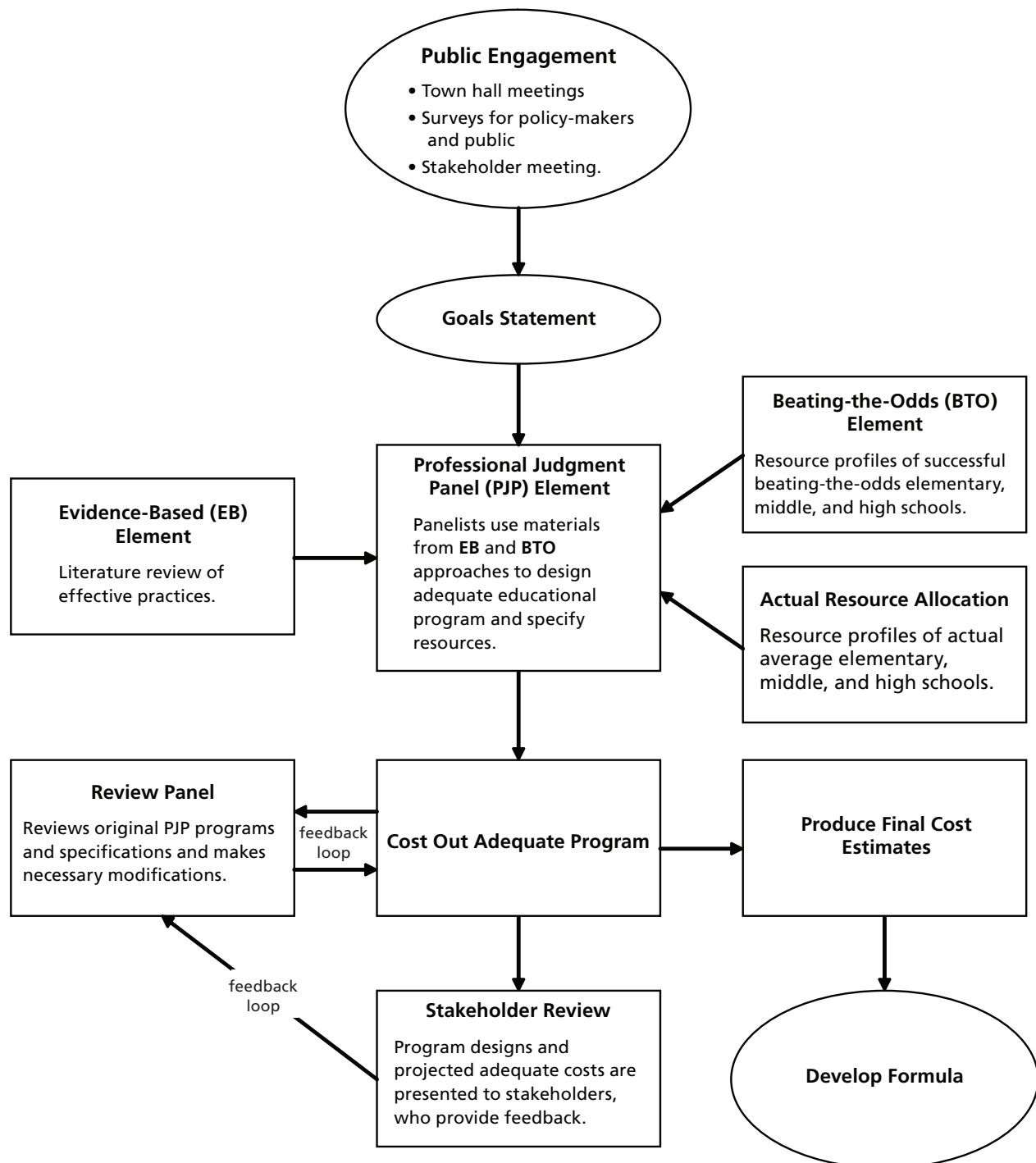
### *PJP Task 1: Designing an Instructional Program*

The first task for each panel is to develop instructional programs designed to deliver an adequate education as efficiently as possible (i.e., one that will satisfy the outcomes put forth in the formal goals statement at minimum cost) for prototypical elementary, middle, and high schools representative of the average low-need schools within their district type (e.g., urban, suburban, or rural). Panels receive the materials described above, along with demographic profiles of low-need elementary, middle, and high schools that include the following demographic characteristics: total school enrollment; percentages of students at risk, in special education programs, and designated as English learners; and school-level mobility rate.<sup>38</sup>

With these materials, the panel conceptualizes an instructional program that will deliver an adequate education. This entails determining the core program for the general education student population and creating a description of the programs that cater to the needs of specific student subpopulations.<sup>39</sup> It is important to note that the instructions for the panel tell them that in developing their program designs, they should provide a rationale for each programmatic component described and, if possible, show how the chosen practices and theory of action are grounded in the effectiveness literature. In addition, throughout the deliberation process, the panels are regularly asked to consider the following questions:

- Will your design reach the goals?
- Does your design minimize cost?
- Is your design supported by research evidence or your practical experience?
- Does your design fit the realities in your state?

**Figure 1. A Comprehensive School Funding Study**





Each panel is provided with a laptop computer for documenting the completed program designs that will serve as the basis for developing specifications of the resources necessary to deliver these programs in Task 2.

### *PJP Task 2: Developing Resource Specifications*

Using the completed schooling-level-specific program design documents, the panels next specify the individual resources necessary to deliver their developed programs for a series of prototypical schools that vary with respect to student need and size.<sup>40</sup> To be precise, panels are asked to specify the following pieces of resource information:

- Length of regular school day and year (for students and teachers, administrators, and student support staff)
- Full-time equivalents (FTEs) of administrative, instructional, and instructional support staff
- Nonpersonnel dollars for professional development, supplies and materials, educational technology, and so on.

In addition, the most recent study in New Mexico (Chambers et al. 2008a, 2008b) also allowed panels to specify the appropriate distribution of teachers with respect to education and experience using the state's three-tiered licensure system. This represented an attempt to incorporate explicit information about adequate student access to highly qualified teachers and the extent to which this might differ with respect to student need.

To facilitate the task of developing resource specifications, each panel is given a set of structured cost model worksheets (one for each schooling level) to record their resource specifications. The worksheets are carefully organized by programmatic component (i.e., core instructional, special education, and English-learner programs; administration; nonpersonnel; special extended-day and extended-year programs; early childhood education; and preschool programs) to make it easier for the panel to specify the necessary resources to deliver their program designs.

Note that the cost-model worksheets not only provide a vehicle to record resource specifications but also calculate in real time the overall and individual-component-level costs of the specified program using average statewide compensation levels to calculate the costs of personnel resources. In this way, the panels have the ability to track the impact of their decisions on the costs of operating the

schools they have designed. Specifically, the cost-model worksheets permit the panels to see and consider the potential for trade-offs related to the costs of various types of professional and paraprofessional staff and nonpersonnel resources.

During the course of their deliberations, panels complete a series of exercises that correspond to various school profiles with regard to student demographics or school size. For example, each panel begins with a base model that represents a low-poverty school with average incidence of students in the other need categories (i.e., average special education, English-learner, and mobility rates) and enrollment. In all but one of the exercises that follow, the value of a single demographic is changed from that of the low-poverty base model, and panels are asked to document changes to their program designs and resource specifications that are deemed necessary to achieve the desired goals for the given school prototype. The full list of PJP model exercises used is as follows:

- **Low poverty (base model).** Low poverty, average levels of other student needs, and average size.
- **High poverty.** Same demographics as base model *except* increased poverty.
- **High poverty/high English learners.** Same demographics as base model *except* increased poverty *and* English learners.
- **High special education.** Same demographics as base model *except* increased special education.
- **High mobility.** Same demographics as base model *except* increased mobility.
- **Small school.** Same demographics as base model *except* increased special education.

For each of the exercises listed above, each panel is asked to complete resource specifications for each school level: one each for an elementary, middle, and high school, respectively. The demographics defining each of the model exercises are set to values typical of the schools in the given district type (i.e., urban, suburban/small-town, or remote rural) represented by the panel.

It is important to point out that in the third model exercise specified above, the incidence of poverty and English learners are both increased above the base-model levels to accommodate the strong relationship between these two characteristics. As indicated earlier, although it

is possible to have high-poverty and low-English learner percentages, it is generally true that high-English learner schools also tend to be high-poverty schools as well (i.e., low-poverty/high-EL schools are uncommon). Therefore, offering a high-English learner exercise that is “linked” to the low-poverty base model would provide a school prototype that is rarely observed in the real world and therefore unfamiliar to most panelists.<sup>41</sup>

Defining and organizing the model exercises in this fashion serves an important purpose. By changing the demographic characteristics that define each model exercise one at a time, we can track how the expected cost of providing an adequate education responds to changes in various student needs and school size. That is, the calculated costs generated by the completed cost-model worksheets can be used to estimate the marginal costs of adequacy with respect to student need and scale of school operations at the elementary, middle, and high school levels. Coupling these results with real school-level data on these cost factors (i.e., levels of student needs and school size) allows the projection of the adequate instructional program cost for each school in the state. The total cost of providing an adequate school-level instructional program is then aggregated across all schools within each district to yield district-level adequate instructional program costs. Below, we discuss how more centralized district administrative as well as maintenance and operations costs are included in the model.

### **Performing Final Review of Resource Specifications**

Before the PJPs deliberate, they are instructed that their names will be public information and that the written materials and cost-model specifications derived from their deliberations will be a matter of public record.<sup>42</sup> Thus, the panel members know they will be held accountable for what they do during their deliberations. We believe that this element of accountability helps them to take their role very seriously. Moreover, they are told that their materials and the adequacy cost estimates derived therefrom will be carefully reviewed by a stakeholder panel.

Whenever possible, AIR has used a review process to reconcile the final program designs and specifications used for the cost analysis. In New York, AIR created a review panel from representatives of each of the original

eight PJPs to facilitate a final set of resource specifications for the cost analysis.

In New Mexico, the Project Advisory Panel (PAP), which comprised a group of legislators and educators completely independent of the original PJPs, was assigned to conduct the review process. Almost all of the legislators also happened to be either current or former educators in New Mexico.

This review helps to ensure that the program designs and resource specifications are as efficient as possible in achieving the stated goals. It also offers an opportunity for the review team to assess how realistic the cost estimates are within the context of the state’s economy—an issue that was a significant criterion established by the New Mexico policymakers in their original specification of the project design.

### **Accounting for District-Level Costs**

In addition to the costs of providing the resources to support school-level operations, several significant costs occur centrally at the district level. These include the costs of ancillary or related services for special education students (which are often deployed by the central district office) as well as the overhead costs associated with central administration services and maintenance and operations.

### **Ancillary or Related Services**

In addition to instructional services, students with disabilities generally require specialized, related services such as speech therapy, physical and occupational therapy, audiological services, orientation and mobility services, and adaptive physical education. Often these services are provided by itinerant staff operating out of the district office and serving multiple schools. These services require additional resources to support travel of professional staff between schools, and these travel costs tend to vary significantly between rural, suburban, and urban districts.

To account for the costs of ancillary services, each PJP must complete one additional district-level exercise that is similar to those presented above for the school prototypes, except that it is geared toward the specification of these ancillary personnel, who commonly work out of the central district office.<sup>43</sup> Instead of specifying the FTEs of the various personnel resources, the panels specify case-loads for each (numbers of students per FTE). Panels also

specify rough estimates of the costs of travel per FTE professional staff in rural versus more urbanized communities. These personnel caseloads and nonpersonnel costs are then used to determine district-level cost of ancillary services in a similar manner to the school-level exercises (i.e., using state average compensation rates for the respective personnel categories).

### Calculating Overhead Costs

The costs associated with central administration services and maintenance and operations are regularly calculated by employing overhead rates. These rates are calculated for each district as the ratio of centralized district-level expenditures to actual school-level expenditures.<sup>44</sup> Therefore, the overhead rates reflect the amount of additional spending required to support district overhead expenditures for every dollar spent at the school level on instructional and related service programs. The model assumes that at least a portion of the district-level overhead costs is likely to expand or contract proportionately to the school-level programmatic costs.<sup>45</sup> That is, if the panels specify an expanded instructional program, additional resources to support administration (e.g., for human resources and administrative oversight) and maintenance and operations are likely to be required as well.

After calculating overhead rates for each district, a simple statistical analysis evaluates how they vary according to district size and other characteristics. Based on analysis of a number of district characteristics, AIR has regularly found that total district enrollment is sufficient to explain a substantial proportion of the variance in the overhead rate.<sup>46</sup>

An example of this type of analysis is portrayed in Figure 2, which plots actual and predicted overhead rates against district size across New Mexico's 89 school districts in 2005–06. The figure shows that in some of the larger districts in the state, approximately 20 cents were required to support central administration and maintenance and operations services for every dollar spent at the school level. In contrast, smaller districts spent a much larger amount of their budget on district-level overhead relative to services occurring at the school level. The middle curved line in the figure denotes the predicted overhead rate at each enrollment level (the top and bottom curves show the statistical upper- and lower-bound predictions, respectively). Either the actual or predicted overhead rate

for each district is then multiplied by the sum of (1) the district-level adequate instructional program cost; and (2) the cost of ancillary special education services in order to calculate the amount of money needed to provide the district-level services necessary to support sufficient school-level instructional programs.<sup>47</sup> This is then added to the district-level adequate instructional program cost to yield the overall district-level cost of providing an adequate education. Dividing these figures by district enrollment provides the adequate district-level per student costs.

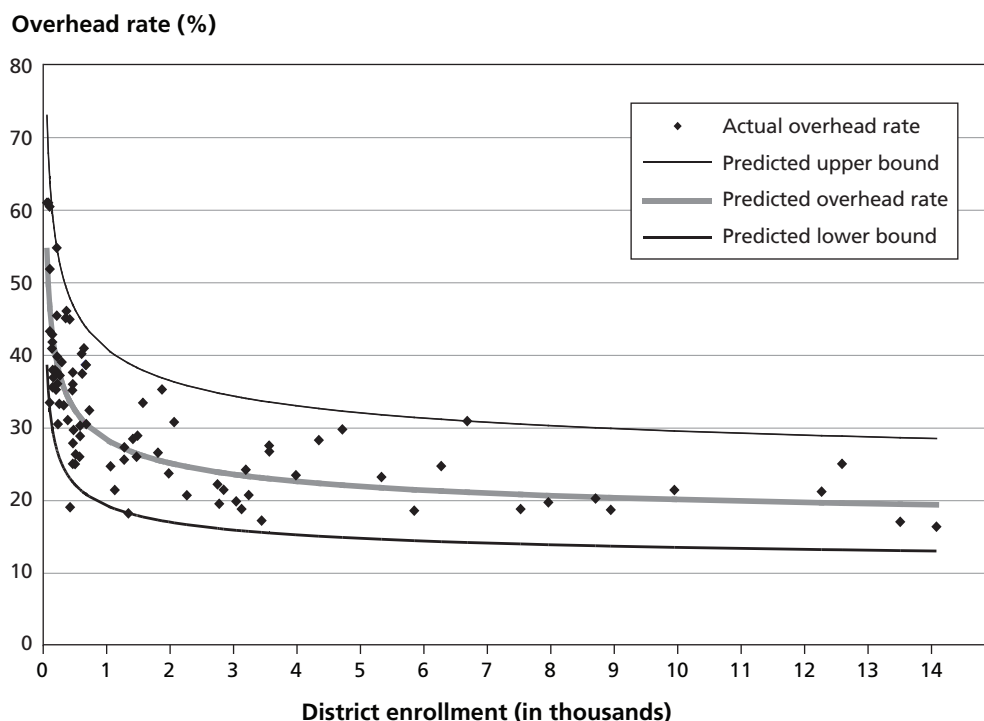
### Accounting for Geographic Cost Differences

The final step in the costing-out process is to control for district variation in the cost of procuring educational inputs. As mentioned above, much of the variation in educational cost stems from factors outside of administrative control that differentially affect the ability to hire and retain comparable staff across districts. To this end, geographic cost of education indexes (GCEIs) are often used to adjust for the fact that it is relatively more costly for some districts to provide an education than for others. In general, the indexes are student-weighted so that they dictate how much more or less costly it is in each district to hire staff relative to the district attended by the average student. Applying the GCEI is simple: the index values are multiplied by the district-level cost of providing an adequate education.

As an example of a GCEI, Figure 3 depicts the cost differentials estimated in the New York adequacy study (Chambers et al. 2004a).<sup>48</sup> There is a clear geographic pattern to the index. Values are highest around New York City and tend to decline as one moves farther away from the state's largest labor market. However, Chambers et al. (2004a) note that index values are also relatively high along the southern shore of Lake Ontario around Syracuse, Rochester, and Buffalo, perhaps reflecting the higher costs in urban areas and the need to compensate teachers for the relatively more severe climate of these areas.

### Conducting Stakeholder Panel Review Meeting

At a final meeting, representatives from the PJPs and the review team described above are required to present their program designs, resource specifications, and adequacy cost estimates to an external panel of stakeholders. These stakeholders are generally the same group of individu-

**Figure 2. Actual and Predicted Overhead Rates for New Mexico Districts, 2005–06**

Source: Chambers et al. (2008a).

Note: For a clearer presentation of the information, the data points for Albuquerque and Las Cruces have been omitted from the figure. Their enrollment / actual overhead rate / predicted overhead rate values are 86,134; 16.6%; and 17.0% and 23,222; 15.1%; and 18.5%, respectively.

als who participated at the end of the public engagement process (described in chapter 3, on the first of the three components necessary to a comprehensive costing-out study—defining adequacy).<sup>49</sup>

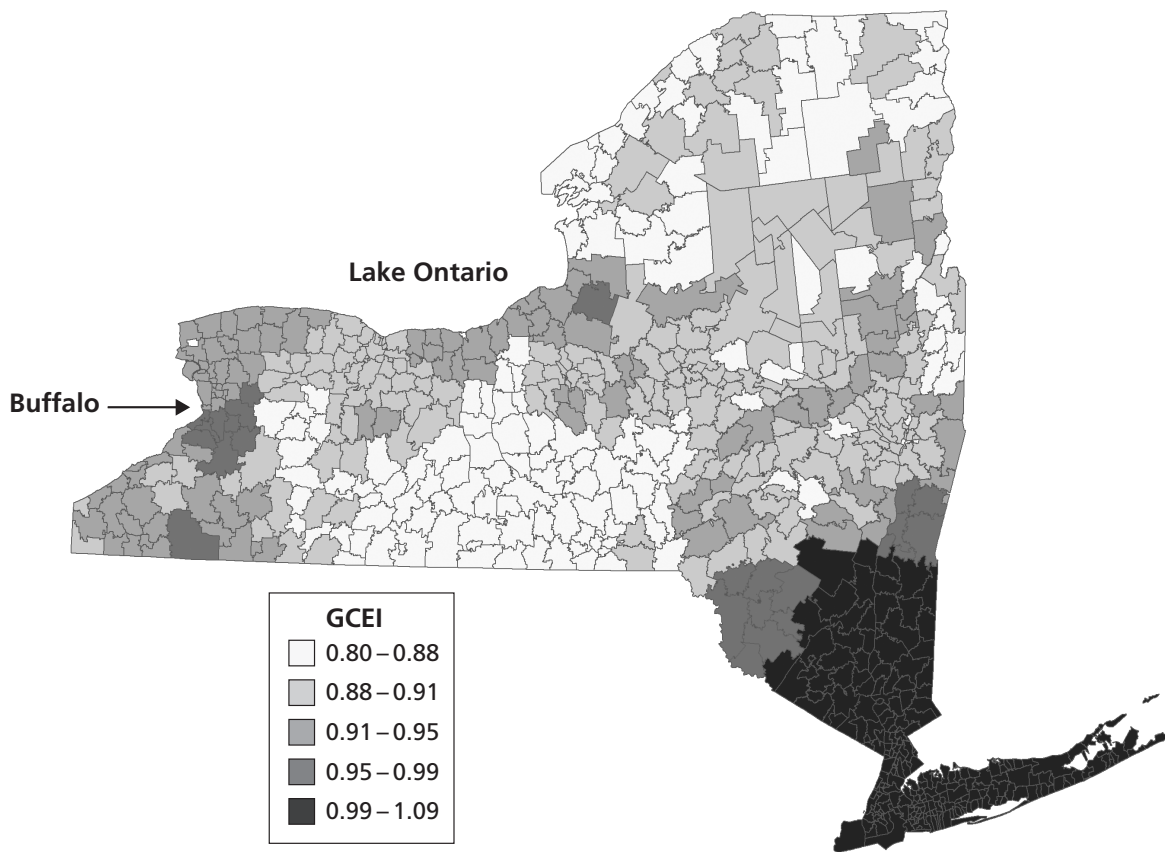
During this meeting, the stakeholders are given the opportunity to question the professional-judgment panelists on every aspect of their program designs and resource specifications. Importantly, because the stakeholder panel comprises local school board members, educators, taxpayers, parents, legislative representatives, representatives of the governor’s office, and members of the business community, it necessarily brings a broad set of perspectives to the process. In addition, including a stakeholder panel review meeting in the process provides a necessary system of checks and balances that serve to ensure the panels have designed programs that will deliver an adequate education in an appropriate and efficient manner. This review can also provide an opportunity to assess

how realistic the cost estimates derived from the PJP process are and what changes might be necessary to proceed with an acceptable reform of the school funding system. Based on these meetings, program designs and resource specifications can be modified before the final cost simulations are performed.<sup>50</sup> These final cost simulations are later used in the process of formula development, so it is important to reach some final agreement on the concepts, goals, and principles underlying the cost estimates before proceeding to the stage of formula development.

## Costing-Out Study Results: Some Examples

### Examples of Programmatic Features and Resource Specifications

Over the past four years, the AIR research team has conducted three major costing-out studies in New York State,

**Figure 3. Geographic Cost of Education Index (GCEI) Values by District in New York**

Source: Chambers et al. (2004a).

Note: This GCEI was estimated with four years of data from 1998–99 through 2001–02 (for details, see Chambers et al. 2004: 48–53).

California, and New Mexico. In each of these studies, a key task of the PJPs was to develop instructional programs designed to meet the specified adequacy goals. The program design documents provide a description of the programmatic practices and elements that the educators believed necessary to achieve the desired results for both the general student population and those students with special needs. Although there is no one-size-fits-all model, it is nevertheless informative to see some of the common elements across the three state-specific studies and to see whether these elements are consistent with the existing research evidence in the field.

As described above, the PJPs were provided with short reviews of the educational effectiveness literature and

expert research briefs. It is difficult to determine the extent to which the various panels actually relied on this information, but a comparison of the commonalities between the practices suggested in these materials and the elements of the final PJP program designs proved quite informative.

Many common themes emerged across the panel resource specifications, both across panels within the individual state-specific works and across the three studies. Table 1 lists the programmatic elements and indicates which of them were specified by panels in one or more of the three adequacy studies highlighted in this paper. The table also indicates whether these practices were also suggested in the literature reviews or expert research briefs provided to the PJPs before their deliberations. Finally,



the table indicates whether each element listed can also be found in the resource elements matrix provided in the recent evidence-based costing-out literature (Odden et al. 2007).

### General Trends in Program Design and Resource Specifications

Table 1 shows the common programmatic trends across the three studies and certainly reveals a significant amount of overlap with both the materials provided to the PJPs and the evidence-based literature.<sup>51</sup> Below, we briefly discuss a select number of these common elements and the PJPs' rationale for including them in their program designs.

- **Lengthen regular instructional school day and year.** In general, panels saw this as integral to providing the time to allow students requiring additional assistance to reach the adequacy goals.
- **Lengthen staff school day and year.** Panels reported that lengthening the staff school day, school year, or both provides time that is necessary for planning and preparation, professional development and collaborative activities, and outreach/follow-up with parents.
- **Ensure appropriately qualified teaching staff.** Panels agreed that schools should have an appropriate composition of qualified teachers. For example, in the New Mexico study, it was determined that an appropriate composition of teachers with respect to licensure level was 17 percent, 50 percent, and 33 percent for Tier I, II, and III teachers, which correspond to entry-level provisional teacher, professional-level teacher, and master teacher, respectively.<sup>52</sup> These licensure levels were directly connected to specific minimum compensation levels, set by state policymakers, that were to be provided to appropriately qualified teachers.
- **Provide academic coaches.** According to several panels, the purpose of academic coaches is twofold. First, academic coaches—especially those in core subject areas such as literacy, math, and science—are necessary to provide struggling students with the extra help they need. Second, coaches can be used to provide professional development and mentoring to teachers and other instructional staff, in addition to helping with curriculum and program design.
- **Provide subject-matter specialists.** Many panels felt that having subject-matter specialists in noncore

subjects (e.g., art, music, and physical education) gives students a more well-rounded education, decreases dropouts by offering subjects that keep students interested in school, and provides extra time for core-subject teachers to prepare and engage in professional development activities.

- **Reduce class sizes/student–teacher ratios.** Common reasons panels chose to reduce class sizes included previous research showing the effectiveness of smaller classes and to accommodate greater inclusion of special education students in general education class settings.
- **Provide instructional support for English-learner, bilingual, and multicultural programs.** Several panels agreed that to reach the adequacy goals it would be necessary to provide *some* additional bilingual and English-language development instructional staff to teach core subject classes as well as to assist other teachers. However, a common theme was that panels noted they did not necessarily need an increase in the level of instructional resources but rather a larger proportion of existing staff members who are certified to teach English learners (i.e., an ESL and/or bilingual certification). In addition, panels saw a need to direct some funding toward nonpersonnel resources such as specific curriculum and technology/software developed for English learners.
- **Provide instructional support for special education programs and promote greater inclusion in general education classrooms.** Many panels opted to increase the number of special education students served in neighborhood schools and general education classrooms. For example, panels in the New York study specified that 90 to 95 percent of special education students should be served in their neighborhood schools rather than in a special more centralized facility. Moreover, panels in the California study shared the same sentiment:

In general, [California] panels expressed the desire to maintain the least restrictive environment possible and serve the maximum number of students possible at the school level. One panel stated that all students identified as having mild to moderate disabilities should be served at neighborhood schools. In addition, certain students with moderate

**Table 1. Commonly Specified Programmatic Elements in Adequacy Studies**

| Programmatic element                                                                                                       | Needs to which programmatic element is highly responsive | Adequacy study |            |                  | Overlap with suggested best practices |                                            |
|----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|----------------|------------|------------------|---------------------------------------|--------------------------------------------|
|                                                                                                                            |                                                          | New York       | California | New Mexico       | Materials provided to PJPs            | In evidence-based resource elements matrix |
| Lengthen regular instructional school day and/or year                                                                      | Poverty                                                  | Yes            | Yes        | Yes              | Yes                                   | Yes                                        |
| Lengthen staff school day and/or year for planning and professional development                                            |                                                          | Yes            | Yes        | Yes              |                                       | Yes                                        |
| Ensure appropriately qualified teaching staff                                                                              | Poverty                                                  |                | Yes        | Yes              | Yes                                   | Yes                                        |
| Support professional development delivered by external providers                                                           | Poverty                                                  | Yes            | Yes        | Yes              |                                       | Yes                                        |
| Provide academic coaches                                                                                                   | Poverty                                                  |                | Yes        | Yes              | Yes                                   | Yes                                        |
| Provide subject matter specialists                                                                                         | Poverty                                                  | Yes            | Yes        | Yes              |                                       | Yes                                        |
| Reduce class size/student–teacher ratio                                                                                    | Poverty                                                  | Yes            | Yes        | Yes              | Yes                                   | Yes                                        |
| Provide instructional support for special education programs and promote greater inclusion in general education classrooms | Special education                                        | Yes            | Yes        | Yes              | Yes                                   | Yes                                        |
| Provide instructional support for English learner, bilingual, and multicultural programs                                   | English learners                                         | Yes            | Yes        | Yes              | Yes                                   | Yes                                        |
| Provide gifted programs                                                                                                    | Gifted                                                   | Yes            |            | Yes              |                                       | Yes                                        |
| Provide librarians and technology specialists                                                                              | Poverty                                                  | Yes            | Yes        | Yes              | Yes                                   | Yes                                        |
| Provide student support staff                                                                                              | English learners<br>Poverty<br>Special education         | Yes            | Yes        | Yes              | Yes                                   | Yes                                        |
| Instructional experience outside of class (field trips, school-to-work programs, etc.)                                     | Poverty                                                  |                | Yes        | Yes              | Yes                                   |                                            |
| Provide extended day and extended year programs                                                                            | Poverty                                                  |                | Yes        | Yes              | Yes                                   | Yes                                        |
| Provide early childhood education/preschool                                                                                | Poverty                                                  | Yes            | Yes        | Yes <sup>a</sup> | Yes                                   |                                            |
| Provide full day kindergarten                                                                                              | Poverty                                                  | Yes            |            | Yes              | Yes                                   | Yes                                        |
| Provide educational technology                                                                                             | English learners<br>Special education                    | Yes            |            | Yes              | Yes                                   | Yes                                        |
| Provide access to health and nutrition services                                                                            | Poverty                                                  | Yes            | Yes        | Yes              | Yes                                   |                                            |

<sup>a</sup> Although PJPs in all three studies recommended preschool and early childhood education programs directed toward certain high-need students, the cost analyses presented in this paper focus only on K–12 costs for comparison. New Mexico also opted not to include preschool and early childhood education programs in their cost estimates in their final report because these are not currently part of their school funding formula, and state policymakers wanted to maintain the division in the way K–12 and preschool and early childhood programs were funded.



to severe disabilities would also be served in schools within the neighborhood. (Chambers et al. 2006a: 31–32)

At the same time, panels also specified greater levels of resources directed toward special education services in schools with higher numbers of special education students (e.g., special day classroom teachers and aides, onsite resource specialists, and additional ancillary service providers such as speech therapists).

- **Provide student support staff.** Often panels stressed the importance of having sufficiently low caseloads for student support staff such as counselors, behavioral specialists, nurses, psychologists, and social workers in order to serve all students with special needs (i.e., those deemed at risk, designated as English learners, and in special education programs).
- **Provide extended-day and extended-year programs.** The provision of extended-day and extended-year programs was seen as a critical programmatic element by many panels. This was considered especially important for struggling students for whom extended-day programs (before or after school or both) provide extra assistance with their studies, decrease their chances of getting into trouble, and increase their likelihood of staying on track to graduate. Similar arguments have been made for extended-year programs, such as summer school and credit recovery.
- **Provide early childhood education/preschool.** Panels felt that early intervention was an important component of a successful education system. They generally emphasized expanded preschool programs targeted to high-poverty schools, aimed at providing additional resources that might not be present in the students' homes and ensuring their readiness for kindergarten.
- **Provide full-day kindergarten.** With the same focus on early intervention and citing significant research showing effectiveness of these programs, panels also specified full-day kindergarten, especially for at-risk students.
- **Provide educational technology.** Panels specified the necessity of providing sufficient educational technology to promote learning. Notable was the implementation of technology to serve the needs of English learners and special education students.

#### ■ **Provide access to health and nutrition services.**

Several panels specified resources to provide health, dental, and nutritional services at the school site itself, to provide referral services for students who otherwise would not have access to these supports, or both.

It should also be noted that focus groups conducted at three beating-the-odds (BTO) schools identified in the New Mexico also yielded similar programmatic recommendations. Staff at these schools consistently attributed their success to highly qualified teachers, adequate collaboration time, curriculum alignment to standards, and adaptation to cultural contexts (including bilingual staff and programs). When asked what additional resources they needed to continue their success and meet the objectives put forth in the goals statement, staff identified additional library and student support staff and upgraded instructional technology.<sup>53</sup>

### **What Does An Adequate Education Cost?**

As mentioned earlier, a primary goal of any costing-out study is to calculate the total cost of providing an adequate education to all students. The preceding section detailed how AIR has used a hybrid costing-out approach to calculate adequate schooling costs for three states (California, New York, and New Mexico). Although these three studies share the same approach to costing out, some significant differences appear in the final adequacy figures. The following section explores this by presenting a comparative analysis of the per student costs of adequacy and how they relate to actual spending levels in each of the three states. In addition, it includes an analysis of how a limited set of student outcomes vary by funding shortfall (i.e., the difference between projected adequate cost and actual expenditure).

### **Adequacy Costs across States**

Because the studies were conducted across different states and for different years, a direct comparison of these results requires two adjustments. To this end, we have chosen to tailor the actual and projected adequacy dollars reported in the New York and California studies so that they are comparable to those of the most recent study in New Mexico.<sup>54</sup> That is, for the purpose of this analysis, we have adjusted all dollar figures for inflation to reflect 2006–07 dollars and made geographic cost differences among the

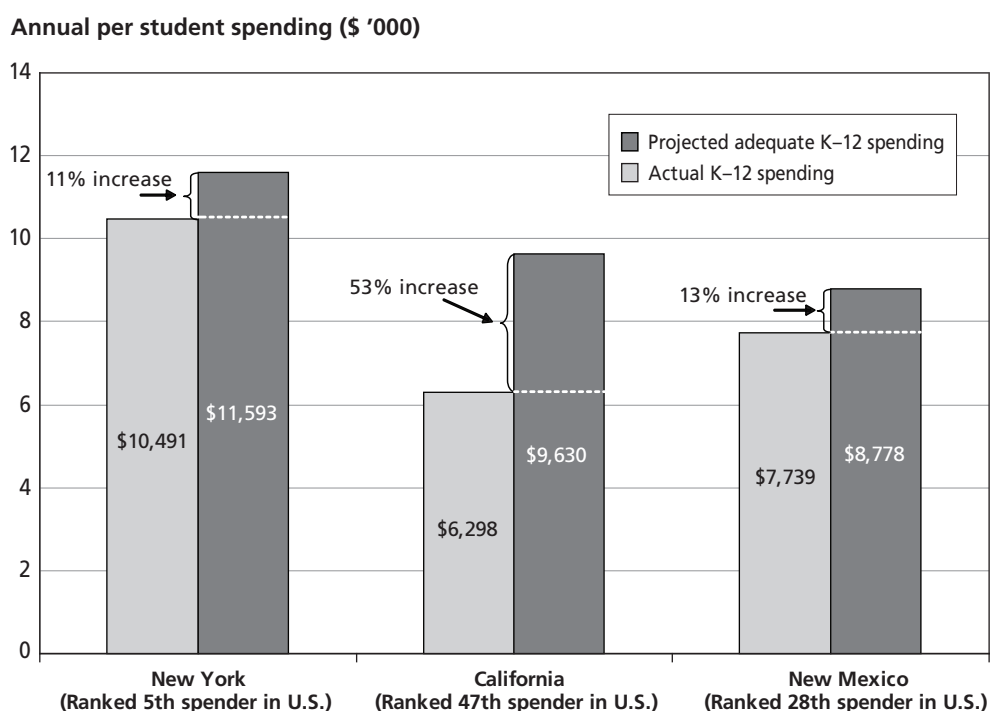
states comparable to New Mexico's (i.e., the New Mexico dollar = 1.00).<sup>55</sup> We also limited the cost comparison to include only K–12 cost estimates. The costs of early childhood education and preschool are excluded here because compatible preschool costs were not calculated in the New Mexico study.

Figure 4 shows for each of the states the projected adequacy cost per student and how it compares with actual spending. The adequacy cost estimates and what was actually spent across the three states range widely. Interestingly, the lowest-spending state of the trio in 2006–07 was California (at \$6,298 per student), followed by New Mexico (\$7,739) and New York (\$10,491). The results suggest that per student spending levels needed to provide an adequate education must be raised to \$9,630, \$8,778, and \$11,593 in California, New Mexico, and New York, respectively, translating into relative increases of 53, 13, and 11 percent.

Why might the estimated shortfalls in adequate funding differ by such large margins? One reason is the large disparity in actual funding against which the adequacy estimates are being compared. When the most recent (2003–04) NCES state-level per student spending numbers are controlled for geographic cost differences, California, New Mexico, and New York rank 47th, 28th, and 5th, respectively, among the 50 states and the District of Columbia. Therefore, the larger relative gaps in adequate funding can be at least partially explained by the dramatic differences in *actual* spending across the three states.

In addition, there are large differences between the estimated adequate costs calculated for each state. Differences in these costs across states may be attributed to a number of factors, including (1) differences in the goals statements that served as the foundation for PJP deliberations; (2) the different composition of student needs and scale of

**Figure 4. Actual versus Adequate K–12 Spending per Student from New York, California, and New Mexico Adequacy Studies (All Figures Geographically and Inflation Adjusted to 2006–07 New Mexico Dollars)**



Source: Prepared for the present report from data from authors' work on New York, California, and New Mexico.

operations across schools in each state; (3) the perceived realities of the educational, political, and economic circumstances that define the context within which these studies are done; and (4) the process, or lack thereof, used to review the final PJP program designs and resource specifications.

As described in chapter 3, the New York and New Mexico studies included goals statements derived through extensive public engagement processes. In contrast, because of its shorter timeframe and smaller scale, the California study did not include a public engagement component to develop the goals statement. Instead, this study drew from a variety of documents, including state content standards, legislation, and public opinion survey studies (Baldassare 2005) intended to set out the goals for the public schools.<sup>56</sup> The goals statement used in the study includes an overall statement derived from the California Education Code (60602(a)(2)) that specifies:

NCLB and state law requires all students in every school district meet “academically rigorous content standards and performance standards in all major subject areas” by the 2013–2014 school year.

This statement is followed by two separate parts, the first of which requires that “all students have access to instructional programs and services that are consistent with the California content standards in all subject areas... as adopted by the State Board of Education.” (Chambers et al. 2006a: 15)

The second part of the statement specifies precise target performance levels for public schools using subject-specific proficiency rates in English-language arts and mathematics, the graduation rate, and the state’s school-level Academic Performance Index.

The New York goals statement was the shortest and simplest of the three state-specific documents. The key phrase asked the professional-judgment panels to “design an instructional program that will provide all students in the school a full opportunity to meet the Regents Learning Standards, and to attain a Regents diploma” (Chambers et al. 2004a, 17).

Although brief, the statement may be deceptive to those unfamiliar with the Regents Learning Standards, which

are quite comprehensive and encompass what is generally regarded as the final goal for many students—a high school diploma. However, note that a diploma under the Regents Learning Standards (a Regents diploma) requires passing tests in the core subject areas of English, social studies, mathematics, and science at a high level (a score of 65 or better). It represents a high standard of excellence and requires tracking of children all through their educational careers to ensure that they are making adequate progress toward this goal.

The goals statement used in the New Mexico study is clearly the broadest of the three, including guaranteed student access to a wide range of content standards, goals defined in terms of noncognitive outcomes, and far less specificity in terms of student performance metrics and levels of academic achievement that should be met. The statement begins with an emphasis on strong school/family partnerships and specifies more general goals: to prepare students to be responsible citizens and family members; have educational success; and obtain and maintain gainful employment.

The performance goals focused more on growth and combined this with explicit references to content standards by specifying that “all public school students shall make positive and measurable gains through appropriate instructional programs aligned to state content standards and benchmarks” (Chambers et al. 2008a: 16).

The goals statement used for the New Mexico study goes beyond the standard range of knowledge and cognitive skills by including personal qualities and noncognitive skills (e.g., positive self-concept, acceptance of personal responsibility, promoting good health, respect for themselves and others, dependability and integrity, and honesty) that the framers of the statement felt also helped enable children to be successful, productive members of their communities.

These features made the New Mexico goals statement unique and much farther-reaching than those of the other two states. This is not to say that some of these same features were not also considered in the California and New York studies but rather to suggest that the stakeholders participating in the New Mexico public engagement emphasized these noncognitive dimensions as more important to an adequate education.

A second factor that clearly played a role in the New Mexico study was the recognition by the PJPs and

stakeholder panel of the economic realities faced by their state. In fact, this was explicitly stated in the project request for proposal:

The purpose of this study is to determine... what an appropriately sufficient basic K–12 educational program includes and how to fund that program given the realities of New Mexico’s economy. (New Mexico Legislative Council Service 2006: 6)

Indeed, this was one of the four considerations the PJPs in New Mexico were told to keep in mind over the course of their deliberations. In addition, this was also very much a part of the thinking among the stakeholders as they reviewed work of the PJPs and preliminary results of the cost simulations.

A third factor that might play a role in explaining the differences in adequacy costs derives from the fact that the California study had a limited budget and timeline, which was not able to support a review process. It is difficult to say what impact this might have had on the California numbers in part because of the different effects the review process had in the New Mexico and New York studies. In New York, the review process, which included a review panel selected from the existing PJP participants, had very little impact on the cost estimates. Total cost estimates actually increased by approximately 2.6 percent.<sup>57</sup> The review panels suggested a few additional resource elements that they felt were underestimated in the resource specifications of the initial panels.

In contrast, in New Mexico, final cost estimates for an adequate education decreased from about a 29.7 percent increase in total necessary expenditure to a 14.5 percent increase. The project advisory panel in New Mexico felt that the established goals could be accomplished more efficiently than the initial PJPs had anticipated. They also excluded some programmatic elements (e.g., parent academies and community outreach) that they believed did not belong in the adequacy cost estimates.<sup>58</sup>

### Shortfalls in Adequate Funding and Student Performance

After the final cost simulation is performed, it is instructive to evaluate how well the costing-out process has

served its purpose in terms of providing funding where it is most needed. (This section is based on an analysis found in Chambers et al. 2006b.) To do so, we have devised an analysis that attempts to validate the costing-out process by illustrating the relationship between the shortfall in adequate funding (i.e., the difference between what the costing-out process has determined is adequate for a given district and how it is actually funded) and student outcomes. As seen below, the example analysis derived from the New York study shows that the costing-out process tends to direct resources to where they are needed most (i.e., where student outcomes are worst), providing a compelling validation of this work.

To facilitate this analysis, we first calculated the ratio of the projected expenditures necessary to achieve adequacy to actual funding for each district in New York. We refer to this measure as the *adequacy gap*. The adequacy gap essentially measures the relative need of a district by contrasting its current condition against the level of resources it requires to provide an adequate education. Given a set amount of resources, districts with relatively high proportions of students in poverty, with disabilities, or who are English learners will have larger adequacy gaps. Measures below 1.00 denote districts that have more than the costing-out model has determined is needed to provide an adequate education to their student population. Conversely, those districts with adequacy gaps above 1.00 indicate they do not have enough to provide an adequate education.

Table 2 displays the distribution of the adequacy gap, including the threshold values that distinguish the quintiles (i.e., the 20th, 40th, 60th, and 80th percentiles).

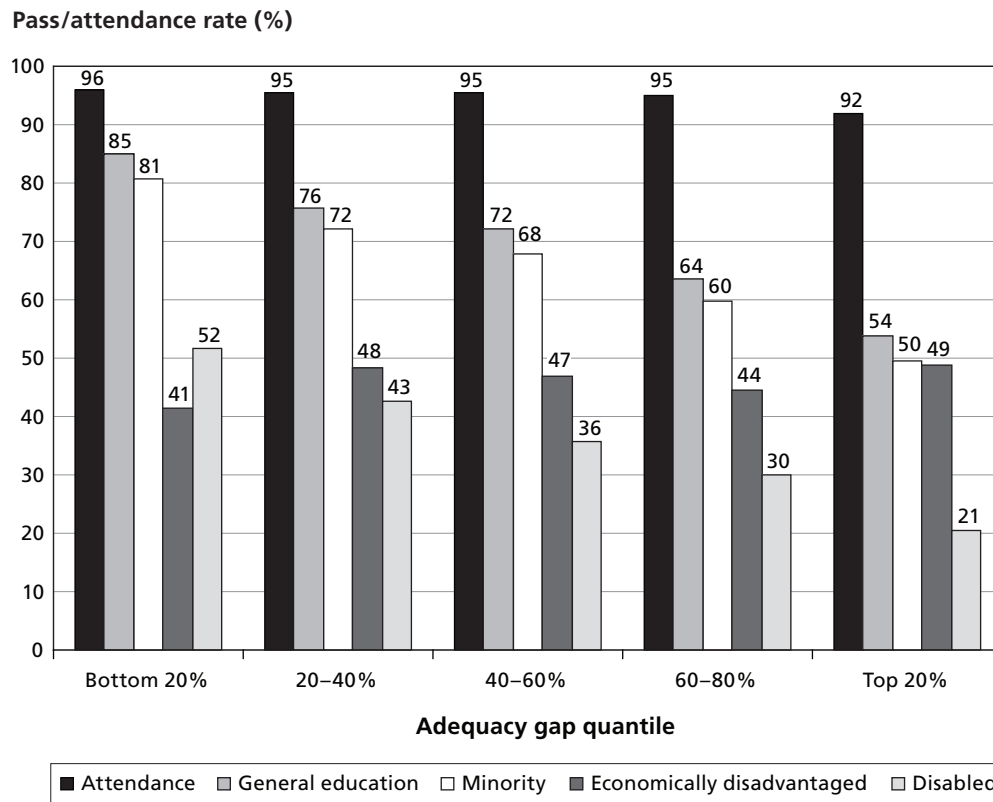
For example, districts in the bottom 20 percent (Quintile 1) of the adequacy gap distribution have an adequacy gap of 0.96 or lower.<sup>59</sup> Those between the 20th and 40th percentiles (Quintile 2) have gaps ranging from 0.96 to 1.07.

Figures 5, 6, and 7 show how the adequacy gap relates to actual performance of the districts with respect to 4th, 8th, and 12th grade attendance and pass rates of various groups of students (e.g., general education, minority, impoverished, and special education students) on New York’s state achievement tests.<sup>60</sup> To distinguish between those districts with high versus low relative need (relative to their actual funding), we divided districts into quintiles based on the distribution of the calculated adequacy gap.

**Table 2. Distribution of Shortfall in Adequate Funding (Adequacy Gap) across New York Districts, 2001–02**

|                    | Percentile |      |      |      |      |      |
|--------------------|------------|------|------|------|------|------|
|                    | Min.       | 20th | 40th | 60th | 80th | Max. |
| Adequacy gap value | 0.52       | 0.96 | 1.07 | 1.16 | 1.24 | 1.54 |

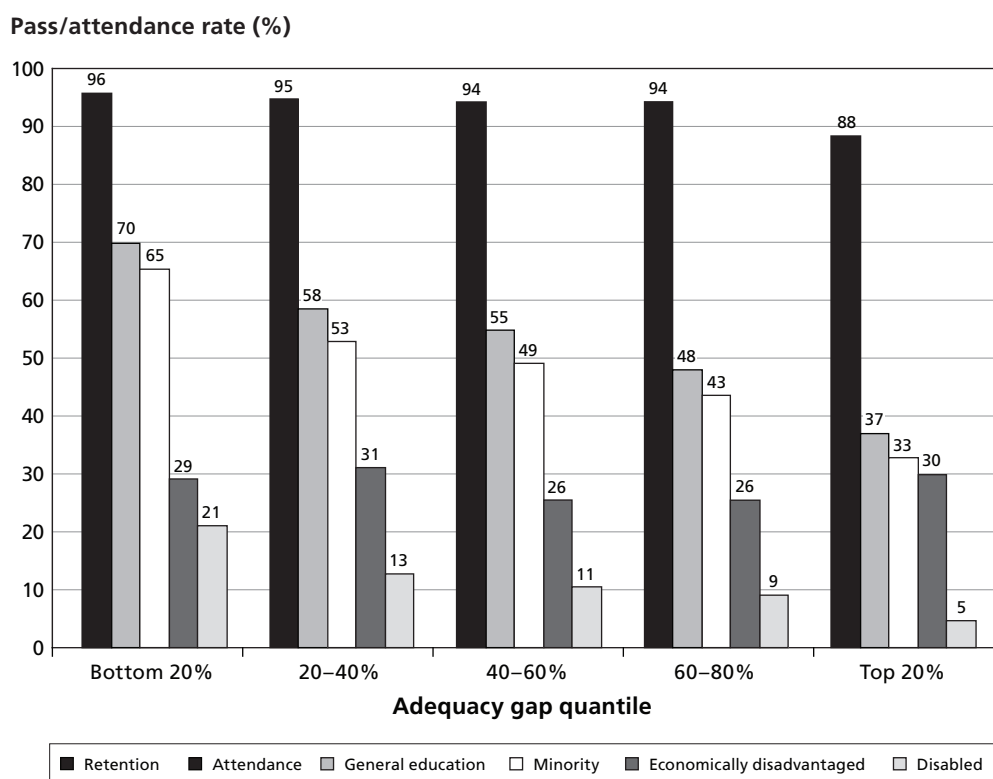
Note: Adequacy gap distribution has a mean equal to 1.10 and standard deviation of 0.16.

**Figure 5. 2001–02 Student-Weighted Average 4th-Grade Attendance/Pass Rates across New York Districts by Adequacy Gap Quintile**

Source: Chambers et al. (2006a).

Note: Pass rate is defined as the lower of the percentages of test takers scoring at level 3 or above on the English and mathematics CTB tests.

**Figure 6. 2001–02 Student-Weighted District Average 8th-Grade Attendance/Pass Rates across New York Districts by Adequacy Gap Quintile**



Source: Chambers et al. (2006a).

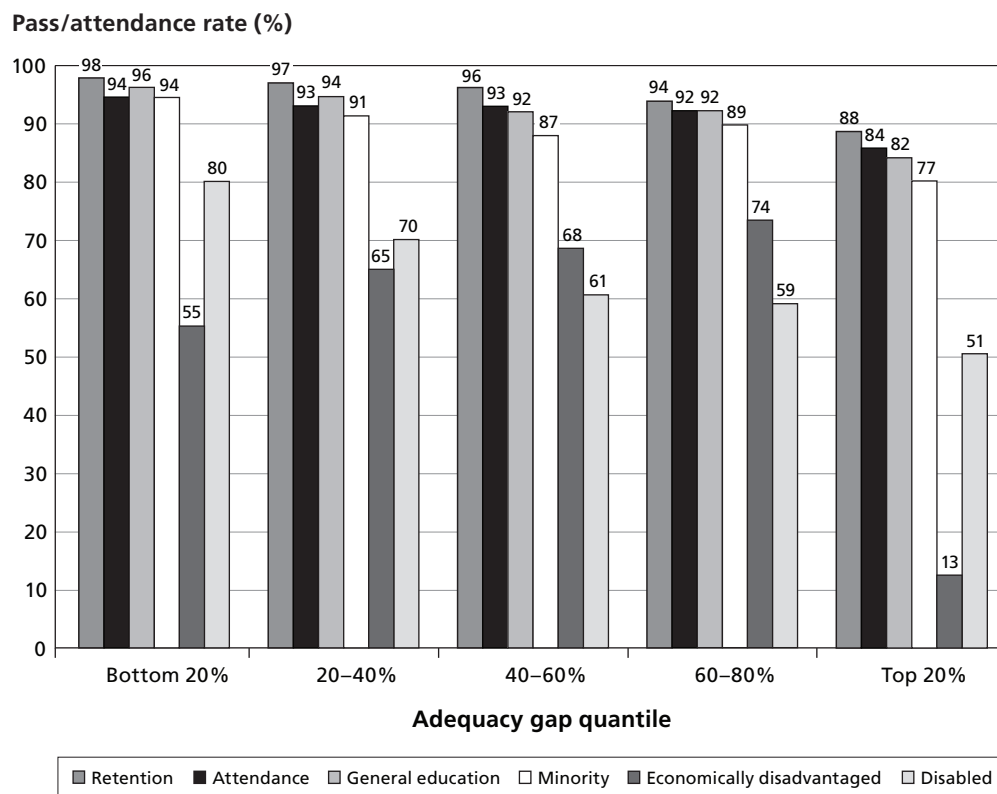
Note: Pass rate is defined as the lower of the percentages of test takers scoring at level 3 or above on the English and mathematics CTB tests.

In each figure (i.e., Figures 5, 6, and 7), the leftmost group of bars corresponds to the bottom 20 percent (Quintile 1 of the adequacy gap distribution) and represents districts with the lowest adequacy gap (ratio of needs to actual resources). In contrast, the rightmost group of bars in each chart denotes districts in the top 20 percent (Quintile 5 of the distribution), or those with the largest adequacy gap—that is, the relatively neediest districts.

Putting the performance measures on the vertical axis, we would expect that districts with the poorest performance levels would exhibit the largest adequacy gaps. Indeed, with few exceptions, one observes that districts with larger adequacy gaps exhibit lower average attendance and pass rates for virtually every group of students including general education, minorities, economically disadvantaged, and disabled students at each of the three grade levels (4th grade, 8th grade, and 12th grade).<sup>61</sup> The

following points summarize how the performance measures vary with respect to the level of shortfall in adequate funding (i.e., size of adequacy gap).

- **Attendance rates.** Attendance rates consistently decline as the adequacy gap grows. Moreover, this phenomenon seems to become more dramatic as grade level increases. The districts in the bottom 20 percent of the adequacy gap distribution exhibit an average elementary school attendance rate of 96 percent, whereas the top 20 percent shows an average that is 4 percentage points lower, at 92 percent. For middle schools, there is a 96 percent average attendance rate among districts in the lowest adequacy gap quintile, whereas the average attendance rate is 88 percent among schools in districts with the highest relative need. At the high school level, the highest versus lowest attendance rates range from 94 percent for the lowest adequacy gap quintile to 84 percent for the highest.

**Figure 7. 2001–02 Student-Weighted Average 12th-Grade Attendance/Pass Rates across New York Districts by Adequacy Gap Quintile**

Source: Chambers et al. (2006a).

Note: Pass rate is defined as the lower of the percentages of test takers scoring at 65 or above on the English and mathematics Regents exams.

- **General education pass rates.** Districts with adequacy gaps in the bottom 20 percent of the adequacy gap distribution exhibit 4th-grade pass rates for general education students of 85 percent compared with just 54 percent for the top 20 percent of the districts. Middle schools, although having noticeably lower average general education pass rates, present a remarkably similar pattern. That is, the pass rate drops from 70 percent for districts with the lowest relative need by almost half, to 37 percent, for those districts with the greatest relative need. For the 12th-grade students, the comparable average pass rates are 96 percent and 82 percent for the bottom and top 20 percent of districts, respectively, with respect to the adequacy gap.
- **Minority pass rates.** Districts with adequacy gaps in the bottom 20 percent exhibit average 4th grade pass rates for minority students of 81 percent versus 50 percent for those in the top 20 percent. Again, similar drops in the average 8th- and 12th-grade minority pass rates are found with increases in the district adequacy gap. Middle school minority pass rates vary from 65 percent to 33 percent for the least to most needy districts. Similar figures for the 12th-grade students are 94 percent and 77 percent, respectively.
- **Economically disadvantaged pass rates.** Interestingly enough, the district average pass rates for economically disadvantaged students do not exhibit a similar pattern to those found above. For the 4th-grade economically disadvantaged population, the average pass rate jumps from 41 percent in districts with the least relative need up to 48 percent and 47 percent in the second and third adequacy gap quintiles, respectively, back down to



44 percent in the fourth, and up to 49 percent in the most needy districts. The 8th-grade average pass rates display a similarly erratic pattern. Strangely enough, the average district pass rate among economically disadvantaged 12th graders experiences a consistent *increase* with respect to relative district need. This result may be driven by in-kind services offered to students whose resource expenditures may not been picked up in our calculation of actual current expenditures.

- **Disabled pass rates.** District average pass rates among special education students are also shown to plummet as need increases: from 52 percent to 21 percent,

21 percent to 5 percent, and 80 percent to 51 percent for elementary, middle, and high schools, respectively.

- **Retention rates.** A final result shows the average retention rate (defined as 1 minus the dropout rate) among public high school students to be approximately 10 percent lower in districts with the highest relative need compared with that found among the lowest-need districts.

It should be noted that similar results have been found across several different costing-out studies (see Baker 2006).



## 5

### *The Comprehensive Costing-Out Study* *Component 3: Developing a Mechanism for Distributing Resources*

Component 2, the specification and costing out of adequate resources, answers the first of the two fundamental questions put forth in the beginning of this paper: “How much will it cost to provide an adequate education to all students?” However, this still leaves the second fundamental question of costing out: “How should resources be allocated in order to achieve an equitable funding distribution?” Component 3 answers this question by developing a distribution mechanism that provides an equitable allocation of adequate resources across school districts. This chapter first provides a general overview of desirable properties of funding systems. It then documents the confounding issue of how federal funds are treated when reconciling what districts currently spend and the additional amount of state funding necessary to provide an adequate education. This is followed by a description of the funding formula the present authors recently developed for the state of New Mexico. Included in this discussion is an account of how the formula was explicitly developed to incorporate several of the desirable properties mentioned.

#### **Desirable Properties of Distribution Mechanisms**

The following includes a compiled list of those properties the authors feel are desirable for any distribution mechanism used to allocate public school funding. Although no funding mechanism is perfect, this list can be seen as properties that formula developers should do their best to aspire to:<sup>62</sup>

- **Adequate and equitable**
  - *Adequate.* Funding is sufficient for all districts to provide appropriate programs for the unique population of students served.
- *Student equity.* Funding is distributed to ensure comparable program quality regardless of where the student attends school.
- *Wealth equity.* The availability of overall funding is not correlated with local wealth.
- *District-to-district fairness.* All districts receive comparable resources for students who are comparable with respect to their needs.
- **Transparent, understandable, and accessible**
  - The funding system and its underlying policy objectives should be transparent and understandable by all concerned parties (legislators and other staff involved in policymaking, local administrators and teachers, parents, and other advocates).
  - The concepts underlying the formula and the procedures to implement it are straightforward and “avoid unnecessary complexity.”
  - Allocations stemming from the formula should be replicable using publicly available data, calculation tools, and associated documentation.
- **Cost-based.** Funding received by districts for the provision of specific programs tailored to their unique population needs should be linked to the costs they face in providing these programs.
- **Minimizes incentives.** The funding formula should minimize incentives to increase funding through over-identification or misclassification of students with respect to special needs, manipulation of enrollment size, or both.<sup>63</sup>
- **Reasonable administration costs**
  - Costs to maintain and update the funding system are minimized at both the local and state levels.
  - The data requirements, recordkeeping, and reporting are all kept at reasonable levels.

■ **Predictable, stable, and timely**

- The funding system allows policymakers to predict future demands for funding accurately.
- State and local education agencies can count on stable funding across years.
- Local education agencies (LEAs) are provided expected funding sufficiently in advance to allow them to develop a plan to allocate resources properly.

■ **Flexible.** To address their specific circumstances and unique local conditions, LEAs are given maximum latitude in how resources are used, in conjunction with a strong outcome accountability system that includes review of resource allocation planning.

■ **Outcome and spending accountability**

- State monitoring of local agencies is based on various measures of student outcomes.
- A statewide system for demonstrating satisfactory progress for all students in all schools is developed.
- Schools showing positive results for students are given maximum program and fiscal latitude to continue producing favorable results.

■ **Political acceptability**

- Implementation avoids any major short-term loss of funding.
- Implementation involves no major disruption of existing services.

## Accounting for Federal Educational Dollars

When a state sets out to conduct a school finance adequacy study, it is often thinking broadly about the commitment to children. These studies ask how much is required to provide an adequate education for all children without regard to the specific source of revenue supporting that effort. When AIR conducted the studies in New York, California, and New Mexico, the effort was devoted to estimating the total cost per student of providing an adequate education.

However, when state policymakers consider the development of a school funding formula, the focus is redirected toward thinking specifically about the state contribution. That is likely a much narrower focus than a comprehensive view of school finance adequacy. Under the public-engagement component of the process, stakeholders are thinking broadly about the overall goals of education, whereas under the cost-analysis component, they want to know

what total investment is required to achieve those goals. The PJPs are asked to design instructional programs and resource specifications capable of achieving the goals and providing an *adequate* education to all public school children. These programs are expected to be comprehensive in nature and to take into account all resources necessary to achieve the goals regardless of the potential sources of revenue, whether they are federal, state, or local. The PJPs are guided through tasks intended to capture the variations in costs that were associated with variations in student needs or the scale of school and district operations.

In the development of these program designs, the PJPs are told to be comprehensive in their design, to be efficient and mindful of the obligations to be imposed on taxpayers implied by these designs, and to include all resources necessary to achieve the goals underlying the definition of an adequate public education, regardless of the revenue source (federal, state, or local) used for support. They were told to develop a program design that would meet the needs of the local communities and that could reasonably be expected to be adopted and funded by a school board comprising knowledgeable, well-intentioned laypersons.

The new public school funding formula developed from these types of cost analyses is intended to ensure every child access to an *adequate* education as defined under the public engagement phase, component 1 of the study, and costed out under component 2 of the study. Moreover, when we cost out adequacy, our first inclination is to compare these figures with current levels of spending on comparable resources and services regardless of the source of funding. For example, the panels thought about what resources would deliver an adequate program for students in poverty, they were not thinking about what portion of the funding came from Title I, Part A, of NCLB. Similarly, they were not thinking about Title III of NCLB as they considered the resources necessary for English learners. Nor did they take into account the funds received under IDEA as they considered the special education resources and services to be included in the model.

As we move to component 3 of this work, we encounter a quandary in the formula development stage. That is, how do we account for federal funding in the context of our cost estimates? It is difficult to separate out which collection of services, and hence funding, should be the responsibility of federal, state, or local taxpayers.

## Accounting Directly for Federal Funding On a District-by-District Basis

Ideally, to preserve the adequacy and equity provided by a well-designed funding formula, total current funding would account directly for that provided by federal support on a district-by-district basis. To determine the responsibility of the state in supporting school finance adequacy, the most efficient and equitable course is to determine the total costs necessary for every district to achieve adequacy and take into account the federal funds to which each is entitled. The state would then *guarantee* the residual (i.e., the amount not covered by federal support) to every district and develop a mechanism for determining the amount of the local contribution necessary for that entity to be entitled to this state guarantee. All funding flowing through the formula would meet the intent and purpose of funding that is commonly provided through such federal programs as Title I, Title III, and IDEA-Part B by virtue of the variation in funding associated with poverty, percentage of English learners, and the special-education eligibility of the students. In a context in which the responsibility for education is left to the states, as it is in the United States, and in which most of the funding comes from state sources, this seems reasonable.

The problem with this suggested approach of accounting for federal funding is that it would seem to violate the “supplement versus supplant” provisions of the federal programs. That is, state funding may not be supplanted by federal funding or, alternatively stated, federal funding must supplement whatever state funding would have been provided in the absence of federal funding.

The federal government includes the “supplement versus supplant” provisions in the law to prevent states from decreasing their support for public education in response to increases in their federal revenues. However, when states are currently providing or proposing to provide a substantial commitment to funding adequacy, as some are doing in the context of costing-out studies, these provisions seem less reasonable. That is, if the costing-out results suggest that overall funding for each and every district should increase or at the very least stay constant (for districts that are held harmless), and that state support will increase across the board to achieve adequacy, then is federal funding really being supplanted?

Unfortunately, the “supplement versus supplant” provisions create somewhat of a conflict in the context of moving toward funding educational adequacy. Should states ignore providing additional funding to schools with higher-poverty populations because federal programs provide for this? How does one determine what the state’s responsibility is for providing an adequate education when the state has conducted a comprehensive study to ascertain the total costs of achieving its educational goals? What proportion of this responsibility should be assigned to the state versus the federal government? Can these sources of funding really be determined independently when they are being allocated along similar dimensions of student need?

What Congress might consider are some changes to NCLB that would provide specific circumstances under which states might explicitly take federal funding into account in designing a school funding formula. The present authors suggest that such accounting of federal funding could be made permissible when states have met the following criteria:

- States have taken on the lion’s share of the responsibility for supporting public education.
- States have conducted reasonably rigorous adequacy studies in a good-faith effort to estimate objectively what an adequate investment in education should be and have determined that significant increases in funding are necessary.
- States are willing to guarantee that every district would receive the amount of funding derived from an adequacy study, as described in the item above.
- States have explicitly included student weights in their proposed funding mechanism, which targets total funding to meet the needs of special populations (e.g., students living in poverty or English learners) at least as well as current federal programs.

Should the states meet the appropriate criteria, they would be permitted to design a formula that accounts for total funding required to achieve adequacy and would simply subtract the federal funding to which each district was entitled based on current federal statute.

A number of states do take on a substantial portion of the responsibility for providing financial support to schools. Table 3 shows four states (bold type) in which more than two-thirds of school funding derived from state

sources in 2004–05. These were Hawaii (87.4%); Vermont (85.0%); New Mexico (70.0%); and Minnesota (69.6%). The next-highest state (North Carolina) provided just over 60 percent of school funding, and the average for the entire United States is 46.9 percent. The range of *federal* funding among these states was 6.5 percent (Minnesota) to 16.5 percent (New Mexico).

All but a handful of states have conducted some kind of a costing-out study, but NCLB would likely have to establish some further criteria to determine what kinds of studies could be classified as rigorous for this purpose.<sup>64</sup>

### Example of Developing a Funding Mechanism from Costing-Out Results

The final section of component 3 provides an example of a funding formula recently developed from the costing-out results in New Mexico. Included is an exposition of how the derived formula relates student need and district size to the necessary costs associated with providing an adequate education. (This section draws heavily on the formula development work in Chambers et al. 2008a.) In addition, we discuss how the recommended mechanism

exhibits several of the desirable properties mentioned above.

The main deliverable emerging from the second component of the comprehensive costing-out study is a data-set that contains for each district the total projected cost of providing an adequate education. It is important to note that these findings represent the combination of the professional-judgment process to determine the necessary inputs at the school level and of associated district-level services, which have been summed and adjusted for geographic cost differences across districts in order to provide the final calculated costs of providing an adequate education. Together, these exercises provide the final calculated costs of providing an adequate education. These cost projections may then be used to estimate the systematic relationship between adequate cost and the student need and scale of the district or charter school operations. That is, using these calculated projections, district- and charter-school-level regression analyses are performed, the results of which provide formulas that equitably distribute adequate levels of funding based on student need and scale of operations.

**Table 3. Percentage of Total Revenues for K–12 Education by Source (Federal, State, Local, and Private) for Ten States with Highest State Portion of Total Revenues**

| Country/state  | Revenue source |       |         |         |
|----------------|----------------|-------|---------|---------|
|                | State          | Local | Federal | Private |
| Hawaii         | 87.4           | 1.0   | 10.4    | 1.2     |
| Vermont        | 85.0           | 6.1   | 7.4     | 1.6     |
| New Mexico     | 70.0           | 11.8  | 16.5    | 1.7     |
| Minnesota      | 69.6           | 20.6  | 6.5     | 3.3     |
| North Carolina | 62.7           | 24.0  | 10.8    | 2.4     |
| Delaware       | 61.8           | 27.4  | 9.4     | 1.3     |
| Washington     | 60.7           | 26.6  | 9.5     | 3.2     |
| West Virginia  | 60.6           | 26.6  | 11.8    | 1.0     |
| Michigan       | 60.1           | 29.6  | 8.4     | 1.8     |
| California     | 59.2           | 28.6  | 11.2    | 1.0     |
| United States  | 46.9           | 41.7  | 9.2     | 2.3     |

*Note:* The rightmost column, Private, includes revenues from gifts and tuition and fees from patrons. The numbers in bold type highlight state contributions that exceed two-thirds of total K–12 education funding.

## Structure of the Recommended Funding Formula

For the New Mexico study, the AIR research team recommended that the state adopt a formula that incorporated three main factors. These were (1) a small and simplified set of weighting factors to achieve an equitable distribution of funds according to student needs (i.e., poverty, English learners, special education, and mobility); (2) a simplified set of programmatic weights that account for student grade-level composition for elementary, middle, and high school students; and (3) weighting schedules that account separately for the scale of district and charter school operations. The advantages of the proposed formula are that it is

- **Simple.** It avoids unnecessary complexity by focusing directly on a limited set of characteristics associated with student need and scale that are regularly collected by school administration.
- **Fair.** It promotes and preserves strict (vertical) funding equity across districts.
- **Minimizes incentives.** It makes use of adjustment factors that are largely beyond a district's control, thus minimizing any incentive to pursue funding not directly linked to student needs.

As mentioned, the district-level projections produced by the costing-out process (component 2) detailed above were used in a regression analysis to derive a district-level formula. The formula comprised a series of seven multiplicative cost-factor adjustments that applied to a base per student cost. The recommended formula is shown in Equation 1 (This is identical to Equation E1 in the executive summary).<sup>66</sup>

### Equation E1. Formula for Adequate Costs Using Base Student Cost Multiplied by Student-Need and Enrollment Cost Factors

$$\begin{aligned} \text{Adequate Cost} = & \text{Base Student Cost} \times \overbrace{\text{Poverty Factor} \times \text{ELL Factor} \times \text{SE Factor} \times \text{Mobility Factor}}^{(\text{Student Needs})} \times \\ & \overbrace{\text{Enrollment Grade 6–8 Factor} \times \text{Enrollment Grade 9–12 Factor}}^{(\text{Grade Range Enrollment Shares})} \times \\ & \underbrace{\text{Enrollment Factor}}_{(\text{Total Enrollment})} \end{aligned}$$

In this simplified formula, the base per student costs are multiplied by a series of seven formula adjustment factors that provide additional funding for various student needs and school size.

The following figures (Figures 8–13) illustrate the way the formula adjustments vary across the different factors. The figures show the corresponding ranges of formula adjustments for poverty, English learners, special education, student mobility, district enrollment, and charter school enrollment, respectively. For example, Figure 8 shows that the formula adjustment factor for a district or charter school with 80 percent of its students receiving free or reduced-priced lunch has a poverty formula adjustment factor of approximately 1.25. That is, to achieve adequacy, this district or school will have to spend 25 percent more per student than an otherwise identical school with zero poverty.<sup>68</sup>

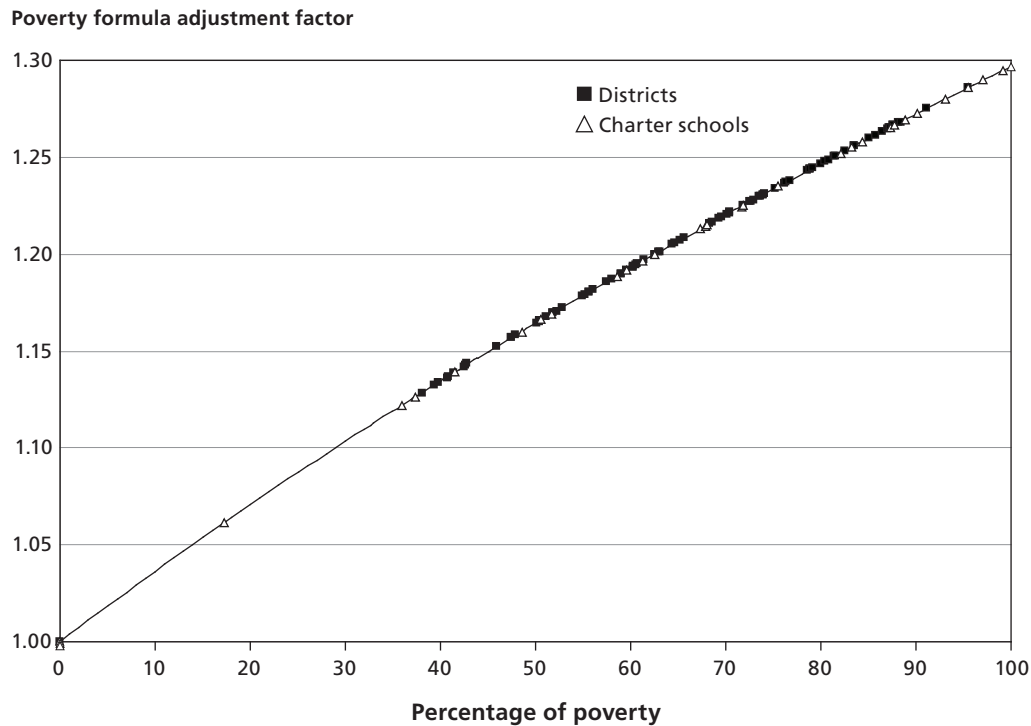
Figures 9 through 11 show that the formula adjustments corresponding to the English-learner, special education, and student mobility cost factors are quite similar to that of poverty in terms of their positive slope and (almost linear) shape.

Figures 12 and 13 show the formula adjustment factors for district and charter school enrollments, respectively. However, here we find that the formula adjustment factor drops as enrollment increases, reflecting the fact that larger districts and charter schools can provide a sufficient program more efficiently (i.e., larger districts and charter schools are able to make use of relative economies of scale). Another difference lies in the fact that the shapes of the formula adjustment factor schedules are curved so that the drop in the adjustment value becomes smaller

as enrollment increases. Note that the enrollment formula adjustment factors have been centered on the statewide average district and charter school sizes (of 3,532 and 160, respectively) so that the adjustments at these enrollments equal 1.00 (shown by the dotted vertical line). The adjustment factor rises sharply as enrollment drops below the average enrollment and



**Figure 8. Relationship between 2006–07 Percentage of Poverty and Poverty Formula Adjustment Factor for New Mexico Districts and Charter Schools**



Source: Chambers et al. (2008a).

declines much more gradually with larger-than-average enrollments.

### Comprehensive Nature of Formula

Recognize that the development of the New Mexico formula involves the simultaneous determination of the relationship between *all* of the needs and scale cost factors and adequate cost. To this end, all of the individual formula adjustment factors must be used in calculating the cost of providing an adequate education in a given district or charter school. To treat the formula cost adjustment factors as a menu and simply “pick and choose” a subgroup of only those that one wishes to use to distribute funding by would be a serious misuse of the formula.<sup>69</sup>

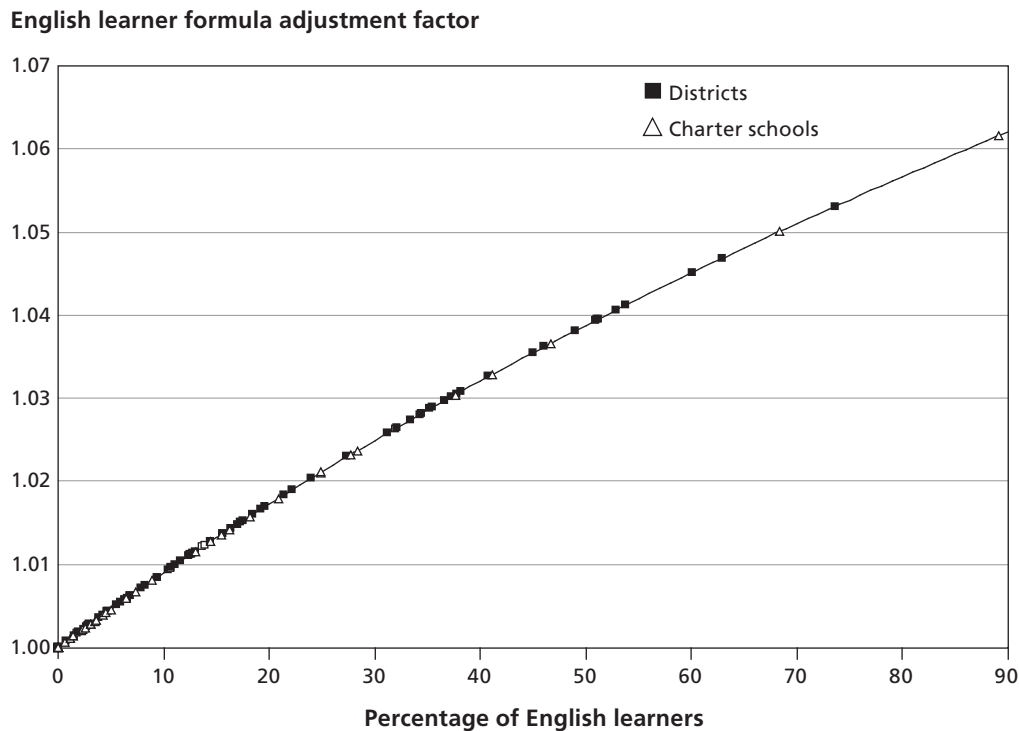
### Examples of Desirable Properties Emulated in Recommended Mechanism

The distribution mechanism developed for New Mexico

exhibits many of the desirable properties mentioned above. We take each in turn and briefly describe how the distribution mechanism exhibits these properties.

- **Adequate and equitable.** Inherent in the development of the formula is the foundation measure on which variations in adequate costs are based. Here, the actual adequacy costs are derived using a bottom-up approach, in which instructional programs are purposefully designed to provide an adequate education, and resources are carefully specified to deliver these programs. Therefore, the costs derived from these resource specifications can be directly interpreted as those necessary to provide an *adequate* education. The formula is equitable by nature, as it represents the responsiveness of adequate costs to student needs and scale-of-operations characteristics, both of which are widely understood to be key determinants of educational costs. To this end, adequacy costs and subsequent

**Figure 9. Relationship between 2006–07 Percentage of English Learners and English Learner Formula Adjustment Factor for New Mexico Districts and Charter Schools**



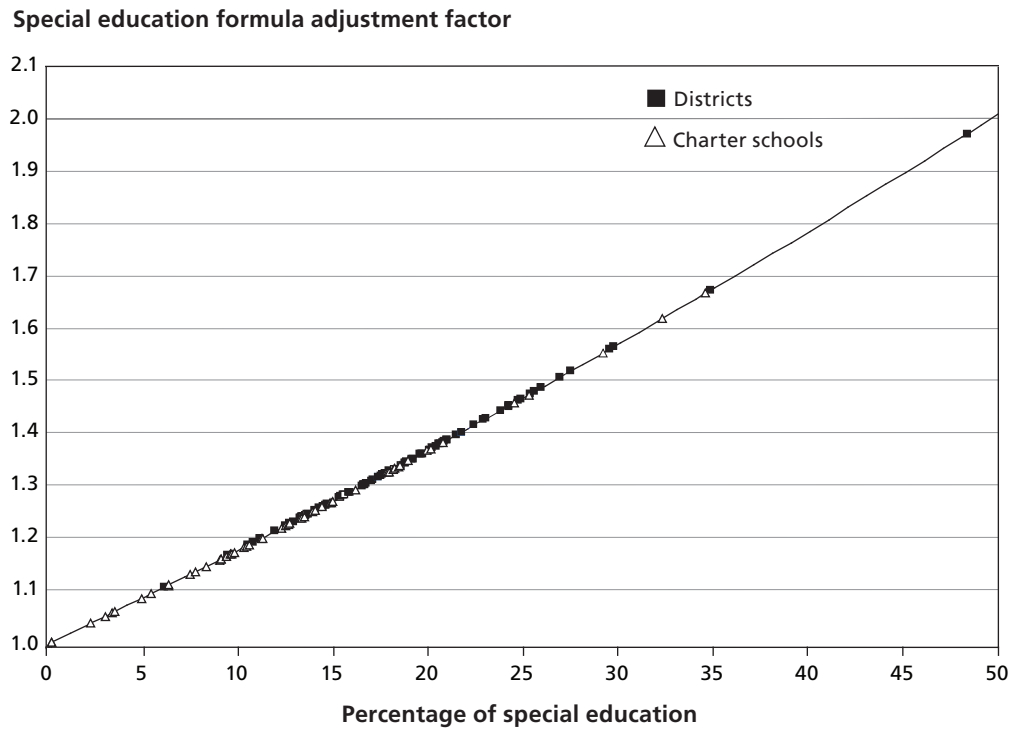
Source: Chambers et al. (2008a).

funding are strictly driven by the needs of students and the sizes of districts' enrollment, not by the wealth of the district.

- **Transparent, understandable, and accessible.** The final recommended distribution mechanism is transparent and not overly complex. Although replicating the projected adequate cost may be somewhat cumbersome on a handheld calculator, district and charter school adequacy projections have already been automated through an extremely simple cost calculator developed by the AIR research team.<sup>70</sup> The formula can be considered rather streamlined, given that only seven cost factors are necessary to calculate the projected adequacy cost. Moreover, the underlying rationale of the formula is understandable and accessible to policymakers, educational practitioners, and parents. Under the proposed formula, districts and charter schools with larger numbers of high-needs students (i.e., students in poverty,

English-language learners, students receiving special education services, and mobile students) receive additional funds to provide educational services necessary to meet the instructional needs of these populations. In addition, the formula assumes that districts and charter schools with larger enrollments are able to operate more efficiently and therefore can provide an adequate education at a lower per student cost compared with their counterparts with smaller enrollments. Finally, all formula adjustments can easily be displayed in charts.

- **Cost-based.** The recommended distribution mechanism strictly links the cost of programs to the specific needs of the district or charter school population served. Moreover, the costing-out process identified appropriate combinations of resources capable of providing adequate programs, which were costed out by the researchers using prevailing market prices for inputs. However, although adjustments for geographic cost

**Figure 10. Relationship between 2006–07 Percentage Special Education and Special Education Formula Adjustment Factor for New Mexico Districts and Charter Schools**

Source: Chambers et al. (2008a).

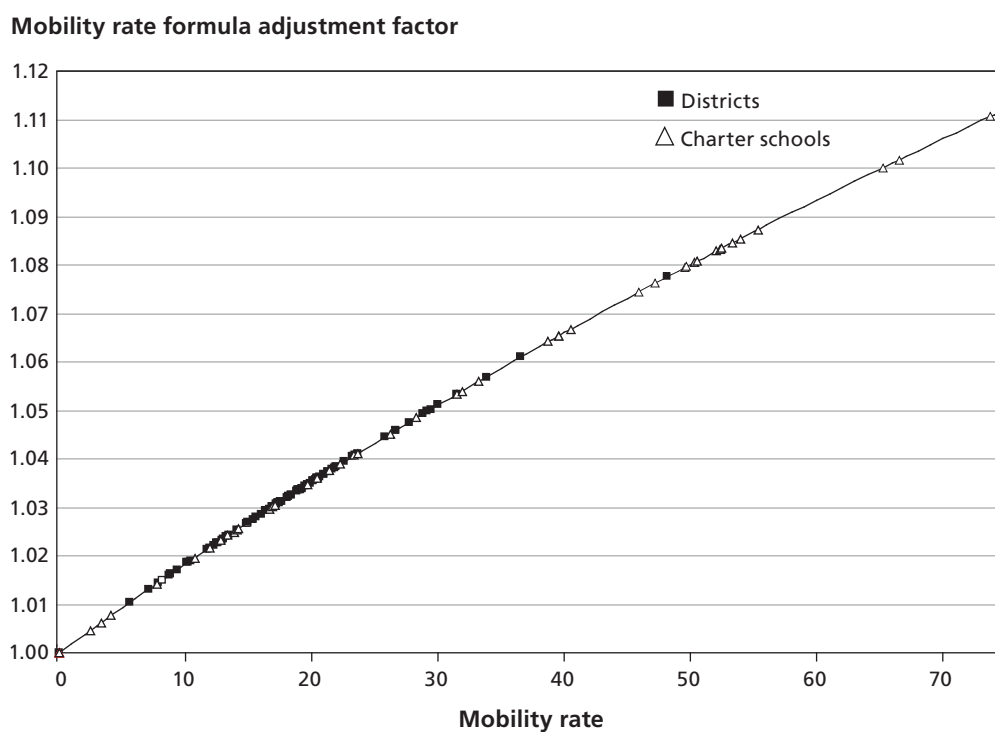
differences across districts were estimated and recommended, these were not implemented, at the client's request.

- **Minimize incentives.** There is no such thing as a completely incentive-free funding formula. The key is to create a formula that maintains the desired incentives preferred by policymakers. The recommended funding scheme attempts to make use of cost factors that are largely outside the control of local administrators. Nevertheless, a number of common cost factors may create potential incentives. For example, the percentage of special education students is certainly a determinant of educational cost, but this factor may also be associated with subtle incentives for identifying students as a way of obtaining additional funding. Although some students with disabilities can be identified unambiguously as eligible for special education services, in a number of disability categories the

criteria for identification leave considerable room for district discretion, and this may result in opportunities for over-identification of children.<sup>71</sup> Some limited evidence suggests that school funding formulas do provide incentives for identifying more students classified with specific learning disabilities, with speech/language impairments, and as emotionally disturbed, or as mentally retarded (see, e.g., Cullen 2003). Thus, district policies themselves can provide mechanisms for erring on the side of identification.

An approach used in several states is to adopt a census-based approach for funding of special education (see Greene and Forster 2002 for a classification of states with respect to method of funding of special education). The census-based approach effectively provides funding for the same percentage of students with disabilities across all districts regardless of their actual identification rates.

**Figure 11. Relationship between 2006–07 Mobility Rate and Mobility Rate Formula Adjustment Factor for New Mexico Districts and Charter Schools**



Source: Chambers et al. (2008a).

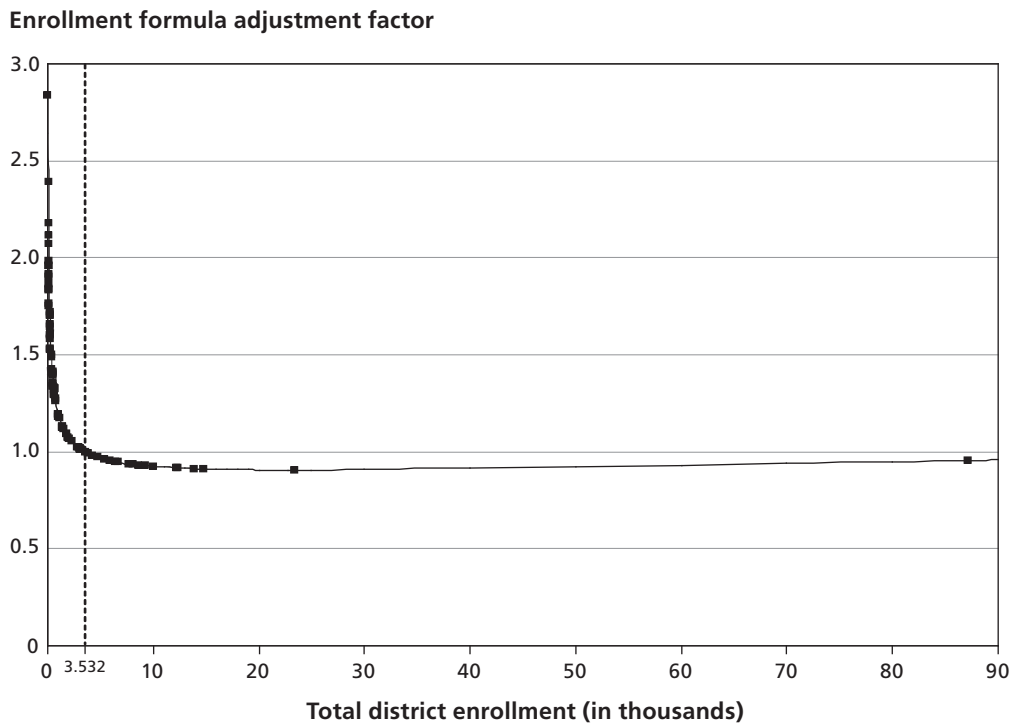
The approach has the advantage of providing more general funding for special education that can be used more flexibly to support prereferral services or response to intervention (RTI) that addresses students' learning problems before they are identified as special education students. Such an approach may actually lead to lower identification rates.

Because New Mexico had widely varying district-level identification rates (ranging from 6.0% to 34.8% in 2006–07), the research team recommended that the state implement a census-based funding scheme with a target identification rate of 16 percent.<sup>72</sup> Furthermore, it was suggested that the state make a concerted effort to lower the target rate gradually over successive years.

Some state funding mechanisms also purposefully include specific incentives aimed at guiding districts and schools toward allocating resources in certain ways. For example, New Mexico's current funding formula has a

Training and Experience (T&E) factor adjustment that provides additional compensation to school districts that choose to employ teachers with more training, experience, or both. One stated rationale is that the T&E factor provides incentives for districts to recruit and retain a *more highly educated or experienced* teaching staff and reduces the incentive to replace such staff members with less experienced teachers at lower pay rates.

One obvious argument against such an incentive is that all districts do not enjoy the same ease in attracting and retaining more highly qualified staff. In a sense, the use of the T&E index adjustment can be seen as exacerbating the existing geographic cost variations by increasing the purchasing power of districts that have an easier time attracting high-quality teachers. To mitigate this effect, the AIR research team initially recommended simply adopting a geographic cost of education index (GCEI) that would effectively equalize the purchasing power of

**Figure 12. Relationship between 2006–07 District Enrollment and District Enrollment Formula Adjustment Factor**

Source: Chambers et al. (2008a).

districts. However, this recommendation was ultimately rejected because of instances where the index values failed to yield intuitive results.<sup>73</sup>

### Reasonable Administration Costs

The costs of administering and maintaining the recommended distribution mechanism should be quite low. The funding formula is based on a limited number of cost factors based on data that are already regularly collected by the New Mexico Public Education Department. Making yearly projections of adequate costs is as simple as inserting these new data into a worksheet that performs the calculations, which can then be made available to district administrators, schools, and other parties interested in a transparent account of how their funding level was determined. One additional necessary cost that would be incurred by New Mexico as a result of implementing the AIR recommendations is that of increased accountability

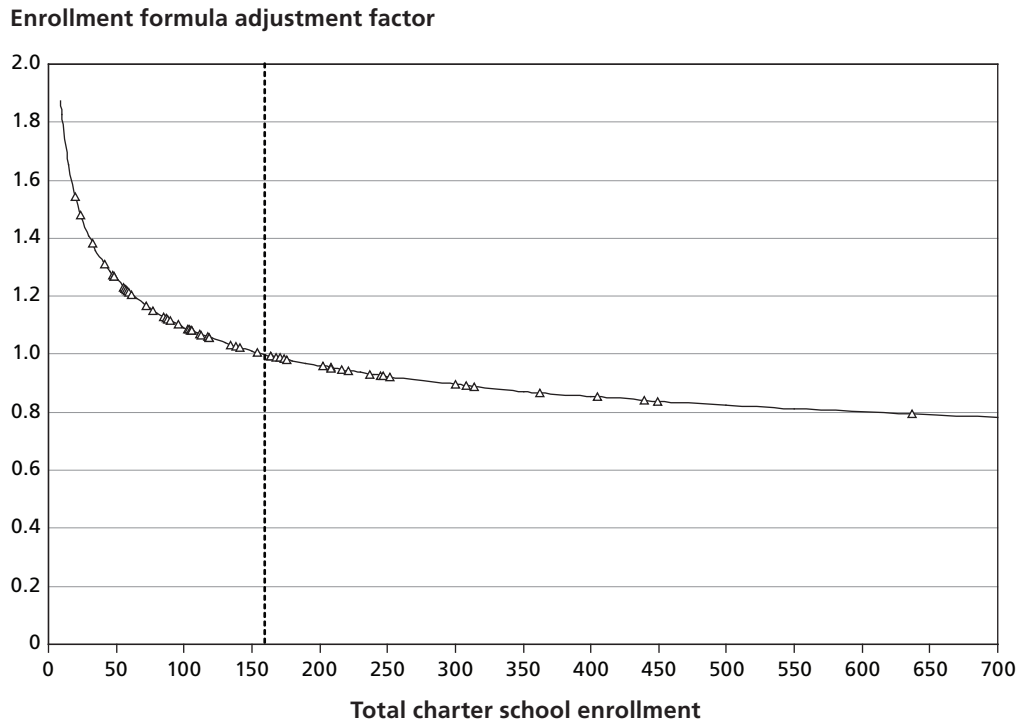
and monitoring of resource allocation and outcomes (see the concluding section of this chapter, which comments on funding and performance expectations).

### Predictable, Stable, and Timely

To the extent that demographic trends can be forecasted reasonably well, the recommended formula can predict the level of funding each district and charter school will need. AIR recommends that the parameters of the formula be set for approximately 5 to 10 years, after which a study update should be performed that reviews and modifies the instructional program designs, corresponding resource specifications, and input prices accordingly to better suit the goals, standards, and contextual realities of the state.

Another key recommendation promotes stability in funding from year to year. New Mexico's active funding formula bases current-year funding on the average

**Figure 13. Relationship between 2006–07 Charter School Enrollment and Charter School Enrollment Formula Adjustment Factor**



Source: Chambers et al. (2008a).

enrollment calculated from the previous year's 80th and 120th day. This feature of their funding mechanism is highly problematic for districts or charter schools that experience large annual enrollment swings. This is especially the case for districts or charter schools that have dramatic increases in enrollment but are funded on a much smaller count from the previous year. Essentially, these schools do not receive funding to support all of the students seated in classrooms for that year. To remedy this phenomenon, the AIR research team recommended a "growth and decline" rule whereby funding would be based on the maximum of the previous year's 80/120 day or the current year's 40-day enrollment.

### **The Importance of Accountability and Linking New Money with Performance**

Most researchers working in education would agree that providing additional funding to districts will not by itself

guarantee results. Funding without accountability is simply not sufficient to achieve the desired educational goals. In turn, a necessary step in the process of implementing mechanisms designed to promote educational adequacy through increases in general funding is that states must begin to hold districts and schools accountable for results. If there has been a reasonable process for defining the goals of an education system and determining the cost of providing an adequate education that will provide the opportunity for all students to reach these goals, the state needs to place a significant responsibility on the local schools and districts to carry out this mission.

Ideally, school funding reform legislation should require schools and districts to go through planning processes that link the programs they offer to the new funding and that provide some guidance on legitimate areas in which districts might reasonably allocate these funds. Such plans need to be realistic, recognize the need for

accurate and appropriate measurement, seek broad public input, implement state standards and required programmatic elements, explicitly acknowledge high-need student populations, and identify resources directed at meeting their needs. At the same time, districts should have the flexibility to select programs and resources that meet the specific needs of the communities in which they are located.

In both New York and New Mexico, policymakers proposed to link school funding reform to accountability structures. In 2007, New York passed the Contracts for Excellence legislation.<sup>74</sup> In conjunction with significant increases in educational funding statewide, this accountability measure required districts to draw up contract plans that would target spending of their increases in state aid across five priority areas. These are promoting smaller class sizes; increasing teacher and principal quality; providing full-day pre-kindergarten; increasing time on task (e.g., after-school programs, extended day, extended year); and restructuring of high schools and middle schools.<sup>75</sup> Moreover, programs must be targeted toward students with the greatest needs (e.g., those from poor households, English-language learners, and special education students). The law also required public participation in the development of the contracts, which must be transparent and provide school-by-school reporting on the use of funds.

In the New Mexico school funding reform package, the legislature proposed to have the Educational Plan for Student Success (EPSS), a planning process already in place, serve as a blueprint for guiding the use of new funding being offered to the districts and schools. The EPSS already requires every district to identify needed improvements in the areas of effective leadership, qual-

ity teaching and learning, collaborative relationships, and necessary support for systemwide improvement. AIR recommended that the state provide additional funds to the districts with the requirement that they align these funds with the priorities laid out in their EPSS, and that the New Mexico Public Education Department (PED) should establish clear guidelines and structures to ensure that the increase in funds aligns with the EPSS.

Dr. Anthony Cavanna noted in his expert brief developed for the New Mexico project that policymakers, state education agencies, and district administrators should set criteria and provide support, but “allow schools to seek to meet expectations in self-determined ways because educators closest to students know what students need.” (Cavanna et al. 2008: 43) The AIR research team felt that aligning funds to EPSS priorities would allow district flexibility in use of funds while providing guidance. Districts receiving additional funds should be required to provide a realistic plan to the PED that documents how these funds will meet the areas outlined in the EPSS.

Further support for Cavanna’s plea for local control comes from a study of international comparisons of the value of investment in education. Psacharopoulos (2006) makes the following assertion based on his review of the international evidence:

There is robust evidence that the institutional environment contributes to the efficient use of resources. A decentralized education system is associated with a higher level of achievement in international tests. Thus, once a given budget is allocated to schools, it might be better managed at the school level rather than by a central authority. (p. 134)



## 6

### Conclusion

In recent years, concern has increased among policy-makers, practitioners, and researchers about the level of public school students' achievement. This has prompted passage of major legislation focused on school accountability (the federal No Child Left Behind Act) and continued research efforts in educational effectiveness. More generally, this research has sought to determine what types of programs and resources are needed to provide students with an education that is deemed "adequate" (i.e., a *high-quality* schooling program that will afford them the opportunity to perform at some desired level).

In parallel with this push to identify what is needed to improve student outcomes, a body of research has emerged with a focus on determining the *costs* of supplying the resources necessary to provide this high-quality education to all students. The purpose of costing-out studies is to assist state policymakers to determine what levels of investment are necessary to provide an adequate education to all children and then to use this information as a foundation for building school funding formulas that equitably distribute resources to meet the needs of students with diverse backgrounds in different locations around a state.

The intention of this report was to provide the reader with a broad introduction to costing out, which included the following:

1. An overview and critique of the four techniques commonly used to determine the costs of an adequate education (cost functions, professional judgment, successful schools/beating-the-odds, and evidence based)
2. An in-depth description of the three components necessary to provide a comprehensive costing-out study (defining adequacy, costing out adequacy, and developing a funding formula)
3. A presentation of results from previous studies conducted by the authors that employ these comprehensive components.

#### What Have We Learned?

The costing out of an adequate education is not an exact science. It follows that currently there is no one right answer to the first fundamental question addressed by costing-out studies—that is, what is the cost of providing an adequate education to all students in the public school system?

Unfortunately, the effectiveness literature has yet to provide an unambiguous answer to "what works" for all children in all circumstances. Many factors must be taken into account in determining the optimal combinations of programs and resources necessary to achieve the desired results. However, several alternative techniques have been developed that provide rational and systematic approaches for arriving at justifiable and reasonable answers to the question. As described above, the four major techniques each have specific strengths and weaknesses that must be taken into account in their application, and an increasing number of studies are incorporating elements of more than one of the methods.

This paper next introduced three components that make up a comprehensive costing-out study: (1) defining adequacy; (2) costing out adequacy; and (3) developing a funding formula. In order to define educational adequacy, the authors stressed the importance of conducting an extensive public engagement process that serves several important functions. For example, it provides public visibility and buy-in to the costing-out process, and it creates a formal mechanism to develop a goals statement that serves as the objective for the costing-out component. In addition, the authors noted the importance of allowing for the consideration and incorporation of a broad set of outcomes (i.e., beyond student achievement test scores) in the goals statement. The research team may help facilitate the process. However, it is the responsibility of state policymakers to develop the goals statement used as a foundation for the costing-out process and to be accountable for it.

A detailed description of costing out adequacy showed how this process takes into account the three major cost factors: student needs, scale of operations, and geographic variation in resource costs. Furthermore, much emphasis was placed on the importance of involving educational practitioners in the costing-out process. The results of three studies in New York, California, and New Mexico, respectively, showed similar patterns in the types of programs and resources specified by professional-judgment panels in the costing-out exercises. Moreover, most of these same programmatic elements specified by the professional-judgment panels were also found in the *expert briefs* drafted by a set of scholars and practitioners for the New Mexico study and in the previous studies that employ the evidence-based technique.<sup>76</sup>

A comparison of adequacy costs from the New York, California, and New Mexico studies presented a qualitatively similar story. In all three cases, significant increases in funding were deemed necessary in order to provide an adequate high-quality education to all students. However, it was also shown that variations in the magnitude of the necessary increases may be related to where each state started with respect to current spending and to the types of educational goals established for the professional-judgment panels charged with developing the program specifications underlying the cost analysis.

Finally, the paper presented a validation analysis of the New York results that showed a robust negative relationship between funding shortfall and student achievement. That is, for most subpopulations of students (e.g., economically disadvantaged, minority, and disabled), average achievement was lower the larger the difference was between the estimates of adequate versus actual spending.

The final portion of the paper turned to putting the research results into practice by showing how the estimated costs of providing an adequate education can be used to develop a simple funding formula capable of equitably distributing resources across districts and schools. Within this discussion of how to build a funding formula, the authors also raised a potential conflict between the use of input-based costing-out techniques (i.e., professional-judgment and evidence-based methods), which develop comprehensive adequate educational programs without regard to various types of funding streams, and the way state school funding formulas take into account federal

revenues. The authors challenge policymakers to rethink the current “supplant versus supplement” restrictions in the way state and federal funds are combined to achieve the desired funding objectives.

Next, the paper presented an example of a funding formula developed in the New Mexico study followed by a discussion of the desirable properties of distribution mechanisms (e.g., adequate/equitable, transparent/understandable, and cost based) and of how several of these were preserved in the recommended formula. The section ended with a discussion of the necessity of designing an effective accountability structure to ensure that increases in funding, and funding in general, are spent productively.

## Directions for Future Research

An important gap remains in the costing-out literature with respect to linking study results to policy application. For example, sometimes only the “bottom line” cost estimates of providing an adequate education statewide are used with little or no regard as to how these funds should be distributed across districts. Clearly, providing adequate funding without altering the mechanisms by which that funding is distributed does nothing to promote increased equity. The authors therefore reiterate that a comprehensive costing-out study *necessarily* includes the development of a funding formula that policymakers can easily adopt. In addition, authors of these costing-out studies should stress that the suggested distribution mechanism must be used in conjunction with the cost estimate.

As a second example, few costing-out studies take into account the fiscal context of the state within which they are working. Clearly, the public’s willingness to pay for increases in funding is an important factor that should be taken into account, especially when defining adequacy goals that necessarily drive the cost estimates. In addition, the public can most certainly provide input as to which revenue sources they would prefer to tap to support funding increases. These points stress the importance of necessarily incorporating public involvement in the costing-out process. Finally, it is far less likely that policy action will be taken to adopt funding increases (and improved distribution mechanisms) unless revenue sources are available to support such an endeavor. To this end, future costing-out research should make an effort to identify viable

revenue streams capable of supporting the necessary funding increases suggested by their results.<sup>77</sup>

There has been significant recognition that education alone cannot substantially reduce the gap in student learning and opportunities. Future research in this arena should link school finance adequacy work to broader sets of cost estimates associated with providing some of the other

services necessary to improve equality of educational opportunity and of life chances for our children. School finance adequacy work needs to take into account the additional costs associated with providing access to children's health services, nutritional services, recreational opportunities, and family support services in order to enhance the potential impact of improved educational opportunities.<sup>78</sup>



# *Appendix A*

## *Examples of Goals Statements from the New York, California, and New Mexico Studies*

**Figure A.1. Goals Statement from New York Study**

The federal No Child Left Behind Act and state law require all students in every school district to meet the Regents Learning Standards within the next 11 years and to make steady progress toward that goal each year. As of 2005, all high school students (except for certain special education students) will be required to achieve a passing score of 65 on the Regents examinations in English, social studies, mathematics, and science to receive a high school diploma. As of the 2005–06 school year, students in grades 3–8 will be tested in English, and mathematics (and shortly thereafter in science) to determine whether they are making satisfactory progress toward meeting the Learning Standards. Rates of yearly progress toward these goals will be disaggregated by racial, economic, disability and limited English proficiency categories.

Your job is to design an instructional program that will provide all students in the school a full opportunity to meet the Regents Learning Standards, and to attain a Regents diploma. For students in the early grades and preschool, this means designing an instructional program that will seek to address any learning problems with which students enter school. For students further along in their educational career, it means addressing any deep-rooted educational deficiencies that may have developed as thoroughly as possible and minimizing dropout rates.

Source: Chambers et al. (2004a: 17).

Note: In the New York study, the goals statement and the instructions for the program design were integrated into a single statement.

*appendix continues on next page*

**Figure A.2. Goals Statement from California Study****Background**

The federal No Child Left Behind Act and state law requires that all students in every school district meet “academically rigorous content standards and performance standards in all major subject areas” by the 2013-2014 school year and to make steady progress toward that goal each year {Cal. Educ. Code 60602(a)(2)}.

**(1) Access to California Content Standards**

All students should have access to instructional programs and services that are consistent with the California content standards in all subject areas, listed below, as adopted by the State Board of Education.

**English-language arts** standards direct children in learning to understand written and oral language expression, to communicate effectively, to comprehend and appreciate a diversity of literature, and to comprehend various sources of information.

**Math** standards are designed to prepare students to grapple with solving problems; develop abstract, analytic thinking skills; learn to deal effectively and comfortably with variables and equations; and use mathematical notation effectively to model situations.

**History-social science** standards emphasize historical narrative, highlight the roles of significant individuals throughout history, and convey the rights and obligations of citizenship.

**Science** standards are viewed as the foundation for understanding technology and societal issues. These issues are strongly connected to community health, population, natural resources, environmental quality, natural and human-induced hazards, and other global challenges.

**Visual and performance arts** standards represent a strong consensus on the skills, knowledge and abilities in dance, music, theatre and the visual arts that students should be able to master at specific grade levels.

**English-language development** standards define what all students, including those learning a second language, are expected to be able to know and do. These standards are designed to supplement the ELA content standard to ensure that limited English-proficient (LEP) students develop proficiency in both the English language and the concepts and skills contained in the ELA content standards.

**Physical education** standards are based on the premise that the quality and productivity of each individual’s life can be enhanced through participation in a comprehensive, sequential physical education system that promotes physical, mental, emotional, and social well-being.

**(2) Target Performance Levels for California Public Schools**

As of the 2005–06 school year, all California high school students (except for certain students with disabilities) will be required to achieve a passing score on the California High School Exit Examinations (CAHSEE) in English-language arts and mathematics to receive a high school diploma. As of the 2005–06 school year, students in grades 3–8 will be tested in English and mathematics (and shortly thereafter in science) to determine whether they are making satisfactory progress toward meeting the learning standards. Rates of yearly progress toward these goals must be disaggregated by racial, economic, disability and limited English proficiency subgroups. The target outcomes for deliberations of the professional-judgment panels should be directed toward those established by the California Department of Education for the 2011–2012 school year as follows:

**Participation rates** of 95 percent school-wide and for each subgroup.

**English-language arts proficiency rates** of 78.4 percent for elementary and middle schools and 77.8 percent for high schools.

**Mathematics proficiency rates** of 79.0 percent for elementary and middle schools and 77.4 percent for high schools.

**An Academic Performance Index (API)** of 740 in every elementary, middle, and high school (an API target of 800 will be addressed in a later task).

A high school graduation rate of 83.4 percent.

Source: Chambers et al. (2006a: 15).

**Figure A.3. Goals Statement from New Mexico Study**

### **Background**

It is the purpose of New Mexico schools, in partnership with families, to

- Prepare all students to be responsible citizens and family members,
- Prepare all students for educational success, and
- Prepare all students to obtain and maintain gainful employment.

By “all” students, it is implied that each student will be provided the opportunity to meet these goals, regardless of classification (English-language learner, poverty, special education or otherwise) or location. To accomplish these goals, public schools shall follow the Public Education Department (PED) Commitment to Excellence, which acknowledges that developing an educated citizenry requires all partners of the educational community to share and support a vision of excellence (NMAC, Title 6, Chapter 30, Part 2).

### **Four Critical Elements**

This Goals Statement encompasses four indispensable and interrelated elements, each of which is described below. Details for each of these elements are provided in the Public Engagement Report found in Technical Volume, Section 2.1—Public Engagement Report.

### **Underlying Philosophies**

State-level goals of excellence should coexist and be balanced with appropriate individual and local goals. Students shall have access to a multicultural education, diverse and highly qualified teachers, necessary supports to achieve these goals, and a range of enhancement opportunities offered in local communities.

### **Content Standards**

All public school students shall make positive and measurable gains through appropriate instructional programs aligned to state content standards and benchmarks. Children will be challenged to learn and succeed, drawing on their strengths through diverse and multiple learning styles.

### **Knowledge, Skills, and Personal Qualities**

New Mexico high school graduates shall exhibit a range of knowledge, skills, and personal qualities that enable them to be successful, productive members of their communities, the nation, and the world.



Schools, in partnership with families and communities, seek to promote personal qualities in ways that integrate with content curriculum and in conjunction with curricular and co-curricular activities.

**Performance Goals**

All students in New Mexico's public education system should have the opportunity to make demonstrable, appropriate growth each year on a wide range of measures. Students should be provided the opportunity to demonstrate learning outcomes aligned with standardized measures reflective of state, national, and international standards and to demonstrate growth in areas not captured by standardized tests. In addition, students graduating from New Mexico high schools should have the requisite skills to enable entry into community college and/or entry into the work force without remedial needs.

Source: Chambers et al. (2008a: 16).

**Table A.1. Comparison of Goals Statements from Costing-Out Studies in New York, California, and New Mexico**

| Goal/Subgoal                             | Costing-out study                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                          | New York                                                                                                                                                                                                                                               | California                                                                                                                                                                                                                                                                                                                                                                                                                                            | New Mexico                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| General description of goals statement   | <p>Stated goal is to provide all students a full opportunity to reach outcomes.</p> <p>Goals statement developed using input from series of 13 public forums throughout state organized by Campaign for Fiscal Equity (CFE).</p>                       | <p>Stated goals are that students should have access to state content standards and meet accountability goals established by the California Department of Education (CDE) by 2011–12.</p> <p>Goals statement developed by American Institutes for Research (AIR).</p>                                                                                                                                                                                 | <p>Stated goals are that students should be prepared to be (1) responsible citizens and family members; (2) academically successful; and, (3) able to obtain and maintain gainful employment. Students should have access and make measurable gains in line with state content and accountability standards, as well as possess specific personal qualities.</p> <p>Goals statement developed using input from series of 23 town-hall meetings throughout state organized by American Institutes for Research (AIR).</p> |
| Student performance outcomes             | <p>All high school students (except for certain special education students) should achieve a passing score of 65 or better on the Regents examinations in English, social studies, mathematics, and science in order to receive a Regents Diploma.</p> | <p>Passing score on the California High School Exit Examinations.</p> <p>English-language arts proficiency rates of 78.4% for elementary and middle schools and 77.8% for high schools.</p> <p>Mathematics proficiency rates of 79.0% for elementary and middle schools and 77.4% for high schools.</p> <p>An Academic Performance Index (API) of 740 in every elementary, middle, and high school.</p> <p>A high school graduation rate of 83.4%</p> | <p>All public students shall make positive and measurable gains and have the opportunity to make demonstrable, appropriate growth each year on a wide range of measures.</p>                                                                                                                                                                                                                                                                                                                                             |
| Curriculum and content standards         | <p>Provide all students in the school a full opportunity to meet the Regents Learning Standards.</p>                                                                                                                                                   | <p>All students in every school district should meet academically rigorous content standards and performance standards in all major subject areas.</p> <p>All students should have access to instructional programs and services consistent with California content standards in all subject areas</p>                                                                                                                                                | <p>Instructional programs should be aligned to state content standards and benchmarks.</p> <p>Demonstrate learning outcomes aligned with standardized measures.</p>                                                                                                                                                                                                                                                                                                                                                      |
| Noncognitive outcomes                    |                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <p>Prepare all students to be responsible citizens and family members.</p> <p>Graduates shall exhibit a range of personal qualities that enable them to be successful, productive members of their communities.</p> <p>Demonstrate growth in areas not captured by standardized tests.</p>                                                                                                                                                                                                                               |
| Preparation for future after high school |                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <p>Prepare all students to obtain and maintain gainful employment.</p> <p>Provide requisite skills to enable entry into community college and/or entry into the work force without remedial needs.</p>                                                                                                                                                                                                                                                                                                                   |
| Diversity of educational experience      |                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <p>Provide access to a multicultural education, and diverse and highly qualified teachers.</p>                                                                                                                                                                                                                                                                                                                                                                                                                           |



# *Appendix B*

## *Overview of the New Mexico School Funding Formula and Calculation Example*

The following provides a technical overview of the recommended public school funding formula developed for New Mexico and an example of using the formula to calculate adequate per student costs for two hypothetical districts.

### **Technical Overview of Formula**

Technically speaking, the formula adjustment factors are determined for each district by calculating indexes based on student need measures and raising them to specific exponents that define the relationship between sufficient per student cost and the cost factors (see Table B.1). The series of adjustment factors are then multiplied through and applied to a common year-specific base per student cost to yield the appropriate adequate cost associated with a given district or charter school. It is extremely important to understand how the base per student cost is defined. The 2007–08 base per student cost (\$5,106) denotes the adequate per student cost for the average-sized New Mexico district (3,532 students) that has average shares of K–5, 6–8, and 9–12 enrollment (44.0%, 23.4%, and 32.5%, respectively) and no additional student needs (i.e., zero poverty, English learners, special education, or mobility). The formula achieves this by utilizing centering values (denominators) in the enrollment and enrollment share formula adjustment factors.

Because charter schools generally have enrollment levels that are far smaller than districts, the district-level formula adjustment for this cost factor is not applicable. Simply put, charter schools cannot be treated the same way districts are in analyzing the impact of scale. To address this difference, an additional regression procedure was run for charter schools that constrained all of the student need adjustments (i.e., for poverty, English learners, special education and mobility) and enrollment composition to be identical to those produced by the district-level equation, but estimated a different relationship between enrollment and sufficient per student cost. Therefore, the only difference between the way districts and charter schools are treated is in terms of the formula adjustment factor associated with enrollment.

**Table B.1. Definitions of Formula Adjustment Factors**

| <b>Cost factor</b>                                              | <b>Formula adjustment factor</b>                                                              |
|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| <b>Student need factors</b>                                     |                                                                                               |
| Free and reduced lunch                                          | (poverty index) <sup>0.375</sup>                                                              |
| English learners                                                | (English learner index) <sup>0.094</sup>                                                      |
| Special education                                               | (special education index) <sup>1.723</sup>                                                    |
| Mobility rate                                                   | (mobility index) <sup>0.190</sup>                                                             |
| <b>District-specific grade composition and enrollment</b>       |                                                                                               |
| Enrollment share in grades 6–8                                  | (grade 6–8 enrollment index) <sup>0.291</sup> / 1.063                                         |
| Enrollment share in grades 9–12                                 | (grade 9–12 enrollment index) <sup>0.608</sup> / 1.187                                        |
| Overall district enrollment                                     | (enrollment) <sup>-0.575</sup> * [exp(ln(enrollment) <sup>2</sup> )] <sup>0.029</sup> / 0.062 |
| <b>Charter school-specific grade composition and enrollment</b> |                                                                                               |
| Enrollment share in grades 6–8                                  | (grade 6–8 enrollment index) <sup>0.291</sup> / 1.074                                         |
| Enrollment share in grades 9–12                                 | (grade 9–12 enrollment index) <sup>0.608</sup> / 1.241                                        |
| Charter school enrollment                                       | (enrollment) <sup>-0.307</sup> * [exp(ln(enrollment) <sup>2</sup> )] <sup>0.012</sup> / 0.291 |

Inserting the district formula adjustment factors from the table into the general structure of the formula yields the following district-level funding equation:<sup>81</sup>

$$\begin{aligned}
 \text{sufficient per student cost} = & \$5,106 \times \\
 & (\text{poverty index})^{0.375} \times \\
 & (\text{English-learner index})^{0.094} \times \\
 & (\text{special education index})^{1.723} \times \\
 & (\text{mobility rate index})^{0.190} \times \\
 & (\text{Grade 6–8 enrollment index})^{0.291} / 1.063 \times \\
 & (\text{Grade 9–12 enrollment index})^{0.608} / 1.187 \times \\
 & (\text{enrollment})^{-0.575} \times [\exp(\ln(\text{enrollment})^2)]^{0.029} / 0.062
 \end{aligned}$$

### Calculation Example

Given a hypothetical district with the following characteristics:<sup>82</sup>

|                                         |          |
|-----------------------------------------|----------|
| poverty (POV)                           | = 40.3%  |
| English learners (EL)                   | = 20.1%  |
| special education (SE)                  | = 16.0%  |
| mobility (MOB)                          | = 17.9%  |
| enrollment share in grades 6–8 (EN68)   | = 21.3%  |
| enrollment share in grades 9–12 (EN912) | = 37.0%  |
| total enrollment (ENR)                  | = 13,423 |

The adequate per student cost would be calculated as follows:

$$\text{Base} \times \text{POV} \times \text{EL} \times \text{SE} \times \text{MOB} \times \text{EN68} \times \text{EN912} \times \text{ENR} = \text{Adequate Cost}$$

$$\$5,106 \times 1.135 \times 1.017 \times 1.291 \times 1.032 \times 0.995 \times 1.020 \times 0.913 = \$7,286$$

The calculated formula adjustment factors make it easy to identify which characteristics have the greatest impact on projected adequate per student cost (i.e., poverty and special education). Also note that the formula adjustments for those cost factors around which the base per student cost is centered (i.e., enrollment shares and total enrollment) can assume values that are greater or less than 1.00. In this example, because the hypothetical district has an above-average share of high school students (32.5%), the adjustment factor EN912 is greater than unity (1.020) in order to cover a greater demand for this more costly type of instructional program. The total enrollment cost factor can also take on values that are above or below 1.00. However, the relationship between enrollment and adequate cost is negative to account for economies of scale. In the example, the hypothetical district has an enrollment that is much larger than the statewide average of 3,532, and therefore the formula accounts for the fact that the district can operate more efficiently by providing a commensurately lower level of funding.

Next, we perform the same calculation for an otherwise identical district, but with twice as much poverty and incidence of English learners (changes in ***bold italics***):

$$\text{Poverty (POV)} = 80.6\%$$

$$\text{English Learners (EL)} = 40.3\%$$

$$\text{Special Education (SE)} = 16.0\%$$

$$\text{Mobility (MOB)} = 17.9\%$$

$$\text{Enrollment Share in Grades 6–8 (EN68)} = 21.3\%$$

$$\text{Enrollment Share in Grades 9–12 (EN912)} = 37.0\%$$

$$\text{Total Enrollment (ENR)} = 13,423$$

The adequate per student cost calculation for the new set of characteristics is:

$$\text{Base} \times \textbf{POV} \times \textbf{EL} \times \text{SE} \times \text{MOB} \times \text{EN68} \times \text{EN912} \times \text{ENR} = \textbf{Adequate Cost}$$

$$\$5,106 \times \textbf{1.248} \times \textbf{1.032} \times 1.291 \times 1.032 \times 0.995 \times 1.020 \times 0.913 = \textbf{\$8,128}$$

The formula has compensated for the increase in student needs accordingly by projecting a higher adequate per student cost of \$8,128 (equal to an 11.5% increase).





## Notes

<sup>1</sup> NEA, *Strategic Planning Process Executive Summary, 2006–2008*. Version of September 13, 2007, page 30, item 7. Retrieved from <http://insidenea.nea.org/NEABiz/ScoreCard/SMSAdminSite/Documents/2006-2008 SMS Documents/A - Strategic Plans/06-07 Versions/FINAL STRATEGIC PLAN FOR SEPT 2006 as of 122806 with 2007 changes accepted as of 091307.doc>. (Document not publicly available.)

<sup>2</sup> See, for example, Hanushek (2005).

<sup>3</sup> In addition, practitioners in these studies were provided research literature on effective educational practices and example resource specifications from extraordinarily effective schools.

<sup>4</sup> Differences in these priorities between educators and non-educators tended to be relatively minor. For more information, see Section 3: Professional Judgment Process, in Chambers et al. (2008b).

<sup>5</sup> The other adjustment factors work in a similar fashion and are detailed in the main text of the paper.

<sup>6</sup> For a comprehensive list of cost studies across states broken out by type of party initiating study (i.e., court ordered, state initiated, and initiated by others) see the National Access Network Web site: <http://www.schoolfunding.info/policy/CostingOut/Costing-Out-Chart.pdf>

<sup>7</sup> For a discussion of the link between adequacy and equity in school finance, see the early works of Chambers and Parrish (1982 and 1984), who conducted the first of what have become known as professional-judgment costing-out studies in Illinois and Alaska. The introductory chapters of these studies specifically address this link between adequacy and equity.

<sup>8</sup> See the following studies for examples of cost-function analyses of adequacy: Duncombe and Yinger (1999); Duncombe

et al. (2003); Reschovsky and Imazeki (2001); Imazeki and Reschovsky (2004); and Imazeki (2006).

<sup>9</sup> Research on the use of average test data for accountability purposes has shown these measures to be subject to high levels of imprecision (Kane and Staiger 2001).

<sup>10</sup> A similar method that makes use of the professional judgment of *individual* practitioners (teachers and principals) in isolation, rather than judgments that have been deliberated in organized groups, has been implemented by Sonstelie et al. (2007).

<sup>11</sup> For more recent professional-judgment studies, see MAP, Inc. (2001); Augenblick and Myers (2003); and Chambers et al. (2004a, 2007, and 2008a).

<sup>12</sup> For example, the educational goals statement that defined an adequate education for the recent study in New Mexico (see Chambers et al. 2008a) included both cognitive elements (i.e., knowledge of content standards) and noncognitive elements (i.e., development of personal qualities such as personal responsibility, civic participation, and work ethic). As recent research suggests that compared with cognitive skills, noncognitive skills (i.e., social skills, motivation, and dependability) continue to develop over a much longer period and generate large payoffs in the labor market (see Heckman et al. 2006), it seems especially important to consider noncognitive outcomes in the educational adequacy objective.

<sup>13</sup> However, an alternative perspective suggests that the cost estimates may be very much driven by the level of the educational objective provided to the professional-judgment panels to guide their deliberations.

<sup>14</sup> Because many of these studies were performed at the district level, this has often also been referred to as the successful school *district* technique.

<sup>15</sup> BTO analysis draws on *adjusted performance measures* in order to identify schools/districts that are considered extraordinarily successful given their characteristics. Some studies have even included measures of school resources in the original statistical models so that their measures of success are really more efficiency measures. Examples of BTO analysis can be found in the studies by include Klitgaard and Hall (1972), Stiefel et al. (1999), and Perez et al. (2007).

<sup>16</sup> See the studies by Odden et al. (2003a, 2003b, and 2006) for applications of the evidence-based technique in the states of Arkansas, Kentucky, and Washington, respectively.

<sup>17</sup> Hanushek (2007) provides a critique of a recent adequacy study that makes use of the evidence-based approach, which emphasizes the unrealistic expected achievement gains implied by the study.

<sup>18</sup> That is, the evidence-based approach does little formally to address Question 2 put forth above.

<sup>19</sup> Examples of studies employing multiple costing-out methods include Augenblick et al. (2006 and 2007) and Chambers et al. (2004a, 2006a, and 2008a).

<sup>20</sup> Unfortunately, the study performed by the authors in California did not include a public engagement component because of time and budgetary constraints. The *goals statement* used in California was based on statements drawn from the California Education Code (see Chambers et al. 2006a).

<sup>21</sup> For example, below the chapter reports on the public engagement process in New Mexico, which measured the relative priority the public gave to schools producing student skills and knowledge versus personal qualities.

<sup>22</sup> This element of public engagement was not carried out in either the New York or New Mexico studies, but the authors plan to pay explicit attention to it in future works.

<sup>23</sup> An in-depth report on the public engagement effort conducted for the New York adequacy study can be found in Chambers et al. (2004b).

<sup>24</sup> The forums took place in Greece/Rochester, Buffalo, Brooklyn, Lake Placid, Ellicottville, Horseheads, Valhalla, Queens, Farmingdale, Cicero, the Bronx, Manhattan, and Albany. These sites were specifically chosen to make the meetings accessible to individuals from rural, suburban, small city, and large urban school districts.

<sup>25</sup> In order to ensure an adequate response from the rural population, a disproportionate share of the meetings were organized in these types of communities.

<sup>26</sup> For more details on the participation in the town-hall meetings and online surveys for the New Mexico project, see the final report and technical appendixes (Chambers et al., 2008a and 2008b, respectively), which are available for download at the project Web site, <http://www.nmschoolfunding.org>

<sup>27</sup> The outcomes were largely drawn from legislation (House Bill 212, New Mexico Statutes Annotated 22-1-1.2) and the State Board of Education's Standards of Excellence (New Mexico Administrative Code 6.30.2).

<sup>28</sup> Differences in these priorities between educators and non-educators tended to be relatively minor. For more information, see Section 3: Professional Judgment Process, in Chambers et al. (2008b).

<sup>29</sup> These elements were grouped into 10 categories, including Early Childhood Opportunities, Academics, Health and Wellness, Extracurricular Opportunities, Family and Community Involvement, Special Education, Language Learning, Extended Time, Teacher Quality, and School Environment.

<sup>30</sup> AIR insisted on establishing a stakeholder committee that was widely representative of the various constituencies around the state that were affected by decisions about school funding or played a significant role in educational policy. This stakeholder committee was to be ultimately responsible for creating the goals statement that would serve as a foundation for the costing-out analysis and needed to represent the citizens and policy making bodies in New Mexico.

<sup>31</sup> This sentiment was reiterated by the public at the town-hall meetings:

Accountability is important, but testing and AYP measures as currently implemented place too much emphasis on performance accountability. The public felt that school systems should be held accountable for both fiscal and performance. However, current assessments and the overemphasis on single test measures have driven other programs out of schools. (Chambers et al. 2008b: 21)

<sup>32</sup> For example, the correlation between percentage of poverty and percentage of EL among California schools in 2005–06 was 0.79. The same measure for New Mexico in 2006–07 was 0.64. Note that these large correlations are driven largely by the fact that schools with high percentages of EL students more often than not also exhibit a high percentage of students living in poverty. However, the opposite is not always the case (i.e., high-poverty schools do exist that have a low percentage of EL students).

<sup>33</sup> That is, the indexes are most often centered (equal to 1.00) around the student-weighted state average (i.e., the district attended by the average student).

<sup>34</sup> For example, Fowler (1993) has shown that on average over 80 percent of total educational costs are attributable to personnel resources, and less than 6 percent of funds are spent on supplies and materials. For an example of the magnitude of some of these nonpersonnel factors, see Taylor et al. (2004). These non-personnel factors, including energy costs, tend to play a much more significant role in relatively rural states such as Alaska, in which many districts very remote.

<sup>35</sup> For example, studies conducted by the authors in New York (Chambers et al. 2004a) and New Mexico (Chambers et al. 2008a) made use of eight and six independent panels, respectively. The California study (Chambers et al. 2006a), with a more limited budget, included two independent panels.

<sup>36</sup> For example, in the New York study, panels were specific to New York City, the other large five cities, suburban/small towns, and rural district. Categorization of districts with respect to urbanization has been performed using the National Center for Education Statistics (NCES) locale code (for an example, see Appendix B in Chambers et al. 2004b).

<sup>37</sup> For example, in New Mexico, AIR provided panels with five expert briefs that were intended to provide a review of the elements necessary for successfully serving specific special-needs populations. The briefs focused on students at risk, designated as English learners, enrolled in special education, attending school in rural areas, and the practitioners' perspective on providing successful schooling programs.

<sup>38</sup> Often additional school-level demographic characteristics are provided (e.g., percentage of students in gifted and talented programs) or further-broken-down measures are introduced, such as the composition of special education students with low-versus high-incidence disabilities.

<sup>39</sup> Examples of programmatic features are target class sizes and student support caseloads; length of school day and year for students, instructors and administrators; subjects/courses and extracurricular activities that will be offered to students; and professional development opportunities made available to staff.

<sup>40</sup> The following discussion refers to the most recent study conducted in New Mexico. Although the basic setup is similar to that of the New York and California studies, the structure and number of exercises differed somewhat across the three studies.

<sup>41</sup> That is, although it is possible to find a high-poverty school with low percentages of English learners, it is generally not possible to find a high percentage of English learners in a low-poverty school.

<sup>42</sup> The final review of resources is depicted by the two-way feedback loop between the boxes labeled Review Panel and Cost Out Adequate Program in Figure 1.

<sup>43</sup> Examples of ancillary service personnel categories that can be specified are as follows: audiologist, Braille specialist, campus security aide, curriculum specialist, diagnostician, homebound hospital teacher, interpreter for the deaf, occupational therapist (assistant); orientation and mobility trainer; other specialists (e.g., transition, education behavior modification); physical therapist (assistant); recreation therapist; rehabilitation counselor; school psychologist; social worker; speech/language pathologist; and technology specialist/coordinator.

<sup>44</sup> These types of expenditure data are regularly collected and made publicly available by state departments of education.

<sup>45</sup> In constructing the overhead rates, the analyst must determine which district-level administrative and maintenance and operations functions are assumed to grow proportionately with those at the school level.

<sup>46</sup> Additional variables analyzed included population density and student needs, and the best models are ones based solely on district enrollment levels.

<sup>47</sup> For example, rather than apply only the actual or predicted overhead rates, a more efficient solution would be to apply the *minimum* of the actual versus predicted overhead rates for each district.

<sup>48</sup> The minimum and maximum values of the index are 0.80 and 1.08, respectively. Geographic cost of education adjustments was also implemented in California using an index developed in Rose and Sengupta (2006). Although adjustments were also estimated for New Mexico, in the end these were not used in the final cost projections, as the client did not feel the estimates accurately reflected the true geographic variations in cost across districts in the state.

<sup>49</sup> Although adequacy costs are available for each district, this information is usually presented only for the average district statewide as well as for the different district categories (e.g., urban, suburban, and rural). We avoid presenting detailed data on a district-by-district basis at this stage so that the Stakeholder Panel will focus its discussion on concepts and principles rather than the politics of the potential funding distributions. The bottom line on the funding distributions must await the development of formulas, so it really does not serve any purpose at this stage.

<sup>50</sup> The is represented by the feedback loop between the boxes labeled Stakeholder Review, Review Panel, and Cost Out Adequate Program in Figure 1.

<sup>51</sup> Many of these were also confirmed as necessary programmatic in a qualitative evaluation of successful beating-the-odds New Mexico schools.

<sup>52</sup> For a detailed explanation of the New Mexico three-tier licensure system, see Rivera (2004).

<sup>53</sup> More information on the evaluation of beating-the-odds schools in New Mexico can be found in two policy briefs posted on the study Web site at <http://www.nmschoolfunding.org>.

<sup>54</sup> The original results of the New York and California studies were reported in 2001–02 and 2004–05 dollars, respectively.

<sup>55</sup> Inflation was adjusted using the Employment Cost Index for elementary and secondary school workers maintained by the Bureau of Labor Statistics (downloadable at <ftp://ftp.bls.gov/pub/suppl/eci.echistrynaics.txt>). Geographic cost adjustments were made using the state-level Comparable Wage Index developed by Professor Lori Taylor (Texas A&M) for the National Center for Education Statistics (downloadable at <http://nces.ed.gov/edfin/adjustments.asp>).

<sup>56</sup> To be precise, the California goals statement drew heavily from the California Department of Education state content standards (available online at <http://www.cde.ca.gov/be/st/ss/index.asp>), the California Assessment of Academic Achievement Act of 1995, and the Public Schools Accountability Act (PSAA) of 1999.

<sup>57</sup> See Chambers et al (2004a), Figure 4-3, and the adjacent discussion in the New York adequacy final report. Additional costs were associated with greater resources allocated for extended time and English learners programs along with some modest changes in the middle school prototypes (see pp. 78–79).

<sup>58</sup> For example, it was suggested that the programmatic inputs and resources set aside “for activities such as parent academies and community outreach would be better funded through categorical grants outside the formula,” and these were therefore excluded from the cost estimates (see Chambers et al 2008a: 26–27).

<sup>59</sup> Note districts in the bottom 20 percent of the adequacy gap distribution are considered to have more than enough funding to provide an adequate education to their students.

<sup>60</sup> Test scores are defined as the minimum pass rate on state accountability tests in English-language arts and math. The

12th grade outcomes are based on the cohort of students that entered high school in the 1998–99 school year.

<sup>61</sup> P-values resulting from all pairwise tests of equality of average pass/attendance rates between adequacy gap groups show significant differences in mean outcomes between the two lowest need categories (the bottom 20% and 20–40%) and those in the upper three need quintiles (40–60% and above).

<sup>62</sup> It should also be noted that some of the properties can also be applied more generally to the allocation of other types of funding as well (i.e., they not limited strictly to the distribution of educational funding).

<sup>63</sup> Minimizing incentives includes some specific issues related to special education. Formulas should be neutral with respect to the identification of students eligible for special education and not create incentives to misclassify special education student disabilities in order gain extra funding. The Individuals with Disabilities Education Act (IDEA) encourages states to reduce incentives for identifying more children and encourages the use of funds for preventative services. In addition, IDEA encourages states to implement funding so that it is not linked to where special education students received services and so that services are not based on type of educational placement or the disability label.

<sup>64</sup> See <http://www.schoolfunding.info/policy/CostingOut/Costing-Out-Map.pdf> for a chart indicating which states have conducted costing-out studies and which ones were initiated by the courts versus others.

<sup>65</sup> We refer here to both districts and charter schools because the New Mexico study developed separate formulas developed for each.

<sup>66</sup> New Mexico actually uses the word *sufficient* rather than *adequate* because of the phrasing of their current state law. In the formula, we have retained the word *adequate* for consistency with the terminology of this report.

<sup>67</sup> In comparison, the funding formula New Mexico currently uses is much more complex, containing approximately three times as many adjustments (21 in total, not including an adjustment for teacher qualifications). The multiplicative funding

formula was simply a matter of choosing a functional form that best fit the data derived from the cost analysis.

<sup>68</sup> The poverty index for this sample district would be 1 plus the proportion of students receiving free or reduced-price lunches or 1.80. For details as to how the calculation is made, the reader is referred to Appendix B: Overview of the New Mexico School Funding Formula and Calculation Example.

<sup>69</sup> Indeed, the multiplicative structure of the presented formula provides an intuitive way to see this. Omitting even one of the formula adjustment factors has the potential to affect the projected adequate cost severely.

<sup>70</sup> The calculator is in an MS Excel worksheets in which users simply have to input values for the seven cost- factor characteristics to project adequate costs for hypothetical (or real) districts or charter schools.

<sup>71</sup> Similarly, variable criteria also can be established for the designation of English learners that can result in higher or lower rates of identification of these types of students. However, this not been fully investigated in the context of funding incentives.

<sup>72</sup> The target identification rate was slightly above the actual 2006–07 statewide rate of 15.6 percent, which was higher than the overall national identification rate of about 14 percent. Because of the relatively higher poverty rates and the current patterns of identification of special education students in New Mexico, the 16 percent target seemed a reasonable and politically acceptable number to use by state policymakers.

<sup>73</sup> For example, some bordering districts differed in their estimated index values by as much as 5 percent. The new formula proposed by AIR to replace the T&E with an Index of Staff Qualifications (ISQ) recalibrated the adjustment to account for the higher level of staff qualifications supported by the base cost model supporting the new funding formula and only applied the adjustment to the proportion of costs associated with spending on staff for whom the ISQ is calculated.

<sup>74</sup> The Contract for Excellence statute is available for download at <http://www.nyscoss.org/pdf/upload/ContractforExcellenceLanguage.pdf>.

<sup>75</sup> In addition, up to 15 percent of the increase in funding could be put toward research-based experimental programs.

<sup>76</sup> It should also be noted that many of these were also confirmed as necessary programmatic elements in a qualitative evaluation of successful beating-the-odds New Mexico schools.

<sup>77</sup> For example, the study in New Mexico conducted by the authors (Chambers et al. 2008a) included a revenue analysis.

<sup>78</sup> For example, the reader is referred to the collection of papers at the recent conference on *Comprehensive Educational Equity* held at the Columbia University's Teachers College in New York City. For a list of papers, see <http://www.tc.edu/symposium/symposium08/symposium.asp>.

<sup>79</sup> The indexes contained within each formula adjustment factor are defined as follows: cost factor index =  $\ln(1 + \text{cost factor})$ . For example, the poverty index is defined  $(1 + \text{percent free and reduced lunch})$ . The denominators used in the enrollment share and total enrollment formula adjustment factors are

used to center the base per student cost and formula projections around districts/charter schools of average size and grade composition.

<sup>80</sup> The base per student cost for charter schools is \$6,907 and is defined as the sufficient per student cost of the average-sized charter school (160 students) with the average grade composition (29.9% in K–5, 27.6% in 6–8, and 42.6% in 9–12).

<sup>81</sup> To obtain the 2007–08 charter school formula, the formula adjustment factors for 6–8 and 9–12 grade composition, and enrollment must be replaced with those in the last three rows of Table B.1, respectively, in addition to the sufficient charter school base per student cost, which equals \$6,907 for the average-sized charter school (160 students) with an average grade composition (enrollment in grades K–5, 6–8, and 9–12 equal to 29.9% in K–5, 27.6% in 6–8, and 42.6% in 9–12, respectively) and no additional needs.

<sup>82</sup> These characteristics are purely hypothetical and are not meant to be representative of an actual New Mexico district.



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