A Comprehensive Review of State Adequacy Studies Since 2003

Prepared for
Maryland State Department of Education

By
Anabel Aportela, Lawrence O. Picus and Allan Odden,
Picus Odden and Associates
&
Mark Fermanich, APA Consulting

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APA Consulting

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The Maryland General Assembly enacted Chapter 288, Acts of 2002 – the Bridge to Excellence in Public Schools Act, which established new primary State education aid formulas based on adequacy cost studies using the professional judgment and successful schools method and other education finance analyses that were conducted in 2000 and 2001 under the purview of the Commission on Education Finance, Equity and Excellence. State funding to implement the Bridge to Excellence Act was phased-in over six years, reaching full implementation in fiscal 2008. Chapter 288 required a follow up study of the adequacy of education funding in the State to be undertaken approximately 10 years after its enactment. The study must include, at a minimum, adequacy cost studies that identify a base funding level for students without special needs and per pupil weights for students with special needs to be applied to the base funding level, and an analysis of the effects of concentrations of poverty on adequacy targets. The adequacy cost study will be based on the Maryland College and Career-Ready Standards (MCCRS) adopted by the State Board of Education and include two years of results from new State assessments aligned with the standards, which are scheduled to be administered beginning in the 2014-2015 school year.

There are several additional components mandated to be included in the study. These components include evaluations of: the impact of school size, the Supplemental Grants program, the use of Free and Reduced Price Meal eligibility as the proxy for identifying economic disadvantage, the federal Community Eligibility Program in Maryland, prekindergarten services and funding, the current wealth calculation, and the impact of increasing and decreasing enrollments on local school systems. The study must also include an update of the Maryland Geographic Cost of Education Index.

Augenblick, Palaich and Associates, in partnership with Picus Odden and Associates and the Maryland Equity Project at the University of Maryland, will submit a final report to the state no later than October 31, 2016.

This report, required under Section 3.2.1.10 of the Request for Proposals (R00R4402342) reviews 39 adequacy studies conducted since 2003. The purpose of this review is to provide Maryland policy makers with information on how the studies were conducted, what the estimated adequate funding levels are and, where definitive information is available, the policy impact the studies had in their own states.

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Executive Summary

Many states face the challenging task of determining how much money is needed for their PK-12 public schools to ensure that all students have the opportunity to meet the state's educational proficiency standards. Answering this question of "how much money do schools need?" is important because public PK-12 education is one of the largest, if not the largest, component of most state and local governments. Today, with the growing importance of standards based education as evidenced by the Common Core and college and career-ready standards, knowing what it might cost to provide all students with an education program that will give them the best possible opportunity to meet those standards is a critical and complex undertaking. Understanding how much money PK-12 schools need is typically referred to in the school finance and education policy communities as adequacy.

Adequacy studies are not new to Maryland. Two studies were conducted in 2001. The first, conducted by Management Analysis and Planning (MAP) for the Maryland Equity Project, utilized the professional judgment approach. The second, conducted by Augenblick & Myers for the Thornton Commission, used the professional judgment and successful schools approaches. The work of the Thornton Commission led to the passage of The Bridge to Excellence in Public Schools Act that estimated a $1.8 billion increase in state funds for education. An evaluation of the impact of the Bridge to Excellence in Public Schools Act by MGT of America reported an increase in education spending from 2002-2007 of $3.3 billion in combined state and local funds (MGT of America, 2008).

This report, prepared for the Maryland State Department of Education addresses the important issue of school finance adequacy by providing a review of recent school finance "costing out" or adequacy studies as the first step in a two-year assessment of funding adequacy for Maryland.

The report reviews 39 adequacy studies conducted since 2003. The purpose of this review is to provide Maryland policy makers with information on how the studies were conducted, what the estimated adequate funding levels are and, to the extent possible, the policy impact the studies had in their own states.

There are four general approaches to estimating adequacy. The **successful schools/districts (SSD)** approach uses spending in districts that meet an agreed upon set of state standards to estimate what other school districts would need (with adjustments for student characteristics). The **cost function (CF)** method relies on econometric techniques to estimate the level of spending needed to meet a specified state standard (typically a standardized test score) while controlling for district and student characteristics. The **professional judgment (PJ)** technique uses panels of education professionals to specify the design and resources needed to support prototypical schools that would offer programs that enable all or almost all students to meet the state's standards, then estimates the cost of those resources across all schools and districts in the state. Finally, the **evidence-based (EB)** model uses educational research findings to specify the design and resources needed for a prototypical school and similarly aggregates those resources to a statewide total. All three of these have evolved over time to the point that today many studies employ multiple methods to determine school funding adequacy.

We identified a total of 39 school finance adequacy studies that have been conducted in 24 states and the District of Columbia since 2003 using three of the four approaches. This report does not include adequacy studies using the cost function approach because that methodology requires a level of data not available in Maryland. Four of the 39 studies were conducted in one state (Colorado) and three studies were conducted in Kentucky during that time frame. Two studies were conducted in nine of the other states and one study in each of the remaining 13 states and the District of Columbia.

Reasons for conducting the studies varied depending on political and economic circumstances in each state. The most common reasons for conducting adequacy studies were in response to stakeholder interest, in response to legislation or a court ruling requiring such a study, or to recalibrate a previous adequacy study – the last often required by either the court or the legislation implementing the findings from an earlier study.

The most common approaches for adequacy studies were the PJ and EB methods. Many of the reports we reviewed indicated the use of multiple approaches, sometimes all with equal weight and sometimes one method used as a secondary approach. For example, many of the PJ studies also used SSD to validate study findings. Similarly, many of the EB studies relied on small numbers of professional panels to test and evaluate the EB recommendations – and make state specific adjustments as appropriate. It is likely the PJ and EB methods have gained greater usage in recent years because in addition to offering a cost estimate, they provide suggestions as to how the resources allocated to schools and districts might be used most effectively.

Only one of the 39 studies (Wyoming 2010) suggested fewer dollars were needed in a state's PK-12 public education system. All others estimated increases in funding that ranged from a low of $144 per pupil in New Jersey in 2006 to a high of over $5,000 per pupil in Montana in 2007.

Our review of the studies identified seven "best practices" for the design of adequacy studies. They are:

1. Clear focus on improvement of student performance
2. The potential value of case studies in future work
3. Importance of state policy makers and local stakeholders in the process
4. Combining multiple methods in each state study
5. Selection of professional judgment panels
6. Number of professional judgment panels
7. Accurately representing compensation in the analysis

Our conclusion notes that the two consulting groups that partnered to work for Maryland on this study conducted 26 of the 39 studies reviewed as well as one of the 2001 Maryland studies. We also noted that adequacy studies have evolved over time such that both the PJ and EB methods now use components of the alternative method – PJ studies use educational research to inform the panels as they make decisions and EB studies use panels to validate and modify recommendations for the specifics of each state. Moreover, most of the PJ studies conducted by APA also conduct a SSD study to validate the findings.

We also found that over time, the use of PJ panels has become more sophisticated, comprising both school level educators as well as district and state level professionals to review the recommendations and provide resource recommendations for central district and state level organizations.

What is clear from this analysis is that the methods for costing out adequacy have become more sophisticated over time and that they are now better tailored to the specific needs and circumstances of each state. We anticipate a similar state specific analysis to emerge from the study we are conducting for Maryland. We also recommend that the adequacy study we are conducting for Maryland include three of the four methods to estimate an adequate level of resources for school districts in Maryland – professional judgment, evidence-based and successful schools/districts.

Contents

Introduction

One of the most important questions facing state policy makers is "how much money do schools need?" This question matters because public PK-12 education is one of the largest, if not the largest, component of most state and local governments. Today, with the growing importance of standards based education as evidenced by the Common Core Standards, knowing what it might cost to provide all students with an education program that will give them the best possible opportunity to meet those standards is a critical and complex undertaking. Understanding how much money PK-12 schools need is typically referred to in the school finance and education policy communities as adequacy.

As typically defined, adequacy means providing a level of resources adequate to ensure that all students have the opportunity to meet their state's educational proficiency standards – in other words, adequate funds to meet world class standards.

Today, many states are faced with the difficult question of determining how much money is needed to educate their school children to those standards and an estimate of how much more – if anything – it would cost beyond what they are already spending. To answer this question they rely on "costing-out" or adequacy studies to provide estimates of the level of funding needed.

This report, prepared for the Maryland State Department of Education, reviews 39 adequacy studies conducted since 2003. In order to provide a comparison to the Maryland context we have also included the two studies completed for the state in 2001. The purpose of this review is to provide Maryland policy makers with information on how the studies were conducted, what the estimated adequate funding levels are, and the policy impact the studies had in their own state.

Adequacy studies are not new to Maryland. Two studies were conducted in 2001. The first, conducted by Management Analysis and Planning (MAP) for the Maryland Equity Project, utilized the professional judgment approach. The second, conducted by Augenblick & Myers for the Thornton Commission, used the professional judgment and successful schools approaches. The work of the Thornton Commission led to the passage of The Bridge to Excellence in Public Schools Act that estimated a $1.8 billion increase in state funds for education. An evaluation of the impact of the Bridge to Excellence in Public Schools Act by MGT of America reported an increase in education spending from 2002-2007 of $3.3 billion in combined state and local funds (MGT of America, 2008).

This is the first of a number of studies designed to help Maryland review current PK-12 education spending and assess the adequacy of current funding levels. By reviewing recent school finance adequacy studies, this analysis will provide the state with information on what has worked and what has not worked in the past. The findings in this document are designed to help Maryland conduct a comprehensive adequacy study that will help the state fund its schools into the future.

In the chapters that follow we consider the following topics:

- An overall summary of the 39 adequacy studies
- The assumptions and programmatic elements used in the studies

- The best practices for the design of adequacy studies in the future and a recommendation on the study approach to be used in the current Maryland study.

We also include a discussion of the timing and use of Maryland's state assessments for supporting the study (Appendix A).

Although the basic "algebra" of school finance is straightforward, there are 51 unique school finance systems across the United States (being the 50 states and the District of Columbia). These systems vary on the relative shares of state and local funds, the rules for distribution of state funds to local school districts, and the ways school districts raise local taxes (generally property taxes) for education. In addition, there are disparities in both the number of students in each state, as well as tremendous variation across the states in the number and average enrollment of school districts and schools both within and across states. As a result, adequacy studies are very "state centric" and often the assumptions and findings of one state's study cannot be applied directly to other states. For that reason, this analysis describes approaches that have been used in the last decade and attempts to develop from those studies a set of best practices that can help guide Maryland policymakers as they identify the components and costs of an adequate school finance system for their state.

Chapter 1: Overview of the Adequacy Studies

This chapter identifies the adequacy studies that have been conducted since 2003 and provides overview information on those studies. Specifically it identifies the organizations that conducted the studies, the reasons why each study was conducted (e.g., as a result of a lawsuit, the result of policy interest in school funding levels, etc.), and provides information on the funding levels recommended by each study. In each section of this chapter we have strived to make our analysis of the studies as comparable as possible, but in some instances direct comparisons are not feasible.

Study Sample

This review of state adequacy studies focuses on 39 adequacy studies that were conducted in 24 states and the District of Columbia since 2003 using three of the four approaches. This report does not include adequacy studies using the cost function approach because that methodology requires a level of data not available in Maryland. Table 1.1 summarizes the states where the adequacy studies were conducted and the number of studies in each state that were reviewed. In most states, only one study has been conducted, but in several there have been two or more. Colorado has had a total of four adequacy studies in the time frame studied, and Kentucky a total of three (with a fourth nearly complete as this report is written)[1]. Table 1.2 summarizes the number of states and respective studies. Within our sample 14 states have had one study each (for this review, the District of Columbia is considered a state), nine states have had two studies, one state has had three, and one state has had four adequacy studies completed since 2003.

In order to provide context to this review of adequacy studies, the first state listed in most tables is Maryland and its two 2001 adequacy studies. The first, published in June of 2001, was a professional judgment panel approach completed by Management Analysis & Planning, Inc. The second, published in September of 2001, was a professional judgment panel and successful schools approach conducted by Augenblick & Myers, Inc.

Table 1.1: Summary of State Adequacy Studies, 2003-2014

State	Number of Studies
Maryland	**2**
Arizona	1
Arkansas	2
California	2
Colorado	4
Connecticut	1
District of Columbia	1
Illinois	1
Kentucky	3
Maine	1
Minnesota	2

[1] The fourth Kentucky study is not included in this analysis because the final results will not be publicly available until after the due date of this report.

State	Number of Studies
Montana	2
Nevada	1
New Jersey	2
New Mexico	1
New York	2
North Dakota	2
Ohio	1
Pennsylvania	1
Rhode Island	1
South Dakota	1
Tennessee	1
Texas	1
Washington	2
Wisconsin	1
Wyoming	2
Total Studies*	**39**

* Does not include Maryland

Table 1.2: Number of States and Studies Conducted*, 2003-2014

Number of Studies Conducted	Number of States
0	26
1	14
2	9
3	1
4	1

*Does not include Maryland

Why Studies Were Conducted and Who Commissioned Them

There are many reasons why states conduct adequacy studies. They are often the result of a court ruling holding the state school funding system unconstitutional, or legislation seeking to understand how well funding for schools stacks up to an estimate of what is needed to meet state proficiency standards. In other states, a private organization or stakeholder group commissions an adequacy study, often with the support of a charitable foundation. These often are intended to drive changes in school funding levels or formulas. Table 1.3 summarizes the types of organizations that funded adequacy studies while Table 1.4 describes the reasons such studies were undertaken.

Table 1.3 shows that the largest number of studies were funded by stakeholder interest groups. Table 1.4 shows that the reason for 12 of the 39 studies was stakeholder interest, thus it is clear education support groups and child advocate groups are a powerful influence in commissioning adequacy studies – in most cases with the hope the study will show more education resources are needed to fund their state's schools.

Another important sponsor of adequacy studies is state legislatures and other government agencies. These studies are often commissioned in response to a state supreme court (or possibly lower court) ruling, or conducted in anticipation of the filing of, or ruling in a school finance lawsuit. While funded through Legislative budget appropriations, some studies are managed by a Legislative office, (either through an interim committee or in some states a Legislative research office or an office established specifically to manage school funding issues), while others are managed by the state department of education, or a commission established to do the study.

Of the 39 studies we reviewed, two were commissioned by the plaintiffs – the 2012 Texas school funding case and the 2011 Colorado case. It is likely that other studies funded by parties to school finance litigation exist, but at present they are not part of the public literature and thus unavailable for this review.

Table 1.4 also shows that seven of the studies were commissioned with the purpose of recalibrating previous studies. The Wyoming Supreme Court requires that state to recalibrate the costs of education at least every five years, and the legislation implementing Arkansas' school funding plan in 2004 called for biennial updates to the model. North Dakota has no specific requirement for recalibration, but after a five-year effort to implement the 2008 study, it commissioned the 2014 study to recalibrate its per pupil funding level. Of the four studies done in Colorado, three were commissioned by a stakeholder group and one by the plaintiffs to a lawsuit. The 2006 and 2013 studies were recalibrations of the 2003 and 2011 studies respectively.

Table 1.3: Organizations that Commissioned Adequacy Studies, 2003-2014

State	Year of Study	Type of Organization
Maryland	**2001**	**Stakeholder Interest Group**
Maryland	**2001**	**Legislature (Thornton Commission)**
Arizona	2004	Stakeholder Interest Group
Arkansas	2003	Legislature
Arkansas	2006	Legislature
California	2006	Other Government Agency or Commission
California	2007	Other Government Agency or Commission
Colorado	2003	Stakeholder Interest Group
Colorado	2006	Stakeholder Interest Group
Colorado	2011	Plaintiffs in a lawsuit
Colorado	2013	Stakeholder Interest Group
Connecticut	2005	Stakeholder Interest Group
D.C.	2013	Other Government Agency or Commission
Illinois	2010	Stakeholder Interest Group
Kentucky	2003	State Department of Education or State Board of Education
Kentucky	2003	State Department of Education or State

State	Year of Study	Type of Organization
		Board of Education
Kentucky	2004	Stakeholder Interest Group
Maine	2014	Legislature
Minnesota	2004	Other Government Agency or Commission
Minnesota	2006	Stakeholder Interest Group
Montana	2005	Legislature
Montana	2007	Stakeholder Interest Group
Nevada	2006	Legislature
New Jersey	2006	State Department of Education or State Board of Education
New Jersey	2007	State Department of Education or State Board of Education
New Mexico	2008	Legislature
New York	2004	Stakeholder Interest Group
New York	2004	Other Government Agency or Commission
North Dakota	2008	Other Government Agency or Commission
North Dakota	2014	Legislature
Ohio	2009	Stakeholder Interest Group
Pennsylvania	2007	State Department of Education or State Board of Education
Rhode Island	2007	Legislature
South Dakota	2006	Stakeholder Interest Group
Tennessee	2004	Stakeholder Interest Group
Texas	2012	Plaintiffs in a lawsuit
Washington	2006	Other Government Agency or Commission
Washington	2006	Other Government Agency or Commission
Wisconsin	2007	Stakeholder Interest Group
Wyoming	2005	Legislature
Wyoming	2010	Legislature

Table 1.4: Reasons Adequacy Studies Were Conducted, 2003-2014

State	Year of Study	Reason for Study
Maryland	**2001**	**Stakeholder Interest**
Maryland	**2001**	**Legislation**
Arizona	2004	Stakeholder Interest
Arkansas	2003	Law Suit/Court Ruling
Arkansas	2006	Recalibration of Previous Study

State	Year of Study	Reason for Study
California	2006	Government Agency Interest (e.g., Dept. of Education)
California	2007	Government Agency Interest (e.g., Dept. of Education)
Colorado	2003	Stakeholder Interest
Colorado	2006	Recalibration of a Previous Study
Colorado	2011	Stakeholder Interest
Colorado	2013	Recalibration of a Previous Study
Connecticut	2005	Stakeholder Interest
D.C.	2013	Government Agency Interest (e.g., Dept. of Education)
Illinois	2010	Stakeholder Interest
Kentucky	2003	Legislation
Kentucky	2003	Legislation
Kentucky	2004	Stakeholder Interest
Maine	2014	Legislation
Minnesota	2004	Government Agency Interest (e.g., Dept. of Education)
Minnesota	2006	Recalibration of a Previous Study
Montana	2005	Law Suit/Court Ruling
Montana	2007	Stakeholder Interest
Nevada	2006	Stakeholder Interest
New Jersey	2006	Government Agency Interest (e.g., Dept. of Education)
New Jersey	2007	Government Agency Interest (e.g., Dept. of Education)
New Mexico	2008	Stakeholder Interest
New York	2004	Law Suit/Court Ruling
New York	2004	Law Suit/Court Ruling
North Dakota	2008	Law Suit/Court Ruling
North Dakota	2014	Recalibration of a Previous Study
Ohio	2009	Government Agency Interest (e.g., Dept. of Education)
Pennsylvania	2007	Government Agency Interest (e.g., Dept. of Education)
Rhode Island	2007	Legislation
South Dakota	2006	Stakeholder Interest
Tennessee	2004	Stakeholder Interest
Texas	2012	Law Suit/Court Ruling
Washington	2006	Legislation
Washington	2006	Legislation
Wisconsin	2007	Stakeholder Interest
Wyoming	2005	Recalibration of Previous Study
Wyoming	2010	Recalibration of Previous Study

Study Methods

Over the past two decades four generally accepted approaches to estimating school finance adequacy have been developed: successful schools/districts (SSD); cost function (CF); professional judgment (PJ) and evidence-based (EB). These approaches differ in terms of underlying philosophy, the assumptions that need to be made to apply them, and the data required. Each approach is briefly summarized below.

The Successful Schools/Districts Approach (SSD)

The successful schools/districts approach is based on the premise that the level of resources needed to meet a set of objectives can be identified by examining the spending of schools or districts that currently meet those objectives. The approach also assumes additional funding is needed to meet the cost of serving students with identified needs and districts with special circumstances. These additional amounts are determined using methods more appropriate for estimating support for students with special needs.

The SSD approach is most useful when the state has specified its student outcome and input objectives and districts or schools that meet them can be identified. The characteristics of the approach are the following: it is based on current practice to meet the standards; it is empirical and tangible, based on the spending of districts meeting the standard; it assumes that resources can be used in very different ways in successful districts; it focuses on the cost of providing services to students with no special needs in districts with no special circumstances; and it only generates a base cost figure – adjustments must be made for students with identified needs and districts with special circumstances.

Typically, SSD adequacy studies are conducted at the district level. There are several reasons for this, including the fact that most states report reliable expenditure data only at the district level and because district supports and strategies often contribute, at least in part, to the success of any one school in a district. Under the SSD approach, districts meeting specific performance criteria are selected and, after conducting an efficiency analysis to screen out districts with unusually high spending patterns, expenditures for general administration, general education, and operations and maintenance are analyzed and used to develop a specific amount for a per student base cost, which estimates the amount of resources required for students with no special needs to successfully achieve state standards.

The adequacy study that APA originally conducted in Maryland made use of a school level successful *schools* approach because the state has too few school districts to provide an adequate number of successful districts on which to base performance and cost comparisons. The theory behind the approach does not change based on the level of analysis – district or school. Successful units are identified, their spending is examined, efficiency screens are applied where possible, and a base cost is developed based on the spending of the efficient, high-performing schools or districts. Where the approaches differ is that when working at the district level expenditure data are typically gathered from readily available state education agency fiscal reports. When schools are the unit of analysis, in nearly all states, school level expenditure data must be collected via specifically administered surveys and/or interviews with the appropriate school and district administrators and then blended with relevant district level expenditures going to support the school to ensure that all applicable resources supporting

a school are accounted for. This is the expenditure data approach used by APA in the 2001 Maryland study and the approach we propose to use again for the current study.

Cost Function (CF)

The cost function or statistical approach is based on understanding those factors that explain differences in spending across school districts while controlling for student performance. Because of its complexity and use of econometrics, the CF approach has proven difficult to explain in situations other than academic forums. The approach requires the availability of a significant amount of data, much of which needs to be at the school or student level in order to be most useful. No state has used the cost function approach alone to determine the parameters of a school finance formula. However, the cost function approach has been used to establish some of the adjustments states use to allocate funding sensitive to uncontrollable cost pressures, such as setting the weights for students enrolled in special education programs or creating the formulas to reflect the costs associated with different enrollment levels.

The SSD and CF approaches identified above are ways to estimate an adequate level of funding, but do not offer guidance about how to allocate those resources. They make no assumption that resources can or will be used differently from current practice. The next two approaches address this issue, one by relying on the expertise of education professionals and the other using the growing research evidence surrounding programs and resource use that lead to improved student learning.

The Professional Judgment Approach (PJ)

The professional judgment approach relies on the expertise of experienced education professionals to specify the kinds of resources, and the quantities of those resources, that would be expected to be available in order to achieve a set of objectives. This "input-based" approach was developed in Wyoming in the late 1990s to calculate a base cost amount in response to the state Supreme Court's requirement that the school finance system reflect the cost of the "basket of goods and services" needed to assure that a high school graduate could be admitted to an institution of higher education in the state. The approach uses panels of experts to specify the way education services should be delivered in order to meet state standards. Once the services have been specified (with a focus on the number and types of personnel, regular school programs, extended-day and extended-year programs, professional development, and technology), costs are attached and a per pupil cost is determined.

This approach best reflects the experiences of people who are actually responsible for delivering education services, and may be combined with research results, as a rational way to specify the resources required to produce a specific level of student performance.

Regardless of how the approach has been implemented, it has been designed to distribute funds through a "block grant" – that is, without specifying exactly how money should be spent; while the professional judgment panels identify specific resources, they do so with the understanding that those resources might be employed differently in each setting to best serve the needs of a particular school or district's students, but that the general level of resource identified is adequate.

The advantages of the approach are that it reflects the views of actual education professionals and it is easy to understand; the disadvantages are that it tends to be based on current practice and there may

not be evidence, beyond individual experience, that the provision of money at the designated level, or even the deployment of resources as specified by the representative schools, will produce the anticipated outcomes. The approach is now often coupled with the use of evidence-based figures as a starting point in order to address some of these disadvantages.

The Evidence-based Approach (EB)

The evidence-based approach assumes that information gathered from research exists to define the resource needs of a hypothetical school or school district to assure that it can meet state standards. This approach was used in New Jersey in 1998 to determine the resource needs of a subset of school districts, commonly referred to as "Abbott" districts. The court identified these districts as requiring special attention and resources. The approach not only determined resource levels but also specified the programmatic ways such resources should be used. The strength of the approach is that it incorporates the latest research about the way services should be delivered to improve their likelihood of success. But there are disadvantages, including questions about whether research applies to all demographic situations, the lack of research information about many cost elements schools face, and the fact that the approach may not be state specific. In recent years the approach has made use of local professional judgment panels and case studies of improving schools to tailor the evidence-based model to specific state contexts.

Use of the Methods in Adequacy Studies

Table 1.5 identifies the methods used in each of the 39 studies we reviewed.[2] In most cases, there was a primary method or approach identified by the consultants. Some of the studies relied on a second approach to test or verify the findings. For example, many PJ studies provide panelists with a set of research findings to help guide their discussions, as noted previously. Similarly most EB studies have used panels of professionals to review and verify the EB recommendations in their particular state. In addition, recent EB studies have also included case studies of improving schools to ascertain how closely the EB strategies match the approach used by these improving schools.

Some of the studies reviewed estimated adequacy findings using multiple approaches. In those cases, all of the approaches are indicated in the primary study approach column of Table 1.5. The two patterns that emerge most clearly from Table 1.5 are 1) most EB studies also have a PJ panel review the EB recommendations, and 2) most of the PJ studies have used SSD as an additional primary method to validate the base cost figures in the study.

Table 1.5: Adequacy Study Methods, 2003-2014

State	Year	Primary Study Approach	Secondary Approach
Maryland	**2001**	**PJ**	
Maryland	**2001**	**PJ & SSD**	
Arizona	2004	EB	PJ

[2] This review does not include adequacy studies using the cost function approach as the methodology requires a level of data not available in Maryland.

State	Year	Primary Study Approach	Secondary Approach
Arkansas	2003	EB	PJ
Arkansas	2006	EB	
California	2006	PJ	
California	2007	PJ (survey)	
Colorado	2003	PJ & SSD	
Colorado	2006	PJ & SSD	
Colorado	2011	PJ & SSD	
Colorado	2013	PJ & SSD	
Connecticut	2005	PJ & SSD	
D.C.	2013	PJ & SSD	
Illinois	2010	EB	
Kentucky	2003	EB	
Kentucky	2003	PJ	
Kentucky	2004	PJ	
Maine	2014	EB	PJ
Minnesota	2004	PJ	
Minnesota	2006	PJ & SSD	
Montana	2005	PJ (survey), EB & SSD	
Montana	2007	PJ & SSD	
Nevada	2006	PJ & SSD	
New Jersey	2006	PJ & SSD	
New Jersey	2007	EB	
New Mexico	2008	PJ	
New York	2004	PJ	
New York	2004	SSD	
North Dakota	2008	EB	PJ
North Dakota	2014	EB	PJ
Ohio	2009	EB	
Pennsylvania	2007	PJ & SSD	EB
Rhode Island	2007	PJ, EB & SSD	
South Dakota	2006	PJ & SSD	
Tennessee	2004	PJ & SSD	
Texas	2012	EB	
Washington	2006	SSD	
Washington	2006	EB	PJ
Wisconsin	2007	EB	PJ
Wyoming	2005	EB	PJ
Wyoming	2010	EB	

Study Impact and Cost Estimates

Maryland's Thornton Commission had an important impact on education funding levels in that state. Its work led to annual increases in state and local funding between 2002 and 2007. Many adequacy studies

have had similar impacts, while others have not led to much change in their state. In states with Supreme Court rulings (e.g. Wyoming and Arkansas), major changes in the distribution formula as well as substantial new funding for schools resulted from adequacy studies and the recalibration of those studies. In other states adequacy studies received considerable attention, but little action for changing funding formulas emerged directly from the study. For example, California's two studies conducted as part of a larger group of studies collectively known as "Getting Down to Facts," had very little direct impact on school funding in the state although some of the initial modeling developed for one of the studies did help in the simulations used to support the successful revision of California's funding formula several years later.

Ohio represents a somewhat different outcome. In 2009, Governor Ted Strickland announced during his state of the state address that Ohio would move to an evidence-based approach to fund schools, and proposed a new funding formula based on the EB model modified to meet Ohio's specific characteristics. The Ohio study reviewed for this analysis does not estimate the cost of adequacy, but rather was commissioned by a charitable foundation to compare the Governor's proposal with the generic EB model. Similarly, the 2007 New Jersey study was a review and comparison of the EB model with a previous adequacy study done in the state that used PJ and SSD methods.

In Pennsylvania, the recommendations of the 2007 study conducted for the State Board of Education were largely adopted by then Governor Rendell, who in 2008 proposed the implementation of a new school funding formula that would phase in the report's recommendations over a six-year period. While implementation made progress during the Rendell administration, subsequent legislative action has reversed much of this work.

Table 1.6 summarizes the increase in total and per pupil funding recommended in each of the studies for which such data can be derived. Some studies reported total funding while others provided estimates of funding per pupil. In a few studies, multiple funding recommendations were reported based on the different adequacy approaches. The studies rarely, if ever, indicated the degree to which the recommended new per pupil levels would be funded with state or local revenues. This omission is appropriate as this should be a state policy decision, generally starting with the Legislature.

In several studies, recommended funding changes were presented as a range, rather than a single estimate. When that occurred, we used the average of the range or amounts reported. If multiple adequacy approach results were reported in one study, Table 1.6 contains additional lines for each reported amount. The corresponding approach is documented in the notes column of the table.

Some studies reported both total funding changes and changes in funding per pupil. When only one of those amounts was reported (generally only the change in total funding) we used the state's total enrollment as reported in the NEA Rankings and Estimates Documents for the appropriate year and computed the missing information. In some instances, the estimated change in total funding was not included in the study (see for example, Ohio).

The Wyoming 2010 study, which was a recalibration of the 2005 study, is unique in that the authors found that state appropriations for K-12 education exceeded current EB estimates of adequacy and that additional resources to fund schools were not necessary.

Table 1.6: Summary of Adequacy Study Funding Recommendations, 2003-2014

State	Year of the Study	Total Additional Funding (in millions)	Per Pupil Funding Change Needed	Implementation of Study Results	Notes
Maryland	**2001**	**$300**	**$352**	**Not Implemented**	**PJ Low Estimate**
		$1,800	**$2,110**	**Not Implemented**	**PJ High Estimate**
Maryland	**2001**	**$2,879**	**$3,375**	**Implemented Thornton Commission recommendation of $1.8 Billion**	**PJ**
		$2,022	**$2,371**		**SSD**
Arizona	2004	$1,325	$1,428	Not Implemented	EB
Arkansas	2003	$847	$1,903	Implemented	EB
Arkansas	2006	$220	$485	Not Implemented	EB
California	2006	$24,140	$3,826	Not Implemented	PJ Low Estimate
		$32,010	$5,073	Not Implemented	PJ High Estimate
California	2007	$19,474	$3,099	Not Implemented	PJ survey
Colorado	2003	N/A	N/A	Not Implemented	PJ
Colorado	2006	$700	$959	Not Implemented	SSD
		$2,078	$2,848	Not Implemented	PJ
Colorado	2011	$1,350	$1,633	Not Implemented	SSD
		$3,580	$4,331	Not Implemented	PJ
Colorado	2013	$2,650	$3,089	Not Implemented	SSD
		$4,060	$4,733	Not Implemented	PJ
Connecticut	2005	$46	$801	Not Implemented	SSD
		$2,020	$3,503	Not Implemented	PJ
D.C.	2013	$182	$2,176	Partially Implemented	PJ
Illinois	2010	$3,540	$1,750	Not Implemented	EB
Kentucky	2003	$740	$1,176	Not Implemented	EB
Kentucky	2003	$1,800	$2,861	Not Implemented	PJ
Kentucky	2004	$1,230	$1,955	Not Implemented	PJ
Maine	2014	$327	$873	Too early to determine	EB
Minnesota	2004	N/A	N/A	N/A	PJ
Minnesota	2006	$1,789	$2,258	Not Implemented	PJ

State	Year of the Study	Total Additional Funding (in millions)	Per Pupil Funding Change Needed	Implementation of Study Results	Notes
		$1,059	$1,384	Not Implemented	SSD
Montana	2005	$96	$660	Not Implemented	SSD
		$329	$2,262	Not Implemented	PJ
		$21	$142	Not Implemented	EB
Montana	2007	$725	$5,021	Not Implemented	PJ
Nevada	2006	$80	$231	Not Implemented	SSD
		$1,321	$3,579	Not Implemented	PJ
New Jersey	2006	$200	$144	Implemented	PJ
New Jersey	2007	N/A	N/A	Implemented	EB
New Mexico	2008	$335	$1,034	Not Implemented	PJ
New York	2004	$6,210	$2,200	Not Implemented	PJ Low Estimate
		$8,400	$2,976	Not Implemented	PJ High Estimate
New York	2004	$4,800	$2,445	Partially Implemented	SSD
North Dakota	2008	$300	$976	Implemented	EB
North Dakota	2014	N/A	N/A	N/A	EB
Ohio	2009	N/A	N/A	N/A	EB
Pennsylvania	2007	$4,378	$2,414	Partially Implemented	SSD/PJ/EB
Rhode Island	2007	$93	$570	Not Implemented	SSD
		$205	$1,262	Not Implemented	PJ
		$57	$349	Not Implemented	EB
South Dakota	2006	$134	$1,148	Not Implemented	SSD
		$406	$3,324	Not Implemented	PJ
Tennessee	2004	$1,114	$1,284	Not Implemented	PJ
Texas	2012	N/A	N/A	N/A	EB
Washington	2006	N/A	N/A	N/A	EB
Washington	2006	$183	$178	Partially Implemented	SSD
Wisconsin	2007	$786	$888	Not Implemented	EB
Wyoming	2005	$327	$3,903	Implemented	EB
Wyoming	2010	-	-	Implemented	EB

Who Conducted the Studies?

A review to ascertain which consultants conducted these studies shows that most of the adequacy studies completed between 2003 and 2014 were led by two firms; Augenblick, Palaich & Associates and

Picus Odden & Associates (in some instances under different firm names but with generally the same leadership staff). Table 1.7 summarizes the number of studies done by each firm, not including Maryland's two 2001 adequacy studies. There were three studies done by multiple firms during this time, including two in which Augenblick, Palaich & Associates partnered with another firm.

Table 1.7: Number of Adequacy Studies Conducted, by Consulting Firm, 2003-2014*

Firm Conducting Study	Number of Studies
Picus Odden & Associates	16
Augenblick, Palaich & Associates	11
American Institutes for Research	2
R. Craig Wood and Associates	2
Multiple Firms	3
Public Policy Institute of California	1
National Louis University	1
Deborah Verstegen	1
Management Analysis and Planning	1
Standard and Poor's	1

*Does not include Maryland

Table 1.8 lists all 39 studies since 2003 and the two Maryland 2001 studies, and indicates the publication year for each study and the consultant conducting the work, including Maryland's two 2001 studies. The first, published in June of 2001, was a professional judgment panel approach done by Management Analysis & Planning, Inc. The second, published in September of 2001 was a professional judgment panel and successful schools approach done by Augenblick & Myers, Inc.

Table 1.8: State Adequacy Studies, 2003-2014

Study #	State	Year	Consultant
	Maryland	**2001**	**MAP**
	Maryland	**2001**	**APA**
1	Arizona	2004	POA
2	Arkansas	2003	POA
3	Arkansas	2006	POA
4	California	2006	AIR
5	California	2007	PPIC
6	Colorado	2003	APA
7	Colorado	2006	APA
8	Colorado	2011	APA
9	Colorado	2013	APA
10	Connecticut	2005	APA
11	District of Columbia	2013	APA and the Finance Project
12	Illinois	2010	National Louis University
13	Kentucky	2003	POA
14	Kentucky	2003	POA
15	Kentucky	2004	Deborah Verstegen

Study #	State	Year	Consultant
16	Maine	2014	POA
17	Minnesota	2004	MAP
18	Minnesota	2006	APA
19	Montana	2005	R. Craig Wood and Associates
20	Montana	2007	APA
21	Nevada	2006	APA
22	New Jersey	2006	APA/New Jersey Dept. of Education
23	New Jersey	2007	POA
24	New Mexico	2008	AIR
25	New York	2004	AIR and MAP
26	New York	2004	Standard and Poor's
27	North Dakota	2008	POA
28	North Dakota	2014	POA
29	Ohio	2009	POA
30	Pennsylvania	2007	APA
31	Rhode Island	2007	R. Craig Wood and Associates
32	South Dakota	2006	APA
33	Tennessee	2004	APA
34	Texas	2012	POA
35	Washington	2006	POA
36	Washington	2006	POA
37	Wisconsin	2007	POA
38	Wyoming	2005	POA
39	Wyoming	2010	POA

POA – Picus Odden & Associates (Also Lawrence O. Picus and Associates)
APA – Augenblick, Palaich & Associates (Also Augenblick & Myers)
AIR – American Institutes for Research
MAP – Management Analysis and Planning

Chapter 2: Assumptions and Programmatic Elements Used in the Studies

The purpose of an adequacy study is to estimate an adequate level of resources needed to provide all students the opportunity to meet state proficiency standards. The SSD approach identifies districts or schools that meet an agreed upon set of standards, determines the per pupil expenditures at that school and applies that estimate (with adjustments for student characteristics like poverty, ELL status and special education needs generated using other methods) to all districts in the state to get an estimate of total funding needs. Although none of the studies reviewed here used the CF approach, it relies on district level data on expenditures, student characteristics and desired student outcomes in a series of regression equations to develop coefficients that can be applied to individual school districts to predict needed spending levels.

The PJ and EB approaches use prototypical schools as the basis for estimating adequacy. Each establishes one or more typical schools at the elementary (K-5), middle (6-8) and high school (9-12) levels to estimate the resources and their costs needed to meet the educational needs of the students so they can perform at high levels (personnel and dollar resources), and aggregates those estimates to the district level. The model then adds estimated district central office costs to the total and sums the estimates across districts to arrive at a total estimated cost for the state. In some recent EB studies, the prototypical school resources are used to estimate average per pupil costs. These include school level costs, adjustments for struggling students (poverty, ELL and special education) as well as district central office costs and adjustments for small districts. These per pupil cost estimates are then applied to the student enrollment and characteristics of either the entire state or to each individual district and summed to get a statewide estimated cost of adequacy.

The main difference between PJ and EB studies is that the parameters of the EB model are more consistent across studies than are the parameters of the PJ models which tend to be more state specific. This is a result of the way each method develops the resources to cost out in prototypical schools. PJ models develop the parameters based upon the knowledge and experience of state education professionals and they tend to vary from state to state based upon each state's unique set of standards. EB estimates begin with more uniform research-based parameters for prototypical schools and then seek input as to the appropriateness of those parameters from a panel of the state's professional educators. The data below show more variation in the characteristics of the PJ studies than the EB studies.

In the tables that follow, we identify the programmatic elements found in adequacy studies and show how they vary across the 39 studies. The elements we consider include:

- Prototypical schools
- Core teachers
- Elective teachers
- Instructional coaches
- Special Education staff
- Other school staff

  - At-risk staff
  - Summer school
  - Extended day
  - Tutors
  - Pupil support
  - ELL staff
- Funds for purchasing materials, technology and professional development

The information reported below pertains almost entirely to PJ and EB studies. There are two reasons for this. First, almost all of the studies reported here used one or both of these methods. Second, the SSD and CF approaches don't rely on the development of a prototypical school, but rather use district or school level data to derive estimates of adequacy school funding.

It is important to note that the 39 studies are not consistent in what they report about methods and assumptions, so the information in the tables often appears incomplete. We have worked to develop consistent comparisons to the extent that is possible.

Prototypical Schools

Both the PJ and EB approaches rely on prototypical schools to establish the range of resources that should be provided. In almost all cases, the studies rely on prototypical elementary, middle and high schools, although in some cases K-8 or K-12 schools may also be estimated.

PJ studies often have multiple levels of prototypical schools based on the size of the district. These schools are often referred to as "hypothetical" or "representative" schools. District size categories are developed first using actual state data to identify four or five size categories that are representative of the state's school districts. These district size categories typically consist of very small, small, medium, large and very large districts. Next, an analysis of the school sizes found within each district size category is undertaken to develop the hypothetical or representative school sizes within each category. This process results in a total of up to 15 prototypical schools that are similar in size to actual schools found in each district size category. Per pupil costs are estimated for each of the prototypical school and then used to estimate total school costs for every school that fits into the enrollment size category. The size ranges for the district categories vary across the studies and are determined based on the characteristics of the schools and districts in each state. In the analysis that follows, for the studies with more than three prototypical schools, we report the parameters of the prototypical schools in the moderate or medium size district and provide additional information about the category sizes in footnotes to Table 2.1.

EB studies generally rely on only three prototypical schools (elementary, middle, and high schools) for a state and then establish algorithms for pro-rating resources up or down for schools of different sizes. In recent years EB studies have used elementary and middle schools with 450 students and high schools of 600 students. These school sizes have evolved from reviews of research on the "optimal" or most effective school sizes, emphasizing research that includes both size as well as student performance. These literature reviews are included, sometimes in abbreviated form in the adequacy studies themselves, but are also available in Odden and Picus (2014).

Table 2.1 summarizes the prototypical school size used in each of the 39 studies where such was identified.

*Table 2.1: Prototypical School Size**

State	Year	Prototypical School Size		
		Elementary	Middle	High School
Maryland	**2001**	**500**	**800**	**1,000**
Maryland	**2001**	**500**	**800**	**1,000**
Arizona	2004	500	500	500
Arkansas	2003	500	500	500
Arkansas	2006	500	500	500
California	2006	N/A	N/A	N/A
California	2007	583	950	1,759
Colorado*	2003	345	345	465
Colorado*	2006	345	345	465
Colorado*	2011	420	450	500
Colorado*	2013	420	450	500
Connecticut	2005	420	525	1,400
D.C.*	2013	420	600	1,000
Illinois	2010	432	450	600
Kentucky	2003	500	500	500
Kentucky	2003	400	500	800
Kentucky	2004	384	567	768
Maine	2014	450	450	600
Minnesota*	2004	372	426	628
Minnesota*	2006	372	426	628
Montana	2005	300	249	399
Montana*	2007	200	116	232
Nevada*	2006	600	750	1,250
New Jersey*	2006	400	600	1,640
New Jersey	2007	400	600	1,640
New Mexico	2008	NA	NA	NA
New York	2004	NA	NA	NA
New York	2004	NA	NA	NA
North Dakota	2008	432	450	600
North Dakota	2014	450	450	600
Ohio	2009	418	557	733
Pennsylvania*	2007	NA	NA	NA
Rhode Island	2007	308	657	891
South Dakota	2006	192	193	256
Tennessee	2004	320	400	1,064
Texas	2012	450	450	600

State	Year	Prototypical School Size		
		Elementary	Middle	High School
Washington	2006	432	450	600
Washington	2006	NA	NA	NA
Wisconsin	2007	432	450	600
Wyoming	2005	288	315	630
Wyoming	2010	288	315	630

In studies where multiple prototype sizes were used, the midsize is reported in the table and the states are indicated with an "".

Core Teachers

Teachers represent the largest component of school district expenditures. Most PJ and EB studies provide estimates for both core and elective teachers; though PJ studies, particularly for secondary schools, often present a total teacher figure without distinguishing between core and elective. Core teachers are regular classroom teachers. In elementary schools, they typically are responsible for a classroom all day (with time for planning). In middle and high schools with departmentalized instruction, core teachers focus on math, language arts, science, social studies and world languages. Elective teachers (discussed in the next section) provide for planning time in elementary schools and teach elective courses at middle and high schools. Table 2.2 shows how the number of core teachers is estimated for each of the studies. The most common approach is to provide a ratio of the number of students to a teacher. For example, most of the EB studies use ratios of 15:1 for grades K-3 (this includes prekindergarten when it is part of the study) and 25:1 for grades 4-12. This may vary due to past practice (Wyoming) or state requirements (Arkansas).

The core teacher ratios vary more in the PJ studies and are sometimes reported in different formats. For example the Colorado and Connecticut studies estimate core teachers based on the number of teachers per 1,000 students to make numbers comparable across all of the prototype schools, although this can be converted easily to the pupil/teacher ratios reported in most of the studies.

Some of the larger ratios are also a function of combining elective teachers with core teachers rather than identify them separately. This is noted in Table 2.3.

Elective Teachers

Elective teachers are included in most of the adequacy studies in this sample. Generally, elective teachers at the elementary level teach art, music and physical education (PE) classes to provide time for core teachers to plan and collaborate. At the middle and high school level core teachers are used to offer non-core elective classes. Table 2.3 shows how elective teachers were allocated in the studies we reviewed.

The EB studies typically estimate elective teachers at 20% of the number of core teachers at the elementary and middle school levels. Early EB studies use the same percentage at the high school level although more recent ones typically use 33% elective teachers so that high schools can use block schedules and still provide a daily planning period for all teachers.

The PJ studies show more variation (as they do with core teachers). Some of the studies identify a percentage, others provide a number of elective teachers for a prototypical school, others identify the number of elective teaches per 1,000 students, while others do not distinguish between core and elective teachers.

Instructional Coaches

Coaches, or instructional facilitators, coordinate the instructional program and ongoing instructional coaching and mentoring for teachers. There is growing evidence that coaches are an important component of improved schools (Lockwood, McCombs & Marsh, 2010; Marsh, McCombs & Martorell, 2010; and Pianta, Allen & King, 2011). Many of the adequacy studies we reviewed include coaches in their cost estimates as shown in Table 2.4.

The EB studies are most consistent, generally resourcing schools with 1 coach for every 200 students or 2.25 coaches for a prototypical school of 450 students and 3 coaches for a prototypical school of 600 students.

There is again more variation in the allocation of coaching resources in the PJ studies when they are included based upon different state approaches to coaching. For example, some states do not have separate instructional coaches but instead rely on mentor teachers with added release time to coach other teachers. Of the 39 studies, only 19 include instructional coaches in the cost estimates. One study in Montana includes them as elective or specialist teachers.

Special Education

Provision of special education is critical to estimating the costs of adequacy. Two approaches were identified in the studies. In some instances, primarily EB studies, a census-based approach was used. In those instances additional staff were included at the school site to provide special education services for children with mild and moderate disabilities while it was recommended that services for children with severe disabilities be funded entirely by the state. Over time the special education allocation has changed from one teacher and a half-time aid for every 150 students to one teacher and one full-time aid for every 150 students. This change appears to be based on feedback from PJ panels that were part of most EB studies. The PJ approach often looks at resources for disaggregated special education categories, such as mild, moderate or severe based upon disabilities or service need levels.

Twelve studies recommended a weighted student approach to funding special education. Table 2.5 summarizes the weights that were used in these 12 studies. The other studies used some combination of either a specific dollar amount, or included Special Education in another category. In Wyoming, special education was not specifically addressed since all approved special education costs are fully funded by the state. In general, special education allocations were state specific and cannot be easily summarized. For Maryland, we recommend using the recommendations that emerge from the EB and PJ studies and developing state specific cost estimates based on current approaches and the special education student counts for the state.

Other School Staff

Schools rely on a range of other staff to provide services to students. We found substantial variation in the types and allocation of staff positions across the studies. Position titles varied across the studies and the expected services each provided varied as well. The following tables provide a summary of these staff allocations across the 39 studies.

- Table 2.6 – At Risk Students
- Table 2.7 – Summer School
- Table 2.8 – Extended Day Programs
- Table 2.9 – Tutors
- Table 2.10 – Pupil Support Staff
- Table 2.11 – ELL

Salary Estimates and Regional Cost Differences

Employee compensation represents the largest component of any school district's expenditures and relatively the largest portion of the total cost of adequacy estimates. Therefore the choice of compensation levels used in the model is critical. The total cost of salaries and benefits will drive the total cost of any adequacy study.

Our analysis found that PJ studies typically rely on statewide average teacher salary and benefit rates and apply them to the number of positions in each category as part of the total cost of adequacy. Cost of living adjustments are often made to these averages to account for variation, as discussed in further detail below. In some states (e.g., South Dakota 2008, Connecticut 2011), the PJ panels recommended that the statewide averages be adjusted to be more competitive with other states. This cost was then reflected in the final cost estimates. Benefit rates in PJ studies vary from state to state based upon available data for the state or districts, but consistently are in the range of 23% to 35%.

EB studies similarly rely on state average salaries to estimate total costs. In early EB studies, average benefit costs were also typically used. However, in recent studies the authors have noted that there is substantial variation in the types of benefits paid to school district employees. This is mostly the result of variation in health care costs. Other benefits such as retirement, Social Security, and Workers' Compensation are typically funded based on a percentage of salary and thus straightforward to estimate if the rates for those benefits are accurately measured. On the other hand, health benefits vary widely in terms of both the level and the type of coverage as well as the number of family members covered. Average costs are difficult to estimate. In one recent study, the 2014 North Dakota recalibration, study consultants suggested estimating health care costs using the costs of providing health care for North Dakota state employees. The average amount paid per employee (not a percentage) was used for health care costs and added to the benefits component of compensation. While this approach is logical, the higher cost of health insurance led to increased benefit rates, particularly for classified employees who typically have relatively low salaries. While this approach may produce a more realistic estimate of the cost of providing health care benefits, it suggests earlier estimates using an overall percentage of salary figure may have potentially underestimated these costs in the past.

Both EB and PJ studies develop models that have the capability of simulating various compensation levels (typically allowing salary, percentage-based benefits and health care costs per employee to vary) so that sensitivity analyses related to variation in the level of salary and benefits can be estimated.

The majority of studies, regardless of methodological approach, take into account the regional cost differences in a particular state by applying, or suggesting, an index that adjusts education costs to account for these differences. In some cases, the research team developed the index. For example, in New Mexico, the research team estimated a Geographical Cost of Education Index (GCEI) to account for differences in demand and salary for personnel. Likewise, the research team in Pennsylvania used a Location Cost Metric (LCM) to reflect cost of living differences across the state. Many other studies rely on the Comparable Wage Index that was developed with the support of the National Center for Education Statistics and updated on an annual basis. The Wyoming study in 2005 developed a Hedonic Wage Index to replace a Wyoming computed price index that was in use at the time. The two indexes were "centered" at the state average, which meant that some districts actually received a negative adjustment if the costs in their geographic area were less than the state average. A final compromise provided each district with the higher of the two indexes, or a value of 1.0, whichever is higher. That compromise remains the approach used in Wyoming today.

Table 2.2: Core Teachers

State	Year	Elementary	Middle	High School
Maryland	**2001**	**21**	**22**	**22**
Maryland	**2001**	**33 (per school)**	**36 (per school)**	**69 (per school)**
Arizona	2004	K-3: 15, 4-5: 25	6-8: 25	9-12: 25
Arkansas	2003	K-3: 15, 4-5: 25	6-8: 25	9-12: 25 Maximum of 150 per semester
Arkansas	2006	Kindergarten: 10; Grades 1-3: 23; Grades 4-12: 25	Grades 4-12: 25	Grades 4-12: 25
California	2006	NA	NA	NA
California	2007	K: 5.2; Gr 1-5: 21.9 (per school)	34.6 (per school)	52.4 (per school)
Colorado	2003	58 per 1,000 students	60.9 per 1,000 students	64.5 per 1,000 students
Colorado	2006	58 per 1,000 students	60.9 per 1,000 students	64.5 per 1,000 students
Colorado	2011	69.05 per 1,000 students	57.78 per 1,000 students	66 per 1,000 students
Colorado	2013	69.05 per 1,000 students	57.78 per 1,000 students	66 per 1,000 students
Connecticut	2005	57.1 per 1,000 students	47.6 per 1,000 students	64.3 per 1,000 students
D.C.	2013	24.3 (per school)	32 (per school)	53.3 (per school)
Illinois	2010	K-3rd Grade: 15, 4th-	4th-12th Grade: 25	4th-12th Grade: 25

State	Year	Elementary	Middle	High School
		12th Grade: 25		
Kentucky	2003	K-3:15, 4-5: 25	25	25
Kentucky	2003	K-3: 15, 4-5: 20	20	20
Kentucky	2004	24 (per school)	27 (per school)	44.8 (per school)
Maine	2014	Preschool: 15, K-3: 15, 4-5: 25	25	25
Minnesota	2004	K: 4; Gr 1-5: 17.5 Total: 21.5 (per school)	22.5 (per school)	34 (per school)
Minnesota	2006	K: 4; Gr 1-5: 17.5 Total: 21.5 (per school)	22.5 (per school)	34 (per school)
Montana	2005	20 (per school)	13 (per school)	20 (per school)
Montana	2007	14 (per school)	5.8 (per school)	16.3 (per school)
Nevada	2006	35 (per school)	30(per school)	65 (per school)
New Jersey	2006	22 (per school)	43 (per school)	128 (per school)
New Jersey	2007	K-3: 17.8, 4-5: 5.3, Total: 23.1 (per school)	24 (per school)	65.6 (per school)
New Mexico	2008	NA	NA	NA
New York	2004	15.7 (per school)	22.6 (per school)	24.3 (per school)
New York	2004	NA	NA	NA
North Dakota	2008	K-3: 15, 4-5: 25	6-8: 25	9-12: 25
North Dakota	2014	K-3: 15, 4-5: 25	6-8: 25	9-12: 25
Ohio	2009	K-3: 15, 4-5: 25	25	25
Pennsylvania	2007	NA	NA	NA
Rhode Island	2007	16 (per school)	31.5 (per school)	52 (per school)
South Dakota	2006	12 (per school)	11 (per school)	18.5 (per school)
Tennessee	2004	19 (per school)	20 (per school)	40.5 (per school)
Texas	2012	K-3: 15, 4-5: 25	6-8: 25	9-12: 25
Washington	2006	K-3: 15, 4-5: 25	6-8: 25	9-12: 25
Washington	2006	NA	NA	NA
Wisconsin	2007	K-3: 15, 4-5: 25	6-8: 25	9-12: 25
Wyoming	2005	16	21	21
Wyoming	2010	16	21	21

Note: Values in each cell represent a ratio unless otherwise noted

Table 2.3: Elective Teachers

State	Year	Elementary	Middle	High School
Maryland	**2001**	**12.25**	**13**	**20**
Maryland	**2001**	**6 (per school)**	**9 (per school)**	**Included with core**
Arizona	2004	20% of core	20% of core	33% of core
Arkansas	2003	20% of core	20% of core	20% of core
Arkansas	2006	20% of core	20% of core	20% of core
California	2006	NA	NA	NA
California	2007	2.2	14.2	40
Colorado	2003	13 per 1,000 students	20 per 1,000 students	23.7 per 1,000 students
Colorado	2006	13 per 1,000 students	20 per 1,000 students	23.7 per 1,000 students
Colorado	2011	Included with core	Included with core	Included with core
Colorado	2013	Included with core	Included with core	Included with core
Connecticut	2005	11.9 per 1,000 students	28.6 per 1,000 students	Included with core
D.C.	2013	4	Included with core	Included with core
Illinois	2010	20% over core teachers	20% over core teachers	33% over core teachers
Kentucky	2003	20% of core	20% of core	20% of core
Kentucky	2003	20% of core	20% of core	20% of core
Kentucky	2004	5.8	6.4	14
Maine	2014	20% of core	20% of core	33% of core
Minnesota	2004	3	1	1
Minnesota	2006	3	1	1
Montana	2005	Included with core	Included with core	Included with core
Montana	2007	4.5	2.8	1.5
Nevada	2006	5	6	Included with core
New Jersey	2006	20% of core	20% of core	30% of core
New Jersey	2007	20% of core	20% of core	30% of core
New Mexico	2008	NA	NA	NA
New York	2004	Included with core	Included with core	Included with core
New York	2004	NA	NA	NA
North Dakota	2008	20% of core	20% of core	33% of core
North Dakota	2014	20% of core	20% of core	1/3 of core
Ohio	2009	20% (same)	20% (same)	25% (33%)
Pennsylvania	2007	NA	NA	NA
Rhode Island	2007	3.125	11.5	8.5
South Dakota	2006	3.5	2.5	Included with core
Tennessee	2004	3	6.5	26
Texas	2012	20% of core	20% of core	33% of core

State	Year	Elementary	Middle	High School
Washington	2006	20% of core	20% of core	33% of core
Washington	2006	NA	NA	NA
Wisconsin	2007	20% of core	20% of core	33% of core
Wyoming	2005	20% of core	20% of core	20% of core
Wyoming	2010	20% of core	20% of core	33% of core

Table 2.4: Instructional Coaches

State	Year	Elementary	Middle	High School
Maryland	**2001**	**not included**	**not included**	**not included**
Maryland	**2001**	**not included**	**not included**	**not included**
Arizona	2004	2.5	2.5	2.5
Arkansas	2003	2.5	2.5	2.5
Arkansas	2006	Minimum: 2.0; $270.95/pupil (schools may use up to .05 for Asst Principals	Minimum: 2.0; $270.95/pupil (schools may use up to .05 for Asst Principals	Minimum: 2.0; $270.95/pupil (schools may use up to .05 for Asst Principals
California	2006	NA	NA	NA
California	2007	1.4	3.1	4.1
Colorado	2003	not included	not included	not included
Colorado	2006	not included	not included	not included
Colorado	2011	2.38 per 1,000 students	2 per 1,000 students	2 per 1,000 students
Colorado	2013	2.38 per 1,000 students	2 per 1,000 students	2 per 1,000 students
Connecticut	2005	not included	not included	not included
D.C.	2013	1	2	2
Illinois	2010	1 per 200 students	1 per 200 students	1 per 200 students
Kentucky	2003	2.5 full time instructional facilitators with a minimum of 1	2.5 full time instructional facilitators with a minimum of 1	2.5 full time instructional facilitators with a minimum of 1
Kentucky	2003	1	1	2
Kentucky	2004	0.5	0.5	1
Maine	2014	1 instructional coach for every 200 students	1 instructional coach for every 200 students	1 instructional coach for every 200 students
Minnesota	2004	NA	NA	NA
Minnesota	2006	NA	NA	NA

State	Year	Elementary	Middle	High School
Montana	2005	not included	not included	not included
Montana	2007	included in Specialist teachers	included in Specialist teachers	included in Specialist teachers
Nevada	2006	3	3	4
New Jersey	2006	0	0	0
New Jersey	2007	2	3	8.2
New Mexico	2008	NA	NA	NA
New York	2004	NA	NA	NA
New York	2004	NA	NA	NA
North Dakota	2008	2.2	2.3	3
North Dakota	2014	2.25	2.25	3
Ohio	2009	One for each organizational unit (One for every 200 students)	One for each organizational unit (One for every 200 students)	One for each organizational unit (One for every 200 students)
Pennsylvania	2007	NA	NA	NA
Rhode Island	2007	not included	not included	not included
South Dakota	2006	not included	not included	not included
Tennessee	2004	not included	not included	not included
Texas	2012	1 per 200 students: 2.25	1 per 200 students: 2.25	1 per 200 students: 3.0
Washington	2006	2.2	2.25	3
Washington	2006	NA	NA	NA
Wisconsin	2007	2.2	2.25	3
Wyoming	2005	1.5	1.5	3
Wyoming	2010	1.5	1.5	1.5

Table 2.5: Special Education Weights

State	Year	Special Education Weight
Maryland	**2001**	**not included in study**
Maryland	**2001**	**1.17**
Colorado	2003	1.15
Colorado	2006	1.15
Colorado	2011	.93 for mild; 1.93 for moderate; 5.2 for severe
Colorado	2013	.93 for mild; 1.93 for moderate; 5.2 for severe
Connecticut	2005	.987 for mild; 1.540 for moderate; 4.182 for severe

State	Year	Special Education Weight
D.C.	2013	Level 1: .88; Level 2: 1.08; Level 3: 1.77; Level 4: 3.13
Kentucky	2004	1.23
Minnesota	2006	1
Montana	2007	.77 for mild; 1.32 for moderate; 2.93 for severe
Nevada	2006	.88 for mild; 1.28 for moderate; 2.52 for severe
Pennsylvania	2007	1.3
South Dakota	2006	.94 for mild, 1.86 for moderate; 4.21 for severe
Tennessee	2004	.5 for mild; 1 for moderate; 3.45 for severe

Table 2.6: At Risk Students

State	Year	Elementary	Middle	High School
Maryland	**2001**	**$364 per pupil**	**$203 per pupil**	**$181 per pupil**
Maryland	**2001**	**$9,165 per pupil (at-risk weight)**	**$9,165 per pupil (at-risk weight)**	**$9,165 per pupil (at-risk weight)**
Arizona	2004	EB*	EB*	EB*
Arkansas	2003	EB*	EB*	EB*
Arkansas	2006	EB*	EB*	EB*
California	2006	NA	NA	NA
California	2007	NA	NA	NA
Colorado	2003	$3,146 per pupil (at-risk weight)	$2,204 per pupil (at-risk weight)	$2,430 per pupil (at-risk weight)
Colorado	2006	$3,146 per pupil (at-risk weight)	$2,204 per pupil (at-risk weight)	$2,430 per pupil (at-risk weight)
Colorado	2011	1.68 additional staff, depending on district size, for low concentration (20%) at risk; 1.88 for moderate concentration (40%) at risk; 2.25 for high concentration (60%) at risk	3.36 additional staff, depending on district size, for low concentration (20%) at risk; 3.8 for moderate concentration (40%) at risk; 4.59 for high concentration (60%) at risk	5.04 additional staff, depending on district size, for low concentration (20%) at risk; 5.47 for moderate concentration (40%) at risk; 7.05 for high concentration (60%) at risk

State	Year	Elementary	Middle	High School
Colorado	2013	1.68 additional staff, depending on district size, for low concentration (20%) at risk; 1.88 for moderate concentration (40%) at risk; 2.25 for high concentration (60%) at risk	3.36 additional staff, depending on district size, for low concentration (20%) at risk; 3.8 for moderate concentration (40%) at risk; 4.59 for high concentration (60%) at risk	5.04 additional staff, depending on district size, for low concentration (20%) at risk; 5.47 for moderate concentration (40%) at risk; 7.05 for high concentration (60%) at risk
Connecticut	2005	2 teachers, 2 aides, and 2 tutors for moderate concentration at-risk	6 tutors for moderate concentration at-risk	2 teachers
D.C.	2013	2.9 teachers, 3 instructional aides, 2.5 support staff	7.5 teachers, 3.6 intervention teachers, 3.6 pupil support	12.4 teachers, 6 intervention teachers, 6 pupil support, 2 security personnel
Illinois	2010	EB*	EB*	EB*
Kentucky	2003	EB*	EB*	EB*
Kentucky	2003	EB*	EB*	EB*
Kentucky	2004	4	9	10
Maine	2014	NA	NA	NA
Minnesota	2004	NA	NA	NA
Minnesota	2006	NA	NA	NA
Montana	2005	$1,193 per pupil	$1,789 per pupil	$2,385 per pupil
Montana	2007	NA	NA	NA
Nevada	2006	3 teachers, 1 pupil support, .8 instructional facilitator, .2 tutor, .5 parent liaison, .3 clinical aide	2 teachers, 1 pupil support, .8 instructional facilitator, 1 parent liaison, .3 clinical aide	1 instructional aide, .8 instructional facilitator, 2 tutors, 1 parent liaison, .3 clinical aide
New Jersey	2006	40% 160**	40% 240**	40% 656**
New Jersey	2007	40% 160**	40% 240**	40% 656*
New Mexico	2008	NA	NA	NA
New York	2004	NA	NA	NA
New York	2004	NA	NA	NA
North Dakota	2008	EB*	EB*	EB*
North Dakota	2014	EB*	EB*	EB*
Ohio	2009	EB*	EB*	EB*
Pennsylvania	2007	NA	NA	NA
Rhode Island	2007	NA	NA	NA
South Dakota	2006	2 teachers, 4 aides, .5	2 teachers, 4 aides, .4	1 teacher, .5 pupil

State	Year	Elementary	Middle	High School
		pupil support	pupil support	support
Tennessee	2004	2 teachers, .75 aides	4 teachers, 3 aides	5 teachers, 5 aides, 1 pupil support
Texas	2012	NA	NA	NA
Washington	2006	EB*	EB*	EB*
Washington	2006	EB*	EB*	EB*
Wisconsin	2007	EB*	EB*	EB*
Wyoming	2005	EB*	EB*	EB*
Wyoming	2010	EB*	EB*	EB*

*Evidence Based Studies provide resources for tutors, pupil support personnel, summer school, extended day, and ELL programs to serve at risk students. Each of these categories is included in subsequent tables.
** Second number reported for New Jersey studies represents school size.

Table 2.7: Summer School

State	Year	Elementary	Middle	High School
Maryland	**2001**	**not included**	**not included**	**not included**
Maryland	**2001**	**not included**	**not included**	**not included**
Arizona	2004	not included	not included	not included
Arkansas	2003	existing amounts carried forward	existing amounts carried forward	existing amounts carried forward
Arkansas	2006	3.33 FTE per 100 at-risk students, paid at 25% of salary, which is equivalent to 1 FTE per 120 at-risk students	3.33 FTE per 100 at-risk students, paid at 25% of salary, which is equivalent to 1 FTE per 120 at-risk students	3.33 FTE per 100 at-risk students, paid at 25% of salary, which is equivalent to 1 FTE per 120 at-risk students
California	2006	NA	NA	NA
California	2007	For 120 students	For 271 students	For 599 students
Colorado	2003	$177 per pupil	$157 per pupil	$35 per pupil
Colorado	2006	$177 per pupil	$157 per pupil	$35 per pupil
Colorado	2011	NA	NA	NA
Colorado	2013	NA	NA	NA
Connecticut	2005	included in At-Risk resources	included in At-Risk resources	included in At-Risk resources

State	Year	Elementary	Middle	High School
D.C.	2013	100% of at-risk students for 6 weeks full day, K-3 at 15:1 teacher ratio, all others 20:1 teacher ratio, 1 social worker, 2 instructional aides, 1 security personnel, plus $500 per pupil for interventions	100% of at-risk students for 6-8 weeks full day, 30:1 teacher ratio, 1 social worker, 1 security personnel, plus $500 per pupil for interventions	100% of at-risk students for 6-8 weeks full day, 30:1 teacher ratio, 2 security personnel, plus $100 per pupil for Summer Bridge for 9th graders; Summer Enrichment for all, 4 weeks, 3 hours, 4 days per week, 20:1 teacher ratio
Illinois	2010	15:1 for half of the students who qualify for free or reduced-price lunch (FRL)	15:1 for half of the students who qualify for free or reduced-price lunch (FRL)	15:1 for half of the students who qualify for free or reduced-price lunch (FRL)
Kentucky	2003	not included	not included	not included
Kentucky	2003	not included	not included	not included
Kentucky	2004	included in At-Risk resources	included in At-Risk resources	included in At-Risk resources
Maine	2014	3.33 FTE per 100 at-risk students, paid at 25% of salary, which is equivalent to 1 FTE per 120 at-risk students	3.33 FTE per 100 at-risk students, paid at 25% of salary, which is equivalent to 1 FTE per 120 at-risk students	3.33 FTE per 100 at-risk students, paid at 25% of salary, which is equivalent to 1 FTE per 120 at-risk students
Minnesota	2004	NA	NA	NA
Minnesota	2006	NA	NA	NA
Montana	2005	$400 per pupil not meeting proficiency	$400 per pupil not meeting proficiency	$400 per pupil not meeting proficiency
Montana	2007	not included separately	not included separately	not included separately
Nevada	2006	included in At-Risk resources	included in At-Risk resources	included in At-Risk resources
New Jersey	2006	1.5 (extended school year)	1.5 (extended school year)	1.5 (extended school year)
New Jersey	2007	1.3	2	5.5
New Mexico	2008	NA	NA	NA
New York	2004	NA	NA	NA
New York	2004	NA	NA	NA
North Dakota	2008	3.33 FTE per 100 at-	3.33 FTE per 100 at-	3.33 FTE per 100 at-

State	Year	Elementary	Middle	High School
		risk students, paid at 25% of salary, which is equivalent to 1 FTE per 120 at-risk students	risk students, paid at 25% of salary, which is equivalent to 1 FTE per 120 at-risk students	risk students, paid at 25% of salary, which is equivalent to 1 FTE per 120 at-risk students
North Dakota	2014	3.33 FTE per 100 at-risk students, paid at 25% of salary, which is equivalent to 1 FTE per 120 at-risk students	3.33 FTE per 100 at-risk students, paid at 25% of salary, which is equivalent to 1 FTE per 120 at-risk students	3.33 FTE per 100 at-risk students, paid at 25% of salary, which is equivalent to 1 FTE per 120 at-risk students
Ohio	2009	$3,000 per summer teacher. Number of summer teachers is based on half the number of economically disadvantaged children with a class size of 30 (.25 FTE certified teachers for 1/2 of students in poverty with a class size of 15)	$3,000 per summer teacher. Number of summer teachers is based on half the number of economically disadvantaged children with a class size of 30 (.25 FTE certified teachers for 1/2 of students in poverty with a class size of 15)	$3,000 per summer teacher. Number of summer teachers is based on half the number of economically disadvantaged children with a class size of 30 (.25 FTE certified teachers for 1/2 of students in poverty with a class size of 15)
Pennsylvania	2007	NA	NA	NA
Rhode Island	2007	NA	NA	NA
South Dakota	2006	included in At-Risk resources	included in At-Risk resources	included in At-Risk resources
Tennessee	2004	not included	not included	not included
Texas	2012	3.33 FTE per 100 at-risk students, paid at 25% of salary, which is equivalent to 1 FTE per 120 at-risk students	3.33 FTE per 100 at-risk students, paid at 25% of salary, which is equivalent to 1 FTE per 120 at-risk students	3.33 FTE per 100 at-risk students, paid at 25% of salary, which is equivalent to 1 FTE per 120 at-risk students
Washington	2006	1.3	1.35	1.8
Washington	2006	NA	NA	NA
Wisconsin	2007	1.1	1.125	1.5
Wyoming	2005	0.25 teacher positions for every 15 summer students	0.25 teacher positions for every 15 summer students	0.25 teacher positions for every 15 summer students
Wyoming	2010	0.25 teacher positions for every 30 at-risk students	0.25 teacher positions for every 30 at-risk students	0.25 teacher positions for every 30 at-risk students

Table 2.8: Extended Day Programs

State	Year	Elementary	Middle	High School
Maryland	**2001**	**not included**	**not included**	**not included**
Maryland	**2001**	**not included**	**not included**	**not included**
Arizona	2004	not included	not included	not included
Arkansas	2003	not included	not included	not included
Arkansas	2006	3.33 FTE per 100 at-risk students, paid at 25% of salary, which is equivalent to 1 FTE per 120 at-risk students	3.33 FTE per 100 at-risk students, paid at 25% of salary, which is equivalent to 1 FTE per 120 at-risk students	3.33 FTE per 100 at-risk students, paid at 25% of salary, which is equivalent to 1 FTE per 120 at-risk students
California	2006	NA	NA	NA
California	2007	41 teacher hours/week	133 teacher hours/week	154 teacher hours/week
Colorado	2003	$237 per pupil	$437 per pupil	$190 per pupil
Colorado	2006	$237 per pupil	$437 per pupil	$190 per pupil
Colorado	2011	NA	NA	NA
Colorado	2013	NA	NA	NA
Connecticut	2005	included in At-Risk resources	included in At-Risk resources	included in At-Risk resources
D.C.	2013	100% of at-risk students for 2.5 hours, 25:1 teacher ratio, .5 coordination personnel, plus $165 per pupil for materials	100% of at-risk students for 2 hours, 30:1 teacher ratio, .5 coordination personnel	100% of at-risk students for 2 hours, 30:1 teacher ratio, 1 coordination personnel
Illinois	2010	15:1 for half of the students who qualify for free or reduced-price lunch (FRL)	15:1 for half of the students who qualify for free or reduced-price lunch (FRL)	15:1 for half of the students who qualify for free or reduced-price lunch (FRL)
Kentucky	2003	not included	not included	not included
Kentucky	2003	not included	not included	not included
Kentucky	2004	included in At-Risk resources	included in At-Risk resources	included in At-Risk resources
Maine	2014	3.33 FTE per 100 at-risk students, paid at 25% of salary, which is equivalent to 1 FTE per 120 at-risk students	3.33 FTE per 100 at-risk students, paid at 25% of salary, which is equivalent to 1 FTE per 120 at-risk students	3.33 FTE per 100 at-risk students, paid at 25% of salary, which is equivalent to 1 FTE per 120 at-risk students
Minnesota	2004	NA	NA	NA

State	Year	Elementary	Middle	High School
Minnesota	2006	NA	NA	NA
Montana	2005	$400 per pupil not meeting proficiency	$400 per pupil not meeting proficiency	$400 per pupil not meeting proficiency
Montana	2007	not included separately	not included separately	not included separately
Nevada	2006	included in At-Risk resources	included in At-Risk resources	included in At-Risk resources
New Jersey	2006	1.5	3	6
New Jersey	2007	1.3	2	5.5
New Mexico	2008	NA	NA	NA
New York	2004	NA	NA	NA
New York	2004	NA	NA	NA
North Dakota	2008	1.5 at-risk weight	1.5 at-risk weight	2.1 at-risk weight
North Dakota	2014	3.33 FTE per 100 at-risk students, paid at 25% of salary, which is equivalent to 1 FTE per 120 at-risk students	3.33 FTE per 100 at-risk students, paid at 25% of salary, which is equivalent to 1 FTE per 120 at-risk students	3.33 FTE per 100 at-risk students, paid at 25% of salary, which is equivalent to 1 FTE per 120 at-risk students
Ohio	2009	Part of responsibility of tutors for struggling students (.25 FTE certified teachers for 1/2 of students in poverty with a class size of 15)	Part of responsibility of tutors for struggling students (.25 FTE certified teachers for 1/2 of students in poverty with a class size of 15)	Part of responsibility of tutors for struggling students (.25 FTE certified teachers for 1/2 of students in poverty with a class size of 15)
Pennsylvania	2007	NA	NA	NA
Rhode Island	2007	NA	NA	NA
South Dakota	2006	included in At-Risk resources	included in At-Risk resources	included in At-Risk resources
Tennessee	2004	not included	not included	not included
Texas	2012	3.33 FTE per 100 at-risk students, paid at 25% of salary, which is equivalent to 1 FTE per 120 at-risk students	3.33 FTE per 100 at-risk students, paid at 25% of salary, which is equivalent to 1 FTE per 120 at-risk students	3.33 FTE per 100 at-risk students, paid at 25% of salary, which is equivalent to 1 FTE per 120 at-risk students
Washington	2006	1.3	1.35	1.8
Washington	2006	NA	NA	NA
Wisconsin	2007	1.1	1.125	1.5
Wyoming	2005	0.25 teacher positions for every 15 extended-day	0.25 teacher positions for every 15 extended-day	0.25 teacher positions for every 15 extended-day

State	Year	Elementary	Middle	High School
		students	students	students
Wyoming	2010	0.25 teacher positions for every 30 at-risk students	0.25 teacher positions for every 30 at-risk students	0.25 teacher positions for every 30 at-risk students

Table 2.9: Tutors

State	Year	Elementary	Middle	High School
Maryland	**2001**	**NA**	**NA**	**NA**
Maryland	**2001**	**500**	**800**	**1,000**
Arizona	2004	1/each 20% poverty or one for every 100 poverty students	1/each 20% poverty or one for every 100 poverty students	1/each 20% poverty or one for every 100 poverty students
Arkansas	2003	1/each 20% poverty or one for every 100 poverty students	1/each 20% poverty or one for every 100 poverty students	1/each 20% poverty or one for every 100 poverty students
Arkansas	2006	1 Teacher for every 100 NSL students*	1 Teacher for every 100 NSL students*	1 Teacher for every 100 NSL students*
California	2006	NA	NA	NA
California	2007	Not included	Not included	Not included
Colorado	2003	NA	NA	NA
Colorado	2006	NA	NA	NA
Colorado	2011	NA	NA	NA
Colorado	2013	NA	NA	NA
Connecticut	2005	NA	3	4
D.C.	2013	NA	NA	NA
Illinois	2010	Minimum of 1 per prototypical school or 1 for every 100 students who qualify for FRL, whichever is greater	Minimum of 1 per prototypical school or 1 for every 100 students who qualify for FRL, whichever is greater	Minimum of 1 per prototypical school or 1 for every 100 students who qualify for FRL, whichever is greater
Kentucky	2003	1 for each 20% students from low income background with a minimum of 1	1 for each 20% students from low income background with a minimum of 1	1 for each 20% students from low income background with a minimum of 1
Kentucky	2003	2 Professional tutor types, 2 learning support for K-3, 2 support for 4-5, one speech/hearing specialist, Total of 7	7 learning support personnel, one for each of the 6 teams plus 1 floating certified staff member and a 1/2	8 includes GATE

State	Year	Elementary	Middle	High School
		certified personnel to handle mild and moderate disabilities and struggling students. Number of tutors to vary by % poverty; minimum of one, maximum of 4.	time speech/hearing specialist. If more than 75% of students in poverty, one more reading specialist.	
Kentucky	2004	NA	NA	NA
Maine	2014	1 FTE per 100 FRL students	1 FTE per 100 FRL students	1 FTE per 100 FRL students
Minnesota	2004	NA	NA	NA
Minnesota	2006	NA	NA	NA
Montana	2005	see At-risk	see At-risk	see At-risk
Montana	2007	1 teacher and 4 paraprofessionals	1 teacher and 2 paraprofessionals	1.5 teachers and 3 paraprofessionals
Nevada	2006	1	3	2
New Jersey	2006	8	6	8
New Jersey	2007	1.6	2.4	6.6
New Mexico	2008	NA	NA	NA
New York	2004	NA	NA	NA
New York	2004	NA	NA	NA
North Dakota	2008	1.0 and an additional 1.0 for every 125 at-risk students	1.0 and an additional 1.0 for every 125 at-risk students	1.0 and an additional 1.0 for every 125 at-risk students
North Dakota	2014	1.0 and an additional 1.0 for every 125 at-risk students	1.0 and an additional 1.0 for every 125 at-risk students	1.0 and an additional 1.0 for every 125 at-risk students
Ohio	2009	1 certified teacher for every 100 students in poverty. Also expected to provide assistance with extended-day instruction and tutoring (1 certified teacher for every 100 students in poverty)	1 certified teacher for every 100 students in poverty. Also expected to provide assistance with extended-day instruction and tutoring (1 certified teacher for every 100 students in poverty)	1 certified teacher for every 100 students in poverty. Also expected to provide assistance with extended-day instruction and tutoring (1 certified teacher for every 100 students in poverty)
Pennsylvania	2007	NA	NA	NA
Rhode Island	2007	NA	NA	NA
South Dakota	2006	NA	NA	NA
Tennessee	2004	NA	NA	NA
Texas	2012	1 teacher for every 100 ED students	2 teacher for every 100 ED students	3 teacher for every 100 ED students

State	Year	Elementary	Middle	High School
Washington	2006	one for every 100 poverty students: 1.55	one for every 100 poverty students: 1.62	one for every 100 poverty students: 2.16
Washington	2006			
Wisconsin	2007	1 for every 100 poverty students (1.30)	1 for every 100 poverty students (1.35)	1 for every 100 poverty students (1.8)
Wyoming	2005	1 FTE teacher tutor for every 100 "at-risk" students	1 FTE teacher tutor for every 100 "at-risk" students	1 FTE teacher tutor for every 100 "at-risk" students
Wyoming	2010	1 FTE teacher tutor for every 100 "at-risk" students	1 FTE teacher tutor for every 100 "at-risk" students	1 FTE teacher tutor for every 100 "at-risk" students

*Arkansas refers to its Free and Reduced Price Lunch program as the National School Lunch (NSL) program

Table 2.10: Pupil Support

State	Year	Elementary	Middle	High School
Maryland	**2001**	**Not specified**	**Not specified**	**Not specified**
Maryland	**2001**	**2 Counselors, 1 Nurse, 1 Health Technician, 2 Psychologists**	**4 Counselors, 1 Nurse, 1 Health Technician, 1 Psychologist, 1 Juvenile Service Worker, 1 Social Worker**	**5 Counselors, 2 Nurses, 1 Social Worker**
Arizona	2004	1/each 20% poverty or 1 for every 100 poverty students	1 for every 100 poverty students plus 1.0 guidance	1 for every 100 poverty students plus 2.0 guidance
Arkansas	2003	1/each 20% poverty or 1 for every 100 poverty students	1 for every 100 poverty students plus 1.0 guidance	1 for every 100 poverty students plus 2.0 guidance
Arkansas	2006	1 Teacher for every 100 NSL	1 Teacher for every 100 NSL	1 Teacher for every 100 NSL
California	2006	NA	NA	NA
California	2007	1.9	4.9	8.4
Colorado	2003	Guidance counselors: 2.9; Nurse: 1.9 per	Guidance counselors:2.9; Nurse: 1.9	Guidance counselors: 4.3; Nurse: 1.4
Colorado	2006	Guidance counselors: 2.9; Nurse: 1.9 per	Guidance counselors:2.9; Nurse: 1.9	Guidance counselors: 4.3; Nurse: 1.4

State	Year	Elementary	Middle	High School
Colorado	2011	Counselors: 2.38; Nurse: 1.19 ; Psychologist: 1.19; Health Aide: 1.19	Counselors: 4.44 ; Nurse: 2.22 ; Psychologist: .44 ; Social Worker: .44	Counselors: 4; Nurse: 2; Psychologist: .50; Social Worker: .50; Health Aide: .50
Colorado	2013	Counselors: 2.38; Nurse: 1.19 ; Psychologist: 1.19; Health Aide: 1.19	Counselors: 4.44 ; Nurse: 2.22 ; Psychologist: .44 ; Social Worker: .44	Counselors: 4; Nurse: 2; Psychologist: .50; Social Worker: .50; Health Aide: .50
Connecticut	2005	2.9 per 1,000 students	5.7 per 1,000 students	7.1 per 1,000 students
D.C.	2013	2.5	3.9	10
Illinois	2010	1 for every 100 students who qualify for free or reduced-price lunch	1 for every 100 students who qualify for free or reduced-price lunch, plus 1 guidance counselor for every 250 students	1 for every 100 students who qualify for free or reduced-price lunch, plus 1 guidance counselor for every 250 students
Kentucky	2003	1 for each 20-25% students from low-income background with a minimum of 1	1 for each 20-25% students from low-income background with a minimum of 1	1 for each 20-25% students from low-income background with a minimum of 1
Kentucky	2003	3 positions to cover health, guidance and coordination for the family resource center	4.5 to cover guidance services, health services, social worker/psychologist, security, and family/youth services	8 positions for guidance, youth services, athletics, family outreach, dropout prevention services, attendance, security, etc.
Kentucky	2004	4	5	7
Maine	2014	1 FTE per 100 FRL students	1 FTE per 100 FRL students	1 FTE per 100 FRL students
Minnesota	2004	1 (10th percentile special needs) and 2 (90th percentile special needs)	2.7 (10th percentile special needs) and 4.5 (90th percentile special needs)	4.1 (10th percentile special needs) and 6.5 (90th percentile special needs)
Minnesota	2006	1 (10th percentile special needs) and 2 (90th percentile special needs)	2.7 (10th percentile special needs) and 4.5 (90th percentile special needs)	4.1 (10th percentile special needs) and 6.5 (90th percentile special needs)
Montana	2005	2.33	1.83	1.83
Montana	2007	1 plus 1 per 80 at risk	.6 plus 1 per 46 at risk	1.2 plus 1.3 per 93 at risk
Nevada	2006	2.4	3.4	5.5

State	Year	Elementary	Middle	High School
New Jersey	2006	7	10.5 including extended school year	19.9 including extended school year
New Jersey	2007	1 for every 100 poverty students: 1.6	1 for every 100 poverty students plus 1.0 guidance/250 students 4.8 total	1 for every 100 poverty students plus 1.0 guidance/250 students 11.1 total
New Mexico	2008	NA	NA	NA
New York	2004	NA	NA	NA
New York	2004	NA	NA	NA
North Dakota	2008	1 Guidance counselor plus 1 pupil support staff position for every 125 at-risk students; At-risk weight=.13	1 Guidance Counselor per 250 students plus 1 Pupil Support Staff Position for every 125 at-risk students; At-risk weight=.13	1 Guidance Counselor per 250 students plus 1 Pupil Support Staff Position for every 125 at-risk students; At-risk weight=.13
North Dakota	2014	1 Guidance Counselor per 450 students (1) & 1 Nurse per 750 students plus 1 Pupil Support Staff Position for every 125 at-risk students	1 Guidance Counselor per 250 students (1.8) & 1 Nurse per 750 students plus 1 Pupil Support Staff Position for every 125 at-risk students	1 Guidance Counselor per 250 students (2.4) & 1 Nurse per 750 students plus 1 Pupil Support Staff Position for every 125 at-risk students
Ohio	2009	1 for every 75 economically disadvantaged students (1 for every 100 students in poverty)	1 for every 75 economically disadvantaged students (1 for every 100 students in poverty)	1 for every 75 economically disadvantaged students (1 for every 100 students in poverty)
Pennsylvania	2007	NA	NA	NA
Rhode Island	2007	4.75	8.375	8.37
South Dakota	2006	0.8	1.25	1.25
Tennessee	2004	2.1	4	4.5
Texas	2012	Counselors: 1 (per state statute); Nurse: 1/750 students	Counselors: 1.0 /250 students; Nurse: 1/750 students	Counselors: 1 (per state statute); Nurse: 1/750 students
Washington	2006	1 for every 100 poverty students	1 for every 100 poverty students plus 1.0 guidance/250 students	1 for every 100 poverty students plus 1.0 guidance/250 students
Washington	2006	NA	NA	NA
Wisconsin	2007	1 for every 100 poverty students	1 for every 100 poverty students plus 1.0 guidance/250 students	1 for every 100 poverty students plus 1.0 guidance/250 students

State	Year	Elementary	Middle	High School
Wyoming	2005	1.0 FTE positions for every 100 at-risk students	1 for every 100 at-risk students plus 1.0 guidance counselor for every 250 students	1 for every 100 at-risk students plus 1.0 guidance counselor for every 250 students
Wyoming	2010	1.0 FTE positions for every 100 at-risk students	1 for every 100 at-risk students plus 1.0 guidance counselor for every 250 students	1 for every 100 at-risk students plus 1.0 guidance counselor for every 250 students

Table 2.11: ELL

State	Year	Elementary	Middle	High School
Maryland	**2001**	**not included in study**	**not included in study**	**not included in study**
Maryland	**2001**	**$6,612 per pupil (ELL weight of 1.0)**	**$6,612 per pupil (ELL weight of 1.0)**	**$6,612 per pupil (ELL weight of 1.0)**
Arizona	2004	An additional .4 teachers for every 100 ELL/LEP students who are also from a poverty family	An additional .4 teachers for every 100 ELL/LEP students who are also from a poverty family	An additional .4 teachers for every 100 ELL/LEP students who are also from a poverty family
Arkansas	2003	An additional 0.4 teachers for every 100 ELL/LEP students who are also from a poverty family	An additional 0.4 teachers for every 100 ELL/LEP students who are also from a poverty family	An additional 0.4 teachers for every 100 ELL/LEP students who are also from a poverty family
Arkansas	2006	1 Teacher for every 100 ELL	1 Teacher for every 100 ELL	1 Teacher for every 100 ELL
Colorado	2003	$3,191 per pupil	$2,859 per pupil	$4,049 per pupil
California	2006	NA	NA	NA
California	2007	Not included	Not included	Not included
Colorado	2006	$3,191 per pupil	$2,859 per pupil	$4,049 per pupil
Colorado	2011	1.76	2.36	2.62
Colorado	2013	1.76	2.36	2.62
Connecticut	2005	ELL weight	ELL weight	ELL weight
D.C.	2013	2 teachers, .4 pupil support, .1 ELL coordinator	2.8 teachers, .5 instructional aides, .4 pupil support, .1 ELL coordinator	4.7 teachers, .6 instructional aides, .9 pupil support,.2 ELL coordinator

State	Year	Elementary	Middle	High School
Illinois	2010	An additional 1.0 FTE teacher positions for every 100 ELL students	An additional 1.0 FTE teacher positions for every 100 ELL students	An additional 1.0 FTE teacher positions for every 100 ELL students
Kentucky	2003	included in Tutors	included in Tutors	included in Tutors
Kentucky	2003	1 teacher for every 15 ELL students	1 per 15 ELL students	1 teacher for every 20 ELL students
Kentucky	2004	0.5	0.5	1
Maine	2014	1 FTE per 100 ELL students	1 FTE per 100 ELL students	1 FTE per 100 ELL students
Minnesota	2004	NA	NA	NA
Minnesota	2006	NA	NA	NA
Montana	2005	not included	not included	not included
Montana	2007	.5 teachers and 2 paraprofessionals	.3 and 1 paraprofessional	.3 and 1 paraprofessional
Nevada	2006	2 teachers, 1 instructional aide, .3 instructional facilitator, .5 parent liaison	2 teachers, 3 instructional aide, .3 instructional facilitator, .5 parent liaison	4 teachers, 3 instructional aide, .3 instructional facilitator, .5 parent liaison
New Jersey	2006	1.1	2	3
New Jersey	2007	0.18	0.26	0.72
New Mexico	2008	NA	NA	NA
New York	2004	NA	NA	NA
New York	2004	NA	NA	NA
North Dakota	2008	Increase weight for new immigrant ELL students to 1.0	Increase weight for new immigrant ELL students to 1.0	Increase weight for new immigrant ELL students to 1.0
North Dakota	2014	0.07 Weight for all ELL Level 1, 2 & 3 students (see text pp. 35-37)	0.07 Weight for all ELL Level 1, 2 & 3 students (see text pp. 35-37)	0.07 Weight for all ELL Level 1, 2 & 3 students (see text pp. 35-37)
Ohio	2009	1 teacher for every 100 LEP students (1 ELL teacher for every 100 ELL students)	1 teacher for every 100 LEP students (1 ELL teacher for every 100 ELL students)	1 teacher for every 100 LEP students (1 ELL teacher for every 100 ELL students)
Pennsylvania	2007	NA	NA	NA
Rhode Island	2007	NA	NA	NA
South Dakota	2006	.5 teacher, .5 aide	.5 teacher, .5 aide	1 teacher
Tennessee	2004	.1 teacher	.1 teacher	.1 teacher
Texas	2012	1 teacher for every 100 LEP students plus	2 teacher for every 100 LEP students plus	3 teacher for every 100 LEP students plus

State	Year	Elementary	Middle	High School
		5 percent of teacher positions for subs plus Additional 5 days a year for each LEP teacher plus $10 per LEP pupil beyond what each generates through the core model	5 percent of teacher positions for subs plus Additional 5 days a year for each LEP teacher plus $10 per LEP pupil beyond what each generates through the core model	5 percent of teacher positions for subs plus Additional 5 days a year for each LEP teacher plus $10 per LEP pupil beyond what each generates through the core model
Washington	2006	An additional 1.00 teachers for every 100 ELL students	An additional 1.00 teachers for every 100 ELL students	An additional 1.00 teachers for every 100 ELL students
Washington	2006	NA	NA	NA
Wisconsin	2007	An additional 1.00 teachers for every 100 ELL students	An additional 1.00 teachers for every 100 ELL students	An additional 1.00 teachers for every 100 ELL students
Wyoming	2005	An additional 1.0 FTE teacher for every 100 ELL students	An additional 1.0 FTE teacher for every 100 ELL students	An additional 1.0 FTE teacher for every 100 ELL students
Wyoming	2010	An additional 1.0 FTE teacher for every 100 ELL students	An additional 1.0 FTE teacher for every 100 ELL students	An additional 1.0 FTE teacher for every 100 ELL students

Funds for Purchasing Materials, Technology and Training

All of the adequacy studies we reviewed also provide resources to purchase items such as technology and instructional materials as well as professional development for staff. Costs for these items are typically identified in terms of dollars rather than numbers of personnel. There is substantial variation across the studies in how each of these is handled, and the following tables identify the major components of these cost items and how they were addressed in each state study.

- Table 2.12 – Instructional Materials
- Table 2.13 – Assessment
- Table 2.14 – Gifted and Talented
- Table 2.15 – Technology
- Table 2.16 – Professional Development
- Table 2.17 – Campus Safety

Finally, in many studies there is a carry forward component of the cost estimate that indicates that the current cost of certain programs and services is carried over as is. This is a result of the wide variety of state specific funding programs for special services, transportation, capital projects, deferred maintenance and other items (sometimes including operations and maintenance), many of which are not included in adequacy studies that typically focus on instructional programs and the resources that

directly support instruction. Table 2.18 displays how carry forward resources are handled in the studies where it is made explicit.

Table 2.12: Instructional Materials

State	Year	Elementary	Middle	High School
Maryland	**2001**	**$158 per pupil**	**$158 per pupil**	**$158 per pupil**
Maryland	**2001**	**$175 per pupil**	**$275 per pupil**	**$550 per pupil**
Arizona	2004	$250/pupil	$250/pupil	$250/pupil
Arkansas	2003	$250/pupil	$250/pupil	$250/pupil
Arkansas	2006	$160 per pupil	$160 per pupil	$160 per pupil
California	2006	NA	NA	NA
California	2007	Not indicated	Not indicated	Not indicated
Colorado	2003	$350 per pupil	$425 per pupil	$500 per pupil
Colorado	2006	$350 per pupil	$425 per pupil	$500 per pupil
Colorado	2011	$225 per pupil	$250 per student	$310 per student
Colorado	2013	$225 per pupil	$250 per student	$310 per student
Connecticut	2005	$175 per pupil	$225 per pupil	$275 per pupil
D.C.	2013	$165/student	$335/student	$400/student
Illinois	2010	$140 Per-Pupil	$140 Per-Pupil	$170 Per-Pupil
Kentucky	2003	not indicated	not indicated	not indicated
Kentucky	2003	$250 per pupil	$250 per pupil	$250 per pupil
Kentucky	2004	$320 per pupil	$325 per pupil	$375 per pupil
Maine	2014	$170 per K-8 pupil (Instructional materials and assessments)	$170 per K-8 pupil (Instructional materials and assessments)	$205 per high school pupil (Instructional materials and assessments)
Minnesota	2004	NA	NA	NA
Minnesota	2006	NA	NA	NA
Montana	2005	250	350	400
Montana	2007	$350 per pupil	$375 per pupil	$400 per pupil
Nevada	2006	$250 per pupil	$300 per pupil	$450 per pupil
New Jersey	2006	$300 per pupil plus additional for LEP and special ed	$300 per pupil plus additional for LEP and special ed	$320 per pupil plus additional or LEP and special ed
New Jersey	2007	$140 per pupil	$140 per pupil	$175 per pupil
New Mexico	2008	NA	NA	NA
New York	2004	NA	NA	NA
New York	2004	NA	NA	NA
North Dakota	2008	$145/pupil	$145/pupil	$180/pupil
North Dakota	2014	$140/student	$140/student	$175/student
Ohio	2009	$165 per pupil phased in at 25% biennium ($165 per pupil)	$165 per pupil phased in at 25% biennium ($165 per pupil)	$165 per pupil phased in at 25% biennium ($200 per pupil)

State	Year	Elementary	Middle	High School
Pennsylvania	2007	NA	NA	NA
Rhode Island	2007	$221 per pupil	$221 per pupil	$221 per pupil
South Dakota	2006	$250 per pupil	$250 per pupil	$250 per pupil
Tennessee	2004	$400 per pupil	$450 per pupil	$600 per pupil
Texas	2012	$140/pupil	$140/pupil	$175/pupil
Washington	2006	$140/pupil	$140/pupil	$175/pupil
Washington	2006	NA	NA	NA
Wisconsin	2007	$140/pupil	$140/pupil	$175/pupil
Wyoming	2005	$285.57/ADM	$285.57/ADM	$349.66/ADM
Wyoming	2010	$140/ADM	$140/ADM	$175/ADM

Table 2.13: Assessments

State	Year	Elementary	Middle	High School
Maryland	**2001**	**$30 per pupil**	**$30 per pupil**	**$30 per pupil**
Maryland	**2001**	**$20 per pupil**	**$20 per pupil**	**$20 per pupil**
Arizona	2004	not included	not included	not included
Arkansas	2003	not included	not included	not included
Arkansas	2006	$25 per pupil	$25 per pupil	$25 per pupil
California	2006	NA	NA	NA
California	2007	not indicated	not indicated	not indicated
Colorado	2003	$22 per pupil	$22 per pupil	$22 per pupil
Colorado	2006	$22 per pupil	$22 per pupil	$22 per pupil
Colorado	2011	$25 per pupil	$25 per pupil	$25 per pupil
Colorado	2013	$25 per pupil	$25 per pupil	$25 per pupil
Connecticut	2005	$12 per pupil	$10 per pupil	$11 per pupil
D.C.	2013	included in Instructional Materials	included in Instructional Materials	included in Instructional Materials
Illinois	2010	$25 Per-Pupil	$25 Per-Pupil	$25 Per-Pupil
Kentucky	2003	not indicated	not indicated	not indicated
Kentucky	2003	not indicated	not indicated	not indicated
Kentucky	2004	$20 per pupil	$20 per pupil	$20 per pupil
Maine	2014	$170 per K-8 pupil (Instructional materials and assessments)	$170 per K-8 pupil (Instructional materials and assessments)	$205 per high school pupil (Instructional materials and assessments)
Minnesota	2004	NA	NA	NA
Minnesota	2006	NA	NA	NA
Montana	2005	$50 per pupil	$50 per pupil	$80 per pupil
Montana	2007	not included separately	not included separately	not included separately

State	Year	Elementary	Middle	High School
Nevada	2006	not included	not included	not included
New Jersey	2006	NA	NA	NA
New Jersey	2007	NA	NA	NA
New Mexico	2008	NA	NA	NA
New York	2004	NA	NA	NA
New York	2004	NA	NA	NA
North Dakota	2008	$25/Pupil	$25/Pupil	$25/Pupil
North Dakota	2014	$30/student	$30/student	$30/student
Ohio	2009	NA	NA	NA
Pennsylvania	2007	NA	NA	NA
Rhode Island	2007	$45 per pupil	$45 per pupil	$45 per pupil
South Dakota	2006	$2,000 per school	$2,000 per school	$2,000 per school
Tennessee	2004	$15 per pupil	$15 per pupil	$15 per pupil
Texas	2012	$25/pupil	$25/pupil	$25/pupil
Washington	2006	not included	not included	not included
Washington	2006	NA	NA	NA
Wisconsin	2007	$25/pupil	$25/pupil	$25/pupil
Wyoming	2005	$28.50/ADM	$28.50/ADM	$28.50/ADM
Wyoming	2010	$28.50/ADM	$28.50/ADM	$28.50/ADM

Table 2.14: Gifted and Talented

State	Year	Elementary	Middle	High School
Maryland	**2001**	**not included**	**not included**	**not included**
Maryland	**2001**	**not included**	**not included**	**not included**
Arizona	2004	not included	not included	not included
Arkansas	2003	not included	not included	not included
Arkansas	2006	not included	not included	not included
California	2006	NA	NA	NA
California	2007	not included	not included	not included
Colorado	2003	not included	not included	not included
Colorado	2006	not included	not included	not included
Colorado	2011	0.6	0.66	0.71
Colorado	2013	0.6	0.66	0.71
Connecticut	2005	not included	not included	not included
D.C.	2013	.2 teacher	.3 teacher	.5 teacher
Illinois	2010	$25 per pupil	$25 per pupil	$25 per pupil
Kentucky	2003	not included	not included	not included
Kentucky	2003	not included	not included	not included
Kentucky	2004	$15 per pupil	$15 per pupil	$15 per pupil
Maine	2014	$25 per pupil	$25 per pupil	$25 per pupil

State	Year	Elementary	Middle	High School
Minnesota	2004	NA	NA	NA
Minnesota	2006	NA	NA	NA
Montana	2005	$487 per participant	$487 per participant	$487 per participant
Montana	2007	not included separately	not included separately	not included separately
Nevada	2006	not included	not included	not included
New Jersey	2006	.2 plus $50/GATE pupil		
New Jersey	2007	$25 per student in school	$25 per student in school	$25 per student in school
New Mexico	2008	NA	NA	NA
New York	2004	NA	NA	NA
New York	2004	NA	NA	NA
North Dakota	2008	$25 per pupil	$25 per pupil	$25 per pupil
North Dakota	2014	$25 per pupil	$25 per pupil	$25 per pupil
Ohio	2009	$25 per student	$25 per student	$25 per student
Pennsylvania	2007	NA	NA	NA
Rhode Island	2007	not included	not included	not included
South Dakota	2006	not included	not included	not included
Tennessee	2004	not included	not included	not included
Texas	2012	$25 per pupil	$25 per pupil	$25 per pupil
Washington	2006	not included	not included	not included
Washington	2006	NA	NA	NA
Wisconsin	2007	$25 per pupil	$25 per pupil	$25 per pupil
Wyoming	2005	$25 per pupil	$25 per pupil	$25 per pupil
Wyoming	2010	$25 per pupil	$25 per pupil	$25 per pupil

Table 2.15: Technology

State	Year	Elementary	Middle	High School
Maryland	**2001**	**$221 per pupil**	**$221 per pupil**	**$221 per pupil**
Maryland	**2001**	**$160 per pupil**	**$137 per pupil**	**$162 per pupil**
Arizona	2004	$250/pupil	$250/pupil	$250/pupil
Arkansas	2003	$250/pupil	$250/pupil	$250/pupil
Arkansas	2006	Unit Price: $250; $250/pupil	Unit Price: $250; $250/pupil	Unit Price: $250; $250/pupil
California	2006	NA	NA	NA
California	2007	1 FTE plus 151.5 computers per school	1.5 FTE plus 322.2 computers per school	2.6 FTE plus 606.1 computers per school
Colorado	2003	$208 per pupil	$272 pupil	$282 per pupil
Colorado	2006	$208 per pupil	$272 pupil	$282 per pupil
Colorado	2011	$232 per pupil	$319 per pupil	$339 per pupil
Colorado	2013	$232 per pupil	$319 per pupil	$339 per pupil

State	Year	Elementary	Middle	High School
Connecticut	2005	$119 per pupil	$156 per pupil	$134 per pupil
D.C.	2013	.5 FTE, $30 per pupil for licensing	1 FTE, $30 per pupil for licensing	1 technology specialist, 1 IT manager, per pupil for licensing
Illinois	2010	$250/pupil	$250/pupil	$250/pupil
Kentucky	2003	$214/student	$214/student	$214/student
Kentucky	2003	1 technology person at the school site,1/2 time instructional, 1/2 time technical; $214/pupil for hardware/software replacement and repair, $50 per pupil for moving to ratio of 1 computer for every 3 students	1 technology person at the school site,1/2 time instructional, 1/2 time technical; $214/pupil for hardware/software replacement and repair, $50 per pupil for moving to ratio of 1 computer for every 3 students	2 technology people at the school site, 1 instructional, 1 technical; $214/pupil for hardware/software replacement and repair, $50 per pupil for moving to ratio of 1 computer for every 3 students
Kentucky	2004	1 technology specialist plus $300 per pupil	1 technology specialist plus $300 per pupil	1 technology specialist plus $300 per pupil
Maine	2014	$250 per all pupils	$250 per all pupils	$250 per all pupils
Minnesota	2004	NA	NA	NA
Minnesota	2006	NA	NA	NA
Montana	2005	1 FTE plus $300 per pupil	0.5 FTE plus $400 per pupil	1 FTE plus $400 per pupil
Montana	2007	$235 per pupil	$266 per pupil	$274 per pupil
Nevada	2006	1 plus $175 per pupil	1 plus $175 per pupil	1 plus $177 per pupil
New Jersey	2006	$150 per student plus 1 tech spec. positions identified above in pupil support staff	$150 per student plus 2 tech spec. positions identified above in pupil support staff	$150 per student plus 2 tech spec. positions identified above in pupil support staff
New Jersey	2007	$250 per pupil	$250 per pupil	$250 per pupil
New Mexico	2008	NA	NA	NA
New York	2004	NA	NA	NA
New York	2004	NA	NA	NA
North Dakota	2008	$250/student	$250/student	$250/student
North Dakota	2014	$250/student	$250/student	$250/student
Ohio	2009	$250 per pupil phased in at 25% per biennium ($250 per pupil)	$250 per pupil phased in at 25% per biennium ($250 per pupil)	$250 per pupil phased in at 25% per biennium ($250 per pupil)
Pennsylvania	2007	NA	NA	NA
Rhode Island	2007	$220 per pupil	$220 per pupil	$220 per pupil

State	Year	Elementary	Middle	High School
South Dakota	2006	1 FTE plus $407 per pupil	1 FTE plus $330 per pupil	1 FTE plus $479 per pupil
Tennessee	2004	1 technology specialist	1 technology specialist	1 technology specialist
Texas	2012	$250/pupil	$250/pupil	$250/pupil
Washington	2006	$250/pupil	$250/pupil	$250/pupil
Washington	2006	NA	NA	NA
Wisconsin	2007	$250/pupil	$250/pupil	$250/pupil
Wyoming	2005	$250/ADM	$250/ADM	$250/ADM
Wyoming	2010	$250/ADM	$250/ADM	$250/ADM

Table 2.16: Professional Development

State	Year	Elementary	Middle	High School
Maryland	**2001**	**Not specified**	**Not specified**	**Not specified**
Maryland	**2001**	**$123 per pupil**	**$200 per pupil**	**$239 per pupil**
Arizona	2004	Included above: Instructional facilitators, Planning & prep time, 10 summer days; Additional: $50/pupil for other PD expenses - trainers, conferences, travel, etc.	Included above: Instructional facilitators, Planning & prep time, 10 summer days; Additional: $50/pupil for other PD expenses - trainers, conferences, travel, etc.	Included above: Instructional facilitators, Planning & prep time, 10 summer days; Additional: $50/pupil for other PD expenses - trainers, conferences, travel, etc.
Arkansas	2003	Included above: Instructional facilitators, Planning & prep time, 10 summer days; Additional: $50/pupil for other PD expenses - trainers, conferences, travel, etc.	Included above: Instructional facilitators, Planning & prep time, 10 summer days; Additional: $50/pupil for other PD expenses - trainers, conferences, travel, etc.	Included above: Instructional facilitators, Planning & prep time, 10 summer days; Additional: $50/pupil for other PD expenses - trainers, conferences, travel, etc.
Arkansas	2006	Instructional facilitators, Planning & prep time, 10 summer days; Additional: $50/pupil for other PD expenses - trainers, conferences, travel, etc.	Instructional facilitators, Planning & prep time, 10 summer days; Additional: $50/pupil for other PD expenses - trainers, conferences, travel, etc.	Instructional facilitators, Planning & prep time, 10 summer days; Additional: $50/pupil for other PD expenses - trainers, conferences, travel, etc.
California	2006	NA	NA	NA

State	Year	Elementary	Middle	High School
California	2007	59 hours/year/teacher for collaborative time	122.1 hours/year/teacher for collaborative time	100.1 hours/year/teacher for collaborative time
Colorado	2003	$1,000 per teacher	$1,000 per teacher	$1,000 per teacher
Colorado	2006	$1,000 per teacher	$1,000 per teacher	$1,000 per teacher
Colorado	2011	5 additional teacher days, $200 per pupil	5additional teacher days, $200 per pupil	5 additional teacher days, $200 per pupil
Colorado	2013	6 additional teacher days, $200 per pupil	5additional teacher days, $200 per pupil	6 additional teacher days, $200 per pupil
Connecticut	2005	$233 per pupil	$25 per pupil	$217 per pupil
D.C.	2013	15 days/teacher; $100 student	15 days/teacher; $100 student	13 days/teacher; $100 student
Illinois	2010	$100/pupil	$100/pupil	$100/pupil
Kentucky	2003	$60,000 for professional development with a minimum of $30,000	$60,000 for professional development with a minimum of $30,000	$60,000 for professional development with a minimum of $30,000
Kentucky	2003	10 extra days for Summer Institutes included in expanded school year. Additional professional development provided by curriculum specialist included above, considerable collaborative planning during planning and preparation times. Plus $50 per student for travel, consultants, materials, etc.	10 extra days for Summer Institutes included in expanded school year. Additional professional development provided by curriculum specialist included above, considerable collaborative planning during planning and preparation times. Plus $50 per student for travel, consultants, materials, etc.	10 extra days for Summer Institutes included in expanded school year. Additional professional development provided by curriculum specialist included above, considerable collaborative planning during planning and preparation times. Plus $50 per student for travel, consultants, materials, etc.
Kentucky	2004	5 days for certified staff, 4 days for classified staff	5 days for certified staff, 4 days for classified staff	5 days for certified staff, 4 days for classified staff
Maine	2014	Instructional Coaches, Collaboration Time, 10 days of pupil free time for training, $100/pupil for training	Instructional Coaches, Collaboration Time, 10 days of pupil free time for training, $100/pupil for training	Instructional Coaches, Collaboration Time, 10 days of pupil free time for training, $100/pupil for training
Minnesota	2004	NA	NA	NA
Minnesota	2006	NA	NA	NA
Montana	2005	not included	not included	not included
Montana	2007	$2,000 per teacher and	$2,000 per teacher and	$2,000 per teacher and

State	Year	Elementary	Middle	High School
		$1,000 per paraprofessional	$1,000 per paraprofessional	$1,000 per paraprofessional
Nevada	2006	$500 per teachers plus 5 extra days	$500 per teachers plus 5 extra days	$500 per teachers plus 5 extra days
New Jersey	2006	$1,250 per personnel plus $50 per student	$1,250 per personnel plus $50 per student	$1,250 per personnel plus $50 per student
New Jersey	2007	$100 per pupil plus costs for inst. Facilitators, planning and prep time and 10 summer days	$100 per pupil plus costs for inst. Facilitators, planning and prep time and 10 summer days	$100 per pupil plus costs for inst. Facilitators, planning and prep time and 10 summer days
New Mexico	2008	NA	NA	NA
New York	2004	NA	NA	NA
New York	2004	NA	NA	NA
North Dakota	2008	Included above: Instructional coaches, planning & prep time, 10 summer days; Additional: $100/student for other PD expenses – trainers, conferences, travel, etc.	Included above: Instructional coaches, planning & prep time, 10 summer days; Additional: $100/student for other PD expenses –trainers, conferences, travel, etc.	Included above: Instructional coaches, planning & prep time, 10 summer days; Additional: $100/student for other PD expenses –trainers, conferences, travel, etc.
North Dakota	2014	Included above: Instructional coaches, planning & prep time, 10 pupil fee days; Additional: $100/student for other PD expenses – trainers, conferences, travel, etc.	Included above: Instructional coaches, planning & prep time, 10 pupil fee days; Additional: $100/student for other PD expenses – trainers, conferences, travel, etc.	Included above: Instructional coaches, planning & prep time, 10 pupil fee days; Additional: $100/student for other PD expenses – trainers, conferences, travel, etc.
Ohio	2009	$1,833 per teacher at an average of 18 pupils per teacher this would be $127.29 per pupil when specialist teachers are included ($100 per pupil)	$1,833 per teacher at a class size of 25 this is $91.65 per pupil when specialist teachers are included ($100 per pupil)	$1,833 per teacher at a class size of 25 this is $91.65 per pupil when specialist teachers are included ($100 per pupil)
Pennsylvania	2007	NA	NA	NA
Rhode Island	2007	$275 per pupil	$275 per pupil	$275 per pupil
South Dakota	2006	$1,000 per teacher	$1,000 per teacher	$1,000 per teacher
Tennessee	2004	5% of total budget	5% of total budget	5% of total budget
Texas	2012	5 additional teacher	5 additional teacher	5 additional teacher

State	Year	Elementary	Middle	High School
		days to total 10 PD days; $100/pupil	days to total 10 PD days; $100/pupil	days to total 10 PD days; $100/pupil
Washington	2006	Included above: Instructional facilitators, Planning & prep time, 10 summer days; Additional: $100/pupil for other PD expenses - trainers, conferences, travel, etc.	Included above: Instructional facilitators, Planning & prep time, 10 summer days; Additional: $100/pupil for other PD expenses - trainers, conferences, travel, etc.	Included above: Instructional facilitators, Planning & prep time, 10 summer days; Additional: $100/pupil for other PD expenses - trainers, conferences, travel, etc.
Washington	2006	NA	NA	NA
Wisconsin	2007	Included above: Instructional facilitators, Planning & prep time, 10 summer days; Additional: $100/pupil for other PD expenses - trainers, conferences, travel, etc.	Included above: Instructional facilitators, Planning & prep time, 10 summer days; Additional: $100/pupil for other PD expenses - trainers, conferences, travel, etc.	Included above: Instructional facilitators, Planning & prep time, 10 summer days; Additional: $50/pupil for other PD expenses - trainers, conferences, travel, etc.
Wyoming	2005	Included above: Instructional facilitators, Planning & prep time, 5 summer days; Additional: $100/pupil for other PD expenses - trainers, conferences, travel, etc.	Included above: Instructional facilitators, Planning & prep time, 5 summer days; Additional: $100/pupil for other PD expenses - trainers, conferences, travel, etc.	Included above: Instructional facilitators, Planning & prep time, 5 summer days; Additional: $100/pupil for other PD expenses - trainers, conferences, travel, etc.
Wyoming	2010	Included above: Instructional facilitators, Planning & prep time, 5 summer days; Additional: $100/pupil for other PD expenses - trainers, conferences, travel, etc.	Included above: Instructional facilitators, Planning & prep time, 5 summer days; Additional: $100/pupil for other PD expenses - trainers, conferences, travel, etc.	Included above: Instructional facilitators, Planning & prep time, 5 summer days; Additional: $100/pupil for other PD expenses - trainers, conferences, travel, etc.

Table 2.17: Campus Safety

State	Year	Elementary	Middle	High School
Maryland	**2001**	**Not specified**	**Not specified**	**Not specified**
Maryland	**2001**	**$12 per pupil**	**$12 per pupil**	**$12 per pupil**
Arizona	2004	not included	not included	not included
Arkansas	2003	not included	not included	not included
Arkansas	2006	not included	not included	not included
California	2006	NA	NA	NA
California	2007	.2	1.7	3.9
Colorado	2003	not included	.5 School Resource Officer	.5 School Resource Officer
Colorado	2006	not included	.5 School Resource Officer	.5 School Resource Officer
Colorado	2011	not included	5.55 per 1,000 students	5.0 per 1,000 students
Colorado	2013	not included	5.55 per 1,000 students	5.0 per 1,000 students
Connecticut	2005	not included	not included	not included
D.C.	2013	2	3	6
Illinois	2010	not included	not included	not included
Kentucky	2003	not included	not included	not included
Kentucky	2003	not included	not included	not included
Kentucky	2004	1	1	2
Maine	2014	not included	not included	not included
Minnesota	2004	.1 (10th percentile special needs) and .1 (90th percentile special needs)	.5 (10th percentile special needs) and .7 (90th percentile special needs)	.5 (10th percentile special needs) and 1 (90th percentile special needs)
Minnesota	2006	.1 (10th percentile special needs) and .1 (90th percentile special needs)	.5 (10th percentile special needs) and .7 (90th percentile special needs)	.5 (10th percentile special needs) and 1 (90th percentile special needs)
Montana	2005	$25	$25	$50
Montana	2007	not included	not included	not included
Nevada	2006	not included	not included	not included
New Jersey	2006	not included	not included	not included
New Jersey	2007	not included	not included	not included
New Mexico	2008	NA	NA	NA
New York	2004	NA	NA	NA
New York	2004	NA	NA	NA
North Dakota	2008	not included	not included	not included
North Dakota	2014	not included	not included	not included
Ohio	2009	NA	NA	NA

State	Year	Elementary	Middle	High School
Pennsylvania	2007	NA	NA	NA
Rhode Island	2007	$16 per pupil	$16 per pupil	$16 per pupil
South Dakota	2006	not included	not included	not included
Tennessee	2004	not included	not included	not included
Texas	2012	not included	not included	not included
Washington	2006	not included	not included	not included
Washington	2006	NA	NA	NA
Wisconsin	2007	not included	not included	not included
Wyoming	2005	not included	not included	not included
Wyoming	2010	not included	not included	not included

Table 2.18: Carry Forwards and Items Excluded from Studies

State	Year	Carry Forward and Exclusions
Maryland	**2001**	**district-level services, special education, and transportation**
Maryland	**2001**	**transportation, capital and facilities, food service**
Arizona	2004	facilities, transportation, food service, etc.
Arkansas	2003	operations and maintenance, central office, facilities, transportation
Arkansas	2006	operations and maintenance, central office, facilities, transportation
California	2006	district level functions, maintenance and operations and transportation, facilities and debt service
California	2007	facilities, transportation services, maintenance and operations, instructional materials, or office supplies
Colorado	2003	transportation, food services, adult education, capital outlay and debt service for facilities
Colorado	2006	transportation, food services, adult education, capital outlay and debt service for facilities
Colorado	2011	capital, transportation, food service
Colorado	2013	capital, transportation, food service
Connecticut	2005	facilities, transportation, food service
D.C.	2013	food services, transportation, facilities
Illinois	2010	NA
Kentucky	2003	NA
Kentucky	2003	NA
Kentucky	2004	debt and facilities
Maine	2014	NA
Minnesota	2004	district administration, maintenance and operations and transportation
Minnesota	2006	district administration, maintenance and operations and transportation

State	Year	Carry Forward and Exclusions
Montana	2005	maintenance and operations, transportation, food costs, central office
Montana	2007	transportation, food services, or facilities
Nevada	2006	transportation, facilities, food services
New Jersey	2006	NA
New Jersey	2007	NA
New Mexico	2008	transportation, facilities, debt service, food services
New York	2004	central office, maintenance and operations, facilities and debt, food service
New York	2004	NA
North Dakota	2008	NA
North Dakota	2014	NA
Ohio	2009	NA
Pennsylvania	2007	capital, transportation, food services, adult education
Rhode Island	2007	education, and community services were excluded from PJ panel
South Dakota	2006	facilities, transportation, food service
Tennessee	2004	facilities, debt service, transportation, food service
Texas	2012	NA
Washington	2006	food services, transportation, facilities
Washington	2006	NA
Wisconsin	2007	facilities, debt service, transportation, food service
Wyoming	2005	NA
Wyoming	2010	NA

Chapter 3: The Evolution of Adequacy Studies and Best Practices for their Design

The preceding chapters identified 39 adequacy studies completed between 2003 and 2014 and provided a detailed description of the ways each study reached its estimate of school finance adequacy in its respective state. The studies use a variety of methods, sometimes individually and sometimes in combination. A review of the studies shows that each of the methods has evolved over time, in some instances incorporating components of other methods in the adequacy estimates. We found that Augenblick, Palaich & Associates or Picus Odden & Associates conducted 27 of the 39 studies and partnered in two additional studies, allowing us to see and reflect on the evolution of the methodologies over time. In general the studies conducted by APA relied on the successful schools/districts (SSD) and professional judgment (PJ) methods while those completed by POA used the evidence-based (EB) approach. The remaining 12 studies relied on a variety of methods, often more than one. Twenty-one of the studies used PJ as the primary method while 16 used EB as the primary method and two the SSD approach.

This chapter summarizes the evolution of the three methodological approaches we reviewed and the best practices that have emerged from this evolution.

Evolution of the Successful Schools/Districts Method

The successful schools/districts approach has evolved over time in two main areas. The first is in the selection and identification of the districts or schools being identified as successful. In the early SSD work the consultant typically created the approach for selecting successful districts or schools. This approach utilized state level testing results to identify the districts or schools that were performing well in an absolute sense. This approach led to the selection of districts or schools achieving high overall (or status) test scores but ignored those districts or schools that may have had lower absolute achievement but were producing significant student growth and improvement over a relatively short period of time.

The method for identifying successful districts or schools began to change as data on student academic growth became more widely available, allowing for the identification and inclusion of systems achieving significant improvement in performance, thus facilitating the inclusion of multiple lenses for identifying high performance. As a result, district or school selection began to focus on identifying both absolute high performers along with those showing dramatic performance improvement but still achieving less than top tier absolute performance. Under this new method for identifying success, performance gains were measured in multiple ways, including identifying districts or schools that were growing at a rate that had them on a path to meet state standards over a set period of time or schools or districts that were outperforming what would be expected of them based on the past achievement of their students.

Along with the change in the types of successful school systems being selected, the focus of the selection process has also changed. As state assessment and accountability systems have become more sophisticated over time the selection method has become less consultant dependent and more aligned with the a state's own accountability system and goals. This approach, where possible, incorporates a state's own definition of what constitutes success and tends to make the selection of districts or schools more understandable to all state stakeholders.

The second area of evolution is in the identification of the base cost figure for each district or school. In earlier SSD work the identification of the base cost figure was done at the total base cost level and no examination was made of the different components of spending making up the base cost, such as instruction, administration or plant maintenance and operations. Also, no consideration was made for the efficiency of spending of the districts included in the successful schools base cost figure, which could lead to the selection of districts or schools that used their resources inefficiently. In more recent applications of the SSD methodology the base cost is disaggregated and analyzed by different cost areas and financial efficiency screens are applied to ensure that inefficient school systems do not bias the base cost estimates upward. Efficiency screens are generally applied only within the group of identified successful districts or schools and the comparative levels of staffing or per pupil spending are used as the measure of efficient use of resources for each of the different cost areas. Districts or schools are excluded from the final base cost figures if their use of resources varies significantly, according to established benchmarks, from that of other successful districts or schools included in the analysis.

The SSD method also began to include studies of some of the identified schools to determine *how* the resources were used to produce the performance results that had them selected for the cost study.

Evolution of the Professional Judgment Method

The professional judgment approach has evolved dramatically since it was first implemented. Early professional judgment work was often based on the work of small groups of educators that met for a few days with little initial guidance or subsequent review of their results. Experts were often not from the state being analyzed and the focus was to build the full array of resources within just a few days, using one or perhaps a handful of panels that all addressed similar questions. As the PJ approach progressed, the number of panels and the levels of review expanded considerably. However, the work continued to focus on one specific representative district or a handful of districts typically categorized by enrollment size. Panelists focused only on their category of district and a number of different representative districts could be built independently without participants from across the panels informing each other's work.

In today's application a multi-tiered approach is used that begins with school level panels. These panels are not specific to one size of district and bring together successful educators from across a state to determine what resources are required for every student in the state to be successful in meeting state standards. Separate special needs panels are assembled to specifically identify the resources needed for special education, at-risk, and English Language Learners to be successful in the school models developed by the first panels.

District panels then meet to determine the types of resources needed at the district level to support the schools that were developed by the school level and special needs panels. These district level panels also bring a district-wide perspective to the school level work by reviewing the school level specifications to determine if there are specific resource changes they would make based on differences in how different sized districts might utilize resources.

Additional panels may be constituted where necessary to ensure all needed resources are identified. These may include a panel of district chief financial officers (CFO), technology specialists, or career and technical education professionals. Finally, a systems panel made up of a select group of district and school level administrators and educators who are known to hold a statewide perspective on educational performance and systems meets to review all of the panels' recommendations developed up to that point. Today's professional judgment panel process has evolved to incorporate multiple levels of input and review from highly regarded in-state participants who possess a strong understanding of the state's educational expectations, student needs, and the types of resources required to allow students to be successful.

Evolution of the Evidence-based Method

The evidence-based method has also evolved over time. The method had its origin in the comprehensive school reform models that provided detailed instructional designs that could be translated into specific resources (e.g., staff or materials) and linked to a cost. Over time, the approach incorporated research evidence on all aspects related to a school and district, where research findings are available. The early EB studies reviewed here (2003-2005) referenced literature on the individual elements of the school model, but had limited descriptions of how the resources could be used to boost student performance.

Subsequent EB studies grew more specific as to the use of resources, outlining a school design that includes significant resources in the early grades, targeted resources for students with additional instructional needs, and an emphasis on teacher professional development. Underlying the approach is the goal of providing every student with an equal opportunity to achieve to state standards and an assumption that there are sets of specific instructional strategies that make that possible. To make that practical in every state, the approach has been refined to include the use of PJ panels and case studies of improving schools.

Unlike the PJ panels described above, the PJ panels used in EB studies are a secondary method. Their role in the EB approach is to confirm that the elements included in the EB model are applied appropriately in their state. Participants are not asked to design a school from scratch – instead, they respond to the evidence presented in light of the specific state context.

The case studies found in the most recent EB studies are also used as confirmation that the EB model is applicable to the state. Leaders and teachers in schools identified as making significant improvement in student achievement, oftentimes "doubling performance" for all or groups of students, are interviewed with the aim of understanding how they align resources to their instructional goals. The results are compared to the EB model in order to determine how well the EB model aligns to the particular state context and to make changes to the EB model when needed. They can also be a powerful local example of how a school may integrate the elements in the EB approach into an instructional school design that improves achievement.

Finally, over time, the EB reports have evolved to provide more pointed recommendations on the use of additional funding. The studies suggest that if the additional resources are not used as the model is designed, substantial improvements in student performance might not emerge. These

recommendations resulted from case studies of improving schools that were included in later EB studies and from a number of follow-up studies conducted in several states where funding was increased following an adequacy study. The consultants consistently found that while there was general support from the education community for the reforms suggested in the EB study, schools provided with increased funding made few changes in *how* they used the resources available to them and student performance remained generally static. On the other hand, the case studies conducted in recent EB reports provide some evidence that improving schools often exhibit the characteristics and resource use patterns identified in the EB model.

Our discussion of the assumptions and programmatic elements of the adequacy approaches in Chapter 2 and the evolution of the three approaches in Chapter 3 highlights how each of the approaches have been improved-upon over time as analysts have gained experience in working with the methods. A discussion of each of the key best practices we have identified through this review is presented below.

Best Practices for the Design of Adequacy Studies

The findings from this review, combined with the experiences of the principal consultants working together on this study, suggest seven "best practices" for the design of adequacy studies. They are:

1. Clear focus on improvement of student performance
2. The potential value of case studies in future work
3. Importance of state policy makers and local stakeholders in the process
4. Combining multiple methods in each state study
5. Selection of professional judgment panels
6. Number of professional judgment panels
7. Accurately representing compensation in the analysis.

1. Focus on Improvement of Student Performance

An explicit goal of most adequacy studies today is the importance of improved student performance. If the intent is to determine what it costs to provide every student an equal opportunity to meet state performance standards, such as Maryland's College and Career-Ready Standards, then a focus on student outcomes and how to reach performance goals is essential. This focus reflects an evolution from early studies – mostly done prior to 2003 – that used the SSD and CF approaches.

The early SSD studies found districts or schools that met a specific performance level while more recent SSD studies also include those schools producing large improvements in student learning. This serves to better identify schools that may face significant instructional challenges and are still able to have their students achieve.

Though the PJ method has always asked panels to design higher performing schools, more recent studies have sought to find members for the panels from schools that have moved the student achievement needle or have National Board certification, for example. The same is true for panelists selected to review the EB recommendations.

The EB method has always referenced research that links each programmatic element to improved student learning, but as this approach evolved over time it began to more explicitly identify a detailed theory of school improvement, i.e., how all of its recommendations could be combined in schools to dramatically improve student learning.

In short, all three adequacy methods proposed for use in the Maryland study have evolved to a point where they explicitly seek to link resources to student performance. Their goal is not only to identify the level and types of resources that are needed to adequately fund the education system, but also to be more explicit about how those resources can be used to attain that performance goal.

At the same time, only a few of the more recent adequacy studies have focused explicitly on attaining Common Core Standards. This latest chapter in the standards movement and its subsequent assessments can be expected to produce additional modifications to each method going forward.

2. The Value of Case Studies in Future Work

We found that a number of recent adequacy studies included case studies of high-performing and/or dramatically improving schools. The case studies have been used to enhance adequacy studies for all three methods for several reasons, including:

- Tailoring the basic parameters of the study method to the specifics of how schools produce learning gains in the state studied.
- Providing examples of how the resources estimated for base funding and additional resources for students with additional needs can be used to effectively boost student achievement.
- Confirming, at least to some degree, the school improvement model that may be embedded in the particular adequacy study approach.

3. Importance of State Policy Makers

Our review of the 39 adequacy studies and our experience in conducting such studies suggests that the involvement of the State Legislature and/or other state policy making bodies is more likely to impact school finance policy and lead to changes in school finance systems. An early example of this was the work of Maryland's Thornton Commission, using findings from APA's study, which led to a five-year strategy to increase state and local education funding by over $3 billion (more than $3,000 per pupil). The Thornton Commission was created by the state's political leaders and included strong representation by members of the Legislature.

The two adequacy studies conducted in Arkansas in 2003 and 2006 were done under the direction and participation of the Legislature's Interim Education Committee. Working hand in hand with the consultants, the Committee responded to the state Supreme Court's decision overturning the school finance system, finding a way to raise over $800 million in additional funding for schools. In Wyoming a joint Legislative Committee (supported by a legislative office focused specifically on school finance) has met on a regular basis since the state's high court first overturned the school finance system in 1997. Along the way, Wyoming pioneered both the PJ and EB approaches to adequacy studies, implementing a funding model that was based directly on the models developed by the consultants involved (initially Management Analysis and Planning and later Picus Odden & Associates). The two adequacy studies

conducted in North Dakota also were conducted for governmental bodies – the 2008 study for the Education Improvement Commission (whose membership included the Lieutenant Governor and several legislators) and the 2014 study for an Interim committee of the Legislature.

Even when Legislative bodies do not commission adequacy studies directly, the involvement of key members of the Legislature, along with other state policy makers is essential if the goal is to produce changes in the school funding system.

4. Combining Multiple Methods in Each State Study

Historically, adequacy studies used one of the four approaches to each study. However, this overview analysis of the studies conducted during the past decade shows that 23 of the 39 studies used multiple methods is assessing school finance adequacy. (All four studies conducted in 2013 and 2014 have used multiple approaches.) A number of them developed cost estimates directly from two or more methods, and several others relied on one primary method, supported by reviews and analyses grounded in another of the four methods. Combining the studies led, in many cases, to multiple estimates of adequacy, which allow policy makers a set of choices about how to structure finance reform and what each option might cost.

Most of the evidence-based studies conducted in the past ten years have used professional judgment panels to help validate or modify the study's initial recommendations. Although the panels were not asked to design high-performing schools from scratch as is done with the PJ approach, they were asked to review the recommendations of the EB model and to provide suggestions regarding the initial EB model parameters and to recommend modifications that better meet the specific needs of their state. Likewise, more recent PJ panels, such as the 2011 Colorado study, have used an evidence-based model as the starting point for PJ panel deliberations.

Similarly, the successful schools/districts approach is usually combined with a second model (generally EB or PJ) because the estimate of a base funding level it generates does not identify weights to support, or make recommendations regarding, the cost of additional services for at risk students (low income, ELL and students with disabilities).

5. Selection of Professional Judgment Panels

Successfully translating the resources identified through adequacy studies into programmatic strategies that can improve instruction and boost student learning has had an impact on how professional judgment panels are populated. Initially, PJ panels were created to ensure the involvement of teachers and education leaders from multiple educational perspectives – elementary, middle and high schools, core and elective subjects, special education – as well as all regions of a state and districts of varying size. Though continuing to meet those criteria, today's PJ panels are, to the extent possible, populated with teachers, instructional coaches, and administrators who:

- Are from schools that have produced large gains in student learning
- Work in turnaround or high-performing schools
- Are National Board Certified or otherwise award winning teachers.

The purpose of this change in the composition of PJ panels has been to ensure that panel members understand how to move the student achievement needle, and have experience in doing so. The hope is that recommendations from successful educators at all levels of the system will be better grounded in strategies for identifying the resources needed to adequately staff and support successful schools as well as how those resources can be used to accomplish the core goal of the education system – improving student achievement.

6. Number of Professional Judgment Panels

Another evolution of the PJ approach has been the addition of more panels at different levels, each reviewing the recommendations of the previous panel. Early PJ studies consisted of school panels at the elementary, middle and high school levels, a panel for central office costs, and occasionally a panel focused on special needs students. More recently special needs panels have become the norm and panels consisting of district budget/finance officers and state officials are also often constituted to review and validate the school and district/central office level panels.

Two studies, California in 2007 and Montana in 2005, used a different approach to PJ panels. They surveyed practitioners from across the state and, as a result, were able to gather professional opinion from many more educators than with a traditional PJ panel approach. We think that this approach, while allowing for input from more professionals, does so at the expense of the panel interaction and thoughtful deliberation that occurs when a group of educators comes together to consider how to best use resources in a school to improve student achievement.

7. Accurately Representing Compensation in the Analysis

A final and just emerging best practice is a growing focus on the details of employee compensation, which constitutes as much as 80% of a school district's total budget. Generally adequacy studies have relied on the average salary of various positions, and average benefit costs, to reach an estimate of total system costs under the new resource recommendations. Today it is relatively straightforward to simulate alternative salary and benefit levels and determine the impact higher salaries and benefits will have on the total cost of the system.

More specifically, it has become important to pay attention to the benefit rate used in calculating total compensation rates for all staff in adequacy studies. The most common practice in the past was to calculate an "average" benefit rate by dividing total expenditures for benefits (when it was available) by the total expenditures for salaries to estimate a benefit rate. When so computed, the benefit rates ranged from 25% to 35% of salaries. Recently, however, as the example of North Dakota showed, efforts are being made to identify the individual elements of and costs associated with benefits and to build a benefit rate figure from the ground up. North Dakota used the actual costs of health insurance for state employees as the estimate of health insurance costs for the K12 system, which produced much higher but more realistic benefit rates, particularly for classified employees. By identifying the individual elements of the bundle of items included in fringe benefits, and their costs, adequacy studies can provide states an opportunity to more explicitly make polices on how such cost elements will be addressed in the K12 funding system.

Another challenge adequacy studies will need to face going forward is unfunded pension liabilities in many states. While the solutions may occur at the state level, they have the potential to increase the costs of education at least for some period of time.

Understanding the implications of alternative approaches to benefits is important for all future adequacy studies.

Recommendations for Maryland

This document summarizes 39 publically available adequacy studies conducted in 24 states and the District of Columbia between 2003 and 2014. It shows that the two consultants who partnered to do the current study in Maryland have conducted most of the studies reviewed (26 of the 39). The review also shows the evolution of adequacy studies over time and how this evolution reflects the development of methodological improvements, or best practices, over time. Both the PJ and EB methods now use components of the other method – PJ studies use educational research to inform the panels as they make decisions and EB studies use panels to validate and modify recommendations for the specifics of each state. Moreover, most of the PJ studies conducted by APA also include a SSD study, and the EB model uses school case studies, to validate the findings.

Given our collective history and expertise in the design of adequacy studies, we recommend that Maryland design an adequacy study that takes the best practices that have emerged from this review and is comprised of all three approaches discussed here – the SSD, PJ, and EB methods. Each of the three methods provides valuable information not found in the others – the programmatic expertise of practitioners found in the PJ approach, research supported programs and strategies from the EB approach, and the actual expenditure levels of currently high-performing schools from the SSD approach. Taken together, these three approaches serve to compliment and validate the findings of the individual study approaches, providing Maryland with the most accurate and actionable findings available.

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Appendix A: Standards, State Assessments and the Adequacy Studies

The fundamental purpose of an adequacy study is to determine the level of resources required within a state or local education agency for providing all students with the opportunity to meet state learning standards and performance expectations. These learning standards and expectations are described and measured by the academic standards and assessment regime adopted by the state. The role played by state standards and assessments in guiding a study of financial adequacy varies by the study approach used. The following provides a brief description of how Maryland's state standards and assessments will be used to guide and inform the adequacy studies presented in the study team's proposal and the interaction of the study's timeline and the implementation schedule for the new PARCC assessments adopted by the state.

For this work, the study team has proposed using three different adequacy methods – evidence-based, professional judgment and successful schools. For the first two methods, evidence-based and professional judgment, state standards provide the benchmark for directing the discussions and fiscal decisions that take place. State assessments, on the other hand, play only an indirect role by providing an indication of how well the educational system is currently meeting state expectations.

In the evidence-based approach specific research-supported programs and strategies are used to construct a comprehensive educational model that should support students in meeting the state's specific academic expectations. A total adequacy cost is then calculated by costing out the various elements of the educational model. Similarly, under the professional judgment approach, participating panelists are instructed on the content and performance expectations contained in the standards and then asked to construct a comprehensive educational cost model that will enable students to meet these expectations. In neither case are state assessment results necessary for linking performance expectations with the adequacy cost model.

Of the three approaches, the successful schools approach makes direct use of state assessment results to determine adequacy. The estimate of an adequate per student base cost is based on how much is spent by districts currently performing well on state assessments – that ideally are aligned with the state's standards. These estimates may be more or less inaccurate to the extent that the state's standards and assessments are not aligned.

The successful schools adequacy work in Maryland is complicated by the fact that the state adopted its College and Career-Ready Standards in 2011-12 but will not administer the PARCC assessments aligned to the new standards until 2014-15. The assessments currently used by the state, the Maryland School Assessment (MSA) and Maryland High School Assessments (MHSA), are not aligned with the new standards. However, the selection of successful schools (and schools to be included in the case studies used to inform our adequacy recommendations) must take place in the fall of 2014, well before the first administration of the PARCC assessments. Working with MSDE staff, we have developed a plan that will keep the study on schedule while incorporating performance information from the new, aligned PARCC assessments.

The initial selection of schools for the successful schools adequacy study and the case studies will be based on six years of MSA and MHSA assessment data for the years 2006 through 2011, during which the state's prior standards were still in effect. This ensures that our school selections will reflect performance data based on aligned standards and assessments. The state's new College and Career-Ready Standards were adopted in 2012, so assessment results from 2012 through 2014 will not be directly comparable to the earlier assessment results.

Although we will be well into our successful schools analysis by the time results for the first administration of the PARCC assessments become available sometime during the summer or early fall of 2015, we will rerun our school selection analysis using the PARCC-based performance data to determine if our list of high-performing schools changes significantly and whether any schools should be added to or dropped from the list of successful schools based on the new assessment data. The criteria for making changes to the list of successful schools will be developed after the data are available and there is a better understanding of magnitude and direction of changes in the performance results. If the list of schools changes, we will rerun the analysis to calculate a new per student base cost based on the new list of schools.

To date, no other state that has contracted for an adequacy study that used assessment data aligned to the Common Core to identify successful schools or districts, making Maryland the first state to do so. Given the relative youth of the Common Core Standards and the time it takes to develop and implement aligned assessments, there have been only a few states (Texas 2012, Colorado 2013, and Maine 2014) that have explicitly referenced the Common Core and/or college and career standards as the goal for student achievement, but none of these used data from assessments in their adequacy studies.