Review of Educational Research
June 2012, Vol. 82, No. 2, pp. 179–232
DOI: 10.3102/0034654312449872

The Cost of Providing an Adequate Education to English Language Learners: A Review of the Literature

Oscar Jimenez-Castellanos
Amelia M. Topper
Arizona State University

This article systematically reviews the cost study literature as it relates to the treatment of English language learners (ELLs). Despite the substantial number of costing out studies that have been conducted over the past several decades, the school finance literature has failed to focus on ELLs—the fastest growing segment of the school-age population. Little attention has been paid to how ELL students are treated under the various costing out methodologies or which approaches yield the most useful results. The two criterion to select the costing out literature to review included (a) peer-reviewed journal articles and commissioned reports that used one of the four primary cost study methodologies (professional judgment panel, successful school model, evidence-based model, and cost function analysis), and (b) studies published after 1990 that focused on generating statewide funding recommendations at the district level. A total of 70 empirical cost studies met these criteria. The review concludes that there is substantial variability in the treatment of ELLs across cost study methodologies, although all methods agree that current funding levels are insufficient to meet specified performance standards. To comprehensively assess the resource needs of this growing school population, cost studies that specifically focus on ELLs will need to be conducted to improve transparency and representativeness for ELLs.

KEYWORDS: cost study, costing out, education finance, English language learners, adequate education.

More than 11 million school-age children between the ages of 5 and 17 spoke a language other than English at home in 2009 (U.S. Department of Education, 2011). These students—typically classified as English language learners (ELLs), limited English proficient students, or linguistic minority students—represented 21% of all school-age children and 11% of all public school enrollments nationally (U.S. Department of Education, 2010). Under the Civil Rights Act of 1964 and the Equal Educational Opportunities Act of 1974, public schools are mandated to

provide the academic and fiscal resources to help ELLs overcome language barriers and gain English fluency. Determining what resources are needed and how much these resources cost have become the principal focus of education finance litigation following *Rodriguez v. San Antonio Independent School District* (Rebell, 2007). The purpose of this article is twofold:

- to understand the cost study literature as it relates to the treatment of ELL students in the four major costing out methodologies and
- to present future avenues for ELL cost study research.

The primary method for determining the costs associated with educating K–12 children, including ELLs, has been through the use of costing out studies. These studies began in the 1970s as resource cost models but have proliferated since the early 1990s. Following the publication of *A Nation at Risk* (National Commission on Excellence in Education, 1983), education finance litigation, and national attention on lagging U.S. student performance on international assessments has resulted in an increasing focus on accountability and state assessments through Goals 2000 (1994) and the passage of the No Child Left Behind Act (NCLB) of 2001 (Berne & Stiefel, 1999).[1] Although many of these national accountability efforts have required states to track ELL performance and outcomes, there are notable exceptions. For example, the Common Core State Standards Initiative (2010) has published information on adapting its standards for ELLs, whereas the U.S. Department of Education's Race to the Top Fund has been criticized by civil rights groups for funding state proposals that do not include accountability measures for ELLs (Zehr, 2010).

Currently, the four prominent cost study methodologies are professional judgment panel (PJP), successful school model (SSM), evidenced-based (EB) approach, and cost function analysis (CFA). Costing out studies, in general, seek to determine what resources are needed to provide an adequate education to public school students, how much an adequate education should cost, and how revenue should be generated. Since the 1970s, costing out litigation has primarily argued for an equitable distribution of funding and resources, either at the student, school, or district level. The equitable distribution of resources and funds does not ensure efficient use, whereas adequacy looks at whether schools and districts have sufficient resources to prepare students to meet the minimum standards on state achievement tests. By focusing on outcomes, adequacy refocuses school finance back on improving student learning. Although there is substantial research that explores the economic and societal benefits of increasing educational outcomes (Belfield & Levin, 2007), the school finance literature has largely failed to focus on ELLs and little attention has been paid to how ELL students are treated under the various costing out methodologies or which approaches yield the most useful results. The school finance literature has also failed to consider the heterogeneity of ELLs; in addition to representing numerous native languages, ELLs vary across a spectrum of other factors such as years in the United States, grade level, and language proficiency.

This review of the relevant cost study literature begins with the background of the four primary costing out methods, including a discussion of adequacy, the key terms used in costing out studies, and the role of the courts. After outlining our

methodological approach, we provide an in-depth exploration of the history and implementation of each costing out approach and an analysis of funding recommendations, particularly as they pertain to ELL students. The article concludes with the theoretical, research, and policy implications.

Background on Cost Study Methods

Costing out studies were first undertaken by economists in the early to mid-1900s and were adopted by education researchers in the 1960s as a way to determine the resources needed to provide each child the opportunity to meet specified outcome measures (King Rice, 1997). Adequacy studies gained prominence in the 1990s (Reschovsky & Imazeki, 2001) and have been conducted in more than 30 states (Duncombe, 2006) despite some criticism questioning their reliability and validity (Hanushek, 2005, 2007). These studies traditionally define educational cost as the amount of resources needed to produce the desired outcomes, typically measured by performance on state standardized tests or some combination of test scores and other academic outcomes (e.g., SAT scores, graduation rates). As previously stated, four primary methods have been developed over the past two decades. These methodologies have evolved in response to litigation and state supreme court rulings that have found state funding formulas unconstitutional (Augenblick, Myers, & Anderson, 1997; Rebell, 2007). The methodologies share several common limitations: heavy reliance on standardized test scores to define adequacy, limited data on special need populations, and the inability to address the appropriate and efficient use of resources (Gándara & Rumberger, 2007).

Defining Adequacy

Although these four cost study methodologies differ in how they cost out an adequate education, they all focus on vertical equity, namely, that an equitable distribution of funds should vary with the needs of students, as opposed to horizontal equity, which is more focused on the equitable distribution of funds across districts instead of across varying groups of students (Berne & Stiefel, 1994; Chambers et al., 2004). To allocate resources within a district or school, the intended educational outcomes need to be clearly articulated. Therefore, defining *adequacy* is a necessary first step in conducting a cost study or an adequacy study. The term *adequacy* has more recently been used by the courts in their rulings on state finance systems and until recently has been tied to funding equity as opposed to student performance (Reschovsky & Imazeki, 2001). One criticism of costing-out studies is that they fail to explicitly define what an adequate education entails (Augenblick et al., 1997; Rebell, 2007).

Public schools serving ELL students have been tasked under Title III of NCLB with preparing these students to "meet the same challenging State academic content and student academic achievement standards as all children are expected to meet" (NCLB, 2001). In NCLB, *adequacy* has been defined as the state's ability to "provide each student an equal opportunity to achieve the state's education performance standards" (Odden, Goetz, & Picus, 2008, p. 376). Although funding formulas have striven to improve fiscal equity between districts, particularly as they shifted from flat grant funding formulas to foundational formulas in the 1920s, it has been the courts that have helped push adequacy to the forefront of the funding agenda. This shift in language changes the conversation from concern about equality of funding

to one of equality of outcomes, usually measured by performance on standardized tests (Ladd, 2008; Odden, Archibald, & Fermanich, 2003). Most costing out studies rely on student performance data on state standardized tests to measure whether students are making adequate progress. However, there is no national standardized method to compare adequacy because achievement tests scores and measures of proficiency differ across states. Although the National Assessment of Educational Progress allows for state comparisons, the test is administered to a sample of students in Grades 4 and 8 and student participation is not required.

Producing Base and Additional Costs

Cost studies typically produce two types of funding recommendations: base costs to establish the minimum amount of money needed to educate the general population of students to meet specified outcomes (e.g., performance on state standardized tests) and the additional costs needed to educate special populations of students, such as ELLs. These additional costs are also known in the literature as *categorical aid, marginal costs,* or *incremental costs*. Categorical aid programs are used in many states to allocate money to special categories of students, such as ELLs or students with special needs (Duncombe & Yinger, 2005a). These funding formulas assign a per pupil weight, typically in decimal form, to students who have been shown in the research literature to have particular needs that should be addressed (i.e., students who require additional services and resources). Per pupil weights represent the increase in spending these populations require in order to meet various outcomes, and they are added to the base cost (the minimum amount needed to educate students with no special needs). If, for example, an ELL per pupil weight was calculated at 1.15 and the base per pupil cost of educating a student without any special needs was calculated at $5,000, the district would need to spend an additional $750 per ELL pupil (i.e., $5,000 × 1.15). These weights vary substantially across special populations, states, and districts, and they generally increase as the percentage of students with special needs increases, due to changes in economies of scale (Duncombe, 2002).

Although per pupil weights are relatively easy to explain to a policymaking audience and make for easy comparison (warranted or not) across states, critics question how weights are derived. It is not always clear how weights are determined, and whether they are they rooted in empirical evidence or are functions of political and budgetary maneuvering (Reschovsky & Imazeki, 2001). Each costing out methodology operationalizes these marginal costs differently, and some methods lend themselves only to the generation of base costs. For instance, the SSM approach, which will be discussed in further detail later in this article, is traditionally designed around determining the base costs for schools or districts that demonstrate high performance on various outcome measures. This method generally is not used to calculate categorical aid costs, largely because many high-performing schools—when identified solely on standardized test score performance—have relatively small populations of special need students.

Cost Studies and the Courts

Historically, state legislatures have initiated costing out studies to determine the instructional, programmatic, and fiscal resources to provide a minimum standard

of public education. The state courts have become more active players in school finance since the 1973 Supreme Court *Rodriguez v. San Antonio* ruling, which concluded that the federal constitution did not see education as a fundamental right. Following the plaintiffs' win in the Texas state courts, plaintiffs in other states have brought similar funding cases to state courts under their state constitutional education clauses. Since *Rodriguez,* school finance litigation has been raised in more than 44 states (Rebell, 2002). Much of the early school finance litigation raised in the 1970s and 1980s focused on ensuring an equitable distribution of fiscal resources. According to Rebell (2002), this emphasis on equity contributed to the high number of defendant victories; the courts struggled with rectifying funding inequities. Since the 1990s, litigation has shifted its focus to adequacy as operationalized under state education clauses, and plaintiffs have been more successful—plaintiffs have won two thirds of recent state finance litigation (Rebell, 2002). These court-ordered studies led to the development of both the PJP and SSM approaches.

Cost Studies and English Language Learners

Costing out studies largely underserve ELL students. Many costing out studies either fail to mention ELL students altogether or aggregate them with low-income[2] or special education students to generate an overall per pupil funding weight (Multicultural Education Training and Advocacy [META], 2008). Although many students classified as ELL fall into one, or several, of these special populations (Gándara & Rumberger, 2008) and aggregating these special populations simplifies the calculation of funding formulas, states run the risk of allocating fewer instructional and fiscal resources to populations with more need by failing to account for the unique needs of each population. Furthermore, many cost studies often overlook the heterogeneity of the ELL population, especially in states like California and New York, by focusing primarily on the general school population. ELL students are not a homogeneous group and therefore may require different resources depending on home language, number of years in the United States, and parental background (Gándara & Rumberger, 2008; Imazeki, 2007; META, 2008). Although, there have been many adequacy studies conducted in the past 10 years, only four cost studies have specifically targeted ELLs (Arizona Department of Education, 2001; Gándara & Rumberger, 2008; META, 2008; National Conference of State Legislatures, 2005). This disconnect between how costing out studies account for special student populations and the accountability standards states are held to results in a failure to properly serve the needs of all students.

Measuring Adequacy for English Language Learners

Although all of the studies reviewed primarily rely on standardized test scores as their output measure for defining adequacy, it is important to note that adequacy may mean something different for ELL students. In Gándara and Rumberger's (2008) study of linguistic minority students in California, the authors present four possible performance standards specifically for this population of students, each with its own financial implications:

1. minimal passing score on an English proficiency exam,
2. minimal passing score across academic content,

3. minimal passing score across academic content and biliteracy, and
4. passing score across academic subjects, resulting in a closing of the achievement gap.

Given the limited costing out research focusing on ELL students, this study does not speak to how adequacy is being applied to ELLs in the majority of studies. However, it does provide insight into how costing out studies could address adequacy as it pertains to ELL students in the future.

The Courts and English Language Learners

A number of court cases and federal legislations have protected the rights of this special student population. The Civil Rights Act of 1964, the Equal Educational Opportunity Act (EEOA) of 1974, and NCLB have all contributed to protecting the rights of ELLs under federal legislation. A number of court cases have also been instrumental in ensuring that ELLs have access to equal access to education and educational resources. The landmark 1974 case *Serna v. Portales Municipal Schools* was the first court case to order schools to implement a bilingual and bicultural curriculum. Later court cases, such as *Castañeda vs. Pickard* (1981) and *Gomez v. Illinois* (1987), ensured that schools were in compliance with EEOA and were offering ELLs programs grounded in theory and evidence. Complementing these court cases, NCLB further ensured the rights of ELLs by mandating that states must establish and meet their specified performance objectives for ELLs or lose some portion of federal funding (Education Alliance, 2006).

The 1992 *Flores v. Arizona* court case is an example of how cost studies have been ordered as a result of school finance litigation. It also serves to illustrate the political and litigious complexity of determining the adequacy of school funding. In this case, the plaintiffs (parents with children enrolled in the Nogales Unified School District in southern Arizona) argued that the state had violated EEOA by failing to provide ELLs with a program of instruction that would build oral and written English fluency (Arizona State Senate, 2008). The plaintiffs also argued that the schools failed to ensure that all students exiting the program had in fact mastered English well enough to be successful in the mainstream classroom. In January 2000, the state district court ruled in favor of the plaintiffs and cited inadequate funding as the primary reason the school district was out of EEOA compliance. The state was able to resolve the program adequacy issue—but not the funding inadequacy—by entering into a consent decree with the plaintiffs in August 2000. The court ordered the state to address the underlying funding concerns by ordering a cost study, which failed to produce specific recommendations beyond very broad estimates of ELL per pupil costs ($0 to $4,600).

A second cost study was ordered in December 2001 and was completed by the National Conference of State Legislatures in August 2004. Although this cost study was more comprehensive than the earlier cost study ordered by the courts, some state legislators questioned the methodology (PJP and school district survey) and the expertise of the panel members. It is not clear to what extent the National Conference of State Legislatures recommendations were incorporated into the categorical aid allocation for ELLs by the legislature. Since this cost study, court orders issued by the district court and overturned by the Ninth Circuit Court of

Appeals resulted in the establishment of an Arizona English Language Learners Task Force to review the empirical literature on bilingual programs and determine categorical aid costs to implement the programs. Despite the costing out studies and the establishment of the task force, the U.S. Supreme Court overturned the state court's decision in *Horne v. Flores* (2009) and ruled in favor of the state. The Court ruled that it was up to the state to determine the requirements for ELL instruction and that the focus should be on educational outcomes and not spending. The case was remanded back to the federal district court and is still active.

Method

To better understand how ELL students are treated in the costing out literature, an integrative review (Cooper, 1982; Torraco, 2005) of the literature was conducted to examine whether and how the four major methodologies account for ELL students and the strengths and weaknesses of these methods in determining adequate ELL funding. A broad review of the literature was undertaken using electronic databases (ERIC, Google Scholar, EBSCO, JSTOR, EconLit, Education Full Text, and Dissertation Abstracts) and combinations of key search terms.[3] The tables of contents of nationally recognized, peer-reviewed journals were searched to ensure that all relevant rigorous studies were included in this review; the following journals were reviewed: *American Educational Research Journal, Journal of Educational Research, Educational Evaluation and Policy Analysis, Review of Research in Education, Journal of Education Finance, Education Policy Analysis Archives,* and *Education Finance and Policy*. Lastly, citations were checked against the National Access Network website—a clearinghouse of education finance reform literature maintained by Teachers College, Columbia University—and the websites of the prominent cost study scholars and researchers.

Our review was limited to studies published after 1990, although the majority of costing out studies were published after 2000. Consequently, this study captures a substantial portion of the costing out literature available to date. Initially, preference was given to studies published in peer-reviewed journals, but it became apparent during our initial review that this preference was too limiting, as the majority of the costing out literature has been commissioned by state courts, legislatures, or nonprofit organizations. Because this review focused on the various statewide costing out methods and how they pertain to ELL per pupil spending, studies that focused on the costing out of specific program offerings, curricula, or interventions were excluded from this analysis. In some cases, results from commissioned or privately funded studies were later published in peer-reviewed journals. To avoid duplication, studies were included only if they approached the analysis from a new perspective and revealed findings not presented in the original costing out study.

From this extensive review of the literature, 70 empirical studies were identified for inclusion in this review, with only four of these studies primarily focused on costing out an adequate education for ELL students (Arizona Department of Education, 2001; Gándara & Rumberger, 2008; META, 2008; National Conference of State Legislatures, 2005). For the purpose of this analysis, studies were classified by methodological approach and analyzed on the following criteria: publication type (peer-reviewed or commissioned report), ELL focus, and (if applicable) per pupil weight assigned to ELL students. Particular attention was paid to the

TABLE 1
Descriptive statistics of the reviewed costing out literature

Dimension	%
Professional judgment approach (PJP)	49
Successful school model (SSM)	40
Evidenced-based model (EB)	31
Cost function analysis (CFA)	27
Multiple methods	34
Peer-reviewed articles	20
Published between 2000 and 2011	90
State distribution	36 states

Note. The percentage of PJP, SSM, EB, and CFA studies will not sum to 100, as approximately one third of the studies used multiple methods.

treatment of ELLs (aggregated with another at-risk population or a separate category) and how resource allocations (i.e., weights) were derived.

The following provides a descriptive overview of the data set ($N = 70$) used for the review of the literature using different dimensions (Table 1). Across all studies, the most popular methods were the professional judgment (49%) and SSM (40%) approaches, followed by the EB (31%) and CFA (27%) approaches. About one third of the studies reviewed used multiple costing out methods (34%), and the majority of multimethod studies were more recent publications (released after 2005). One fifth (20%) of the studies were published in peer-reviewed journals, with the rest commissioned by states or published as part of a study funded by a nonprofit organization. The overwhelming majority of studies (90%) were published between 2000 and 2011. Although these studies represent 36 states, the costing out literature from states in the southeastern part of the United States was underrepresented. It may be that internally commissioned cost studies were conducted but are not publically available. States with larger student populations, such as California, New York, and Texas, were overrepresented, as were states with a history of education finance litigation, such as Kentucky and Wisconsin.

Review of the Literature

Over the past two decades, school finance scholars have debated the merits and accuracy of the four major costing out methodologies. There is little consensus on which of these methods—or combination of methods—produces the most accurate results (Duncombe, 2006; Gronberg, Jansen, Taylor, & Booker, 2004; Hanushek, 2005; Imazeki, 2007), and each method has its advocates and critics. As school finance has gained prominence through litigation and a national focus on student outcomes, it has become increasingly more common to find studies using multiple methodological approaches in an attempt to better triangulate costs. The purpose of this review is to see how students classified as ELL have been treated, both in terms of defining adequacy and generating funding recommendations, in each of the costing out methodologies. The literature is organized by methodological approach; studies that use multiple methods are addressed in each relevant methodological section. Background information on each method is provided, followed by an analysis of key findings derived from each method, with special attention

paid to the treatment of ELL students. Our review begins with the PJP approach, the oldest and most commonly used costing out method. We then turn to the SSM approach, which is often used to support other costing out methods. An evaluation of studies using the EB and CFA approaches follows. Comprehensive tables displaying key findings by methodological approach are located in the appendix (Tables A1–A4).

Professional Judgment Panel

The PJP approach—also known as the *resource cost model, market-basket approach,* or *ingredients approach*—is currently the most commonly used costing out method. It was developed by Jay Chambers and Thomas Parrish in the 1980s as part of their research into school finance reform in Alaska and Illinois (Chambers & Levin, 2006; Rebell, 2007) and later expanded by James Guthrie and Richard Rothstein to include teams of local education experts—typically educators and administrators from within the state, but occasionally national experts as well. Panelists are asked to assign costs to the services and programs needed to allow students to meet specified performance outcomes in various prototypical schools or districts. Prototypical schools or districts are constructed to represent the average student population in districts of different sizes. Most PJP studies include additional weights for students classified as ELL or low income or for students with other special needs (Gándara & Rumberger, 2007).

The PJP studies (n = 34) reviewed span 14 states, with multiple studies conducted primarily in states with ongoing school finance litigation, such as Arizona and New York. As with most costing out studies, the majority of PJP studies were commissioned by state legislatures or nonprofit organizations. The PJP approach was the sole method employed in 13 of the studies, whereas the remaining studies used multiple costing out methods to support their recommendations. Many studies utilizing this approach supplemented their findings using SSM as a secondary method, including recent studies in New Mexico (Chambers, Levin, DeLancey, & Manship, 2008), Montana (Augenblick, Palaich, & Associates, 2007b), and Rhode Island (R. C. Wood & Associates, 2007).

The PJP approach has several advantages over the other models; namely, its methodology is fairly standard and transparent, it is easier to articulate findings to a policymaking audience, it engages input from local experts, and it recommends how districts should use resources. Advocates for this method stress that the outcomes reflect the experiences of people in the field, and they believe that most states do not have enough school- or district-level data to reliably use alternative costing out methods, such as the CFA approach (Augenblick, Palaich, & Associates, 2003b, 2005). Criticisms of this approach include concerns that the estimated costs may be weakly connected to specific outcomes, that the base costs do not reflect current prices or consider the overall budget, and that recommendations may be overestimated (Augenblick, Palaich, & Associates, 2003b; Chambers & Levin, 2006; R. C. Wood & Associates, 2005; Verstegen, 2004). Another concern is whether a different configuration of panelists could generate similar funding recommendations (R. C. Wood & Associates, 2007).

PJP studies have evolved over time in both orientation and structure, which is consistent with the larger shift in the adequacy literature, moving away from horizontal equity toward vertical equity. Early PJP studies focused more on the

equitable funding of instructional programs and resources than on progress on performance outcomes (Chambers et al., 2008). Recent PJP studies reflect this shift in the literature toward progress on outcomes for all students, where adequacy is primarily defined as a broader combination of outputs—proficiency on state standardized exams, high school graduation and dropout rates, and/or attendance rates—for the general school population. There is generally little discussion or conceptualization of what adequacy looks like for different subgroups of students. Only one study thoroughly defined expected outcomes for ELL students (META, 2008). This costing out study, commissioned by the New York Immigration Coalition, was undertaken to determine the costs associated with adequately educating ELLs in the State of New York. It defined adequacy for ELLs as 80% or higher scoring proficient on state math and English exams in Grades 4 and 8, 80% or higher pass rate on state high school exams, and a dropout rate of no more than 3%.

Construction of panels. The PJP studies varied substantially both in the number of panels held and the number of panelists, which could reflect the size of the state or the financial resources of the study. Early costing out studies used a more traditional PJP methodology constructed around several independent panels composed of local educators (Augenblick & Myers, 2001b; Management Analysis & Planning, 2001). Later studies divided these panels into several tiers (Augenblick & Myers, 2002a; Augenblick, Palaich, & Associates, 2003b, 2004; Verstegen, 2004, 2006): school-level panels that focused on estimating the resource needs of school sites; district-level panels that reviewed the school-level panel recommendations and estimated district-level costs; and an overview, or system-level, panel that reviewed and reconciled all of the previous panels' recommendations. Approximately half of the PJP studies reviewed used a tiered panel method, including recent studies in Colorado (Augenblick, Palaich, & Associates, 2011), Pennsylvania (Augenblick, Palaich, & Associates, 2007a), and Montana (Augenblick, Palaich, & Associates, 2007b). Of these, six studies constructed panels or subpanels that focused on reviewing the school-level resource allocations of ELL students (Augenblick, Palaich, & Associates, 2006a, 2006c, 2007a, 2007b, 2011; Chambers, Levin, DeLancey, & Manship, 2008).

Although the majority of PJP studies asked panelists to consider ELLs, the level of consideration varied widely, ranging from merely assigning an average ELL percentage to each prototypical school or district to convening panels specifically focused on ELL and other student populations with special needs (i.e., low-income students, students with disabilities). Recent studies using this approach, such as those conducted in Colorado (Augenblick, Palaich, & Associates, 2011) and California (Chambers, Levin, & DeLancey, 2007), were more likely than older studies to hold separate panels for special need students. Another recent study in California provided panelists with a simulated budget, which included ELLs, to work with (Sonstelie, 2007). It is not clear, however, what the qualifications of these panelists were or how the recommendations from these special panels were incorporated into the final study recommendations.

A recent costing out study in Colorado (Augenblick, Palaich, & Associates, 2011) illustrates the decision-making complexity of the tiered-panel approach. Two special focus panels were tasked during the second round of meetings to review the recommendations of the first round of panelists, with an eye toward

ELL students and students with disabilities. As with the other studies that included special focus panels, it was not clear from this study what changes or contributions these panels made to the initial recommendations or to what extent their recommendations persisted through to the final set of recommendations. Furthermore, the three additional rounds of panels that followed this review may have mitigated or reversed the recommendations made by the special focus panels. The advantage of using this tiered-panel approach is that it can further refine the cost recommendations by engaging multiple stakeholders with varying professional perspectives. At the same time, this approach may introduce a level of political or professional bias as the recommendations of school-level stakeholders are tempered—or worse, overturned—by the concerns of the state overview panels.

Another evolution of the traditional PJP approach is the hybrid model, which merges the PJP and EB approaches. Panelists are provided either with materials on proven instructional programs or policies or with research briefs on special topics (such as ELL students) written by national experts. This approach has been implemented in Arizona (Lawrence O. Picus & Associates, 2004, 2005a), New Mexico (Chambers et al., 2008), and New York (META, 2008). Two of these studies, conducted in New Mexico (Chambers et al., 2008) and New York (META, 2008), provided panelists with ELL-specific resources to inform their recommendations. In all four cases, panelists were instructed to utilize this information as they saw fit, including disregarding it if they felt it did not inform their work. No information was provided on whether or how panelists chose to incorporate the provided research into their recommendations.

The selection criteria of panel members were similar across all three PJP approaches (traditional, tiered, and hybrid), with the exception of one early study that provided very little information on panelists and their role (Oregon Quality Education Commission, 2000). All of the PJP studies sought panelists who were experienced educators, with preference given to those coming from high-performing schools or districts. Researchers attempted to design heterogeneous panels that represented diverse professional occupations (i.e., teacher, principal, superintendent, school business official) and district types (i.e., small district, very large district). However, only seven of the studies explicitly identified panelists with expertise in teaching ELL or English as a second language (Chambers et al., 2007; Lawrence O. Picus & Associates, 2004, 2005a; META, 2008; National Conference of State Legislatures, 2005; Norman, 2002; Verstegen, 2006), but no information was provided on their educational backgrounds, certification, years of experience working with ELLs, or school background (e.g., large ELL population). Although one of the strengths of a PJP is its transparency, our review of the literature indicates a substantial lack of clarity on the professional background of the panelists. It is difficult to determine from the information provided whether the composition of the panels adequately reflected the needs of the ELL population in each state.

Two PJP studies focused solely on determining ELL costs and were explicit about the construction of the panels (META, 2008; National Conference of State Legislatures, 2005). In both studies, panelists were selected based on nominations from state teacher organizations and based on their experience working with ELL students. The New York ELL cost study (META, 2008) made a concerted effort to include ELL specialists who had a range of experience with different ELL program models, as well as different language groups, district sizes, and geographic regions

(i.e., rural, urban). This study provides a comprehensive example of how the PJP approach can be modified to account for the diversity of a state's ELL student population. Similarly, the Arizona ELL costing out study (National Conference of State Legislatures, 2005) convened two panels—one of in-state and one of national ELL experts. Panelists were tasked with first with identifying current costs associated with ELL students and then adjusting these costs to comply with the state litigation. Although the study called for doubling ELL per pupil spending, it was harshly criticized by the legislature for failing to provide an overall funding recommendation, and the expertise of the panelists was called into question.[4] The legislature also felt that the calculation of costs was overinflated based on its small sample of Arizona districts; the data provided to the panelists were based on responses from only 14 out of 38 districts. Despite these criticisms, this study provides an additional model for accounting for ELLs in its attempt to solicit a diverse panel of experts.

Funding recommendations for ELL students in professional judgment panels. Most of the PJP studies reviewed concluded that current ELL funding levels were inadequate to prepare students to meet the specified performance objectives. Specific recommendations ranged from the derivation of per pupil weights and the calculation of marginal costs to staffing recommendations. Staffing recommendations varied, from a 60-to-1 ratio of elementary school students to ELL teachers (Chambers et al., 2004) to 0.4 teachers for every 100 ELL students who are also from poverty families (Lawrence O. Picus & Associates, 2005a). Some studies made general per pupil weight recommendations regardless of district size (Augenblick & Myers, 2001b; Augenblick, Palaich, & Associates, 2005, 2006a; META, 2008; R. C. Wood & Associates, 2007). These static weights ranged from 0.50 in Colorado (Augenblick, Palaich, & Associates, 2006a) to 2.0 in New York (META, 2008).

PJP studies that took district size into account showed substantial variation both across and within studies. Across studies, ELL per pupil weight recommendations ranged from 0.39 above base cost (Augenblick, Palaich, & Associates, 2006b) to 2.0 above base cost (META, 2008; National Conference of State Legislatures, 2005). Within-study variation was largely a function of district size. For example, an early Kansas costing out study recommended an ELL per pupil weight ranging from a low of 0.14 for very small districts to a high of 1.03 for large districts (Augenblick & Myer, 2002b). Other studies also show this same pattern of assigning smaller ELL per pupil weights to small districts and higher per pupil rates to large and very large districts (Augenblick & Myers, 2003; Augenblick, Palaich, & Associates, 2006b).

Interestingly, about half of the studies assigned higher weights to smaller districts (Augenblick, Palaich, & Associates, 2003a, 2003b, 2006c, 2007a, 2007b, 2011). A recent costing out study in Montana (Augenblick, Palaich, & Associates, 2007b) is one such example, calling for ELL per pupil weights of 0.82 for small districts and 0.50 for very large districts. These discrepancies in ELL per pupil weights across PJP studies may reflect differences in state student populations or indicate conflicting positions on how to account for economies of scale, efficiency, or district size. Regardless of per pupil recommendations—whether they varied across districts or were static across school types—there was very little information on how the weights

were actually derived and the process the panels underwent to make their recommendations. These variations, however, underscore the importance of context in deriving per pupil weight for ELLs and the challenge in comparing findings across states.

How to improve professional judgment panels to accommodate ELLs. The validity of a PJP cost study rests on the construction of the panels and the derivation of the prototypical schools or districts. The PJP cost study literature, particularly the older cost studies (see Massachusetts Business Alliance, 1991), is largely silent on the backgrounds and expertise of panelists, the types of ELL programs (English as a second language vs. English as a foreign language) and their implementation costs, and the characteristics of the ELL students panelists are asked to consider. The number of panels, the expertise of panelists, and how the panelists' recommendations are incorporated into the final funding recommendations are key components in developing accurate funding models. The breadth of the data available to researchers is also critical in creating the prototypical districts. To take ELL students into account, a cost study using a PJP approach would strive to build panels that were representative of different types of ELL personnel. Panelists would also have demonstrated expertise working with ELL instructional materials and the ELL school community. The development of prototypical districts or schools is also another area where PJP studies can be more responsive to ELLs. Most PJP studies asked panelists to consider a district or school with an average percentage of ELL students. In doing so, panelists are not given the opportunity to fully consider the spectrum of ELL needs, which is dependent on a variety of complex language, cultural, and academic factors that each influence associated costs.

Successful School Model

Developed around the same time as the PJP approach, SSM was first employed in 1997 by John Augenblick and John Meyers as part of an Ohio State Supreme Court school finance case (R. C. Wood & Associates, 2005; Rebell, 2007). Since then it has been used in Mississippi (Augenblick, Van de Waters, & Myers, 1993), New Hampshire (Augenblick & Myers, 1998), Illinois (Augenblick & Myers, 2001a), and Washington (Lawrence O. Picus & Associates, 2006a). Twenty-seven costing out studies using an SSM approach spanning 17 states were identified. All but two studies were commissioned by a state legislature or a state nonprofit organization. The SSM approach was the sole method used in 10 studies, with three of these studies modifying the methodology by adding additional criteria for inclusions. Some studies that used a SSM approach, such as Perez et al.'s (2007) costing out study in California, focused specifically on schools that were performing substantially better than predicted given their student body characteristics (i.e., percentage of ELL, low-income, and special needs students). Other studies used an SSM approach to supplement their PJPs or attempted to triangulate findings by employing multiple methods. Studies that used both a PJP and a SSM approach primarily used SSM to develop an estimate of base costs either to inform their panels or to incorporate into the final resource recommendations. Recent studies in Nevada (Augenblick, Palaich, & Associates, 2006c) and Washington (Educational Policy Improvement Center, 2007) have used both an SSM approach and two other costing out methods in an attempt to triangulate their findings.

To conduct an adequacy studying using this technique, researchers first identify districts with a high proportion of students passing the state standardized exam. Data on current expenditure levels are then used to estimate funding levels for all districts after controlling for student characteristics (Gándara & Rumberger, 2007; Lawrence O. Picus & Associates, 2003a). Like the PJP approach, SSM is fairly transparent and its findings can be easily articulated to a policymaking audience. Moreover, proponents of this method believe it is a more reliable way than other approaches to calculate costs because it reflects the actual costs of districts that are meeting state standards. Critics contend that SSM studies lack relevancy to large, urban school districts, which tend to score lower on performance outcome measures, have much larger share of students with special needs (ELL, special education, low income), and different economies of scale (Lawrence O. Picus & Associates, 2003a, 2003b; Standard & Poor's School Evaluation Services, 2004). In addition, SSM studies often exclude outlier schools or districts from analysis, which could further skew the pool toward more average-looking districts. For example, a recent study conducted in Montana attempted to control for statistical outliers by excluding tribal schools due to their substantially lower performance on state exams, as well as schools in the top and bottom 5% of average per pupil expenditures (R. C. Wood & Associates, 2005). SSMs are also criticized for not recommending how districts should effectively use resources to ensure outcomes are being adequately met (Lawrence O. Picus & Associates, 2003c).

Criteria for selecting successful schools. The SSM approach can be used to evaluate costs in either schools or districts, and the literature was equally divided between these units of measure. In some studies, researchers felt there were not enough districts in the state to produce a rigorous or valid analysis (Augenblick & Myers, 2001b; Augenblick, Paliach, & Associates, 2006c), whereas other studies focused specifically on the characteristics of successful schools (Chambers et al., 2008; Perez et al., 2007). Two studies, however, chose to analyze both successful schools and successful districts (Arizona Department of Education, 2001; Lawrence O. Picus & Associates, 2006a).

Most of the SSM studies used performance on state exams as the primary criteria to identify high-performing schools or districts. This was particularly the case for studies published after NCLB, which relies on the state's measure of adequate yearly progress (AYP) and highlights the influence of national policy on the SSM methodology. Nine studies took progress on subgroup AYP into account (Arizona Department of Education, 2001; Augenblick, Palaich, & Associates, 2006b, 2006c, 2006d; Chambers et al., 2008; Chambers et al., 2004; Gándara & Rumberger, 2007; META, 2008; Perez et al., 2007). Studies in Nevada (Augenblick, Palaich, & Associates, 2006c) and Minnesota (Augenblick, Palaich, & Associates, 2006d), for example, considered schools and districts successful if they met at least two of the six special population performance objectives, although it was not specified which two were met by the final list of successful schools and districts.

Three of these studies (Arizona Department of Education, 2001; Gándara & Rumberger, 2007; META, 2008) focused solely on schools and districts that had high proportions of ELL students; two of these studies looked specifically at schools and districts that made substantial annual progress toward meeting their ELL student performance outcomes (Gándara & Rumberger, 2007; META, 2008).

Studies in New York (Chambers et al., 2004; META, 2008) used performance on state tests to determine whether ELL students were making adequate progress. Similarly, a California study (Gándara & Rumberger, 2007) presented four different ways to conceptualize adequacy for ELL students, namely, (a) a minimal standard of reclassification as a fluent English proficient (FEP) student; (b) reclassification to FEP and sustained basic or proficient standing on standardized tests; (c) reclassification to FEP, sustained basic or proficient standing, and closing of the achievement gap; and (d) reclassification to biliteracy, defined as reaching proficiency on state tests. Two additional ELL outcomes were identified as possible district goals: establishing performance outcomes for ELLs who test proficient in English and the development of various nonacademic goals. Each of these standards would have a different effect on district- and school-level expenditures.

Funding recommendations for ELLs in successful school model. There were very few specific recommendations for ELLs, as most SSM studies focus almost entirely on the general school or district student population and their costs. Given that the SSM approach was not designed to determine marginal costs, researchers often accounted for the expenditures related to serving ELL students—a higher need and more expensive student population—by removing expenditures for ELLs from the calculations when detailed expenditure data were available or when researchers discounted costs by an estimated percentage. Each of these methods attempts to "level the playing field" so that expenditures at successful schools and districts can be accurately compared to those of other schools and districts.

The majority of SSM studies reviewed (15) did not compare the enrollment characteristics of the successful schools to those of nonsuccessful schools. Without knowing this information, it cannot be determined to what extent their success is a function of the student enrollment profile. Furthermore, close to half of the studies reviewed did not provide enough detail to determine whether ELL students were accounted for (i.e., removed from analysis or discounted) in the base cost calculations. Although all of the four studies that discounted ELL student costs used a discount of 25% (Augenblick, Palaich, & Associates, 2006b, 2011; R. C. Wood & Associates, 2005, 2007), it is not clear how this percentage was determined besides it being a figure inherited from the research literature. It is important to note the discount percentage reflects only current spending on ELL students and does not address whether additional spending would influence performance outcomes.

How to improve successful school model to accommodate ELLs. Traditional cost studies using an SSM approach are of limited use for understanding the costs associated with ELL students. Districts that do well on state performance outcomes typically have lower percentages of students with special needs. Although some of the SSM studies reviewed here took into account the progress of ELL students on state standardized tests (Chambers et al., 2008; Educational Policy Improvement Center, 2007; Gándara & Rumberger, 2007, 2008; META, 2008; Perez et al., 2007), ELLs were not considered a factor in the majority of SSM studies. ELL cost studies employing a SSM approach, like Gándara and Rumberger's (2008) study in California, would ideally focus on high-performing schools or

districts with large proportions of ELL students as well as on high-performing schools or districts with highly diverse ELL student populations. This would allow stakeholders to explore the conditions related to ELL student success in these high-ELL schools and districts. Given that most cost studies are focused on calculating a base cost for the general school population, ELLs could be accounted for by moving toward a "beating the odds" approach, most recently utilized in New Mexico (Chambers et al., 2008) and California (Perez et al., 2007). By shifting the conversation toward schools or districts that show high performance despite high proportions of students with special needs, stakeholders can obtain a clearer picture of how ELL success is operationalized in these model districts.

Evidence-Based Approach

The EB approach was developed in 1998 in response to litigation in New Jersey (Rebell, 2007). In all, 22 studies were identified that used an EB approach. The literature spans 14 states and includes two studies that focused on costing out an adequate education at the national level—the only peer-reviewed publications (Odden, Goetz, & Picus, 2008; Odden, Picus, & Goetz, 2010). The EB approach was the sole method of costing out in about half of the studies, whereas the remaining studies used multiple methods to determine costs. As with the SSM approach, these studies primarily used the EB findings as a secondary resource or to PJP panelists (Augenblick, Palaich, & Associates, 2006d; Chambers et al., 2004, 2008).

There are many similarities between the PJP approach and the EB model. First, both rely on experts to define the resources needed to provide an adequate education. The expert in this model is the research literature on programs and practices that have shown evidence of positively influencing student academic outcomes. Second, the costs of the various programs are estimated and aggregated to produce state- and district-level costs (Gándara & Rumberger, 2007). Third, the strengths of the EB model lie in its transparency, its reliance on the expertise of "experts" (i.e., the vetted research literature), and the specific recommendations on how resources should be used (Rebell, 2007). Critics of this approach question both how the literature is selected and how its effects are measured (R. C. Wood & Associates, 2007). The model's reliance on the published research literature can also become dated unless the literature is regularly reviewed. Critics also take issue with the estimated costs, which may not be strongly related to the specific outcomes of the state being studied (Hanushek, 2007).

Selection of literature. Given that the EB approach generates program, staffing, and funding recommendations based on the evidence in the research literature, understanding how studies are selected for inclusion in this model is a necessary step in interpreting recommendations. Overall, the EB studies provided very little information on the criteria used to identify best practices. The EB studies authored by Allan Odden and Lawrence Picus typically include the following criteria in each report:

1. studies that use a randomized design,
2. studies that use quasi-experimental research methods, and

3. studies at the school or district level that focus on best practices or program impact.

Beyond these criteria, however, there is little discussion about how the authors are aggregating and analyzing the research. Some studies provided a vague scan of the literature (MAP, 2000), whereas others relied on the evidence published in earlier costing out studies (Augenblick, 2006b; Chambers et al., 2004) or on national experts to identify best programs and practices (Augenblick, Palaich, & Associates, 2006d; Chambers et al., 2008). The remaining studies did not include enough detail to discern how studies were selected for inclusion.

One way to better understand how these EB studies have used the research literature to guide their recommendations is to look at what studies have been cited, whether there has been change over time, and how the studies are being analyzed. There is very little discussion of the studies that were included, besides general statements about their findings. Using a recommendation common to almost all of the studies—full-day kindergarten—it is evident that the majority of EB studies include either no or very few references to the research literature. Studies in Wyoming (Lawrence O. Picus & Associates, 2003c), Washington (Lawrence O. Picus & Associates, 2006a), and Wisconsin (Odden, Picus, Archibald, et al., 2007) cite the same three to five studies on the positive outcomes associated with kindergarten and provide a brief summary of effect sizes determined in the sole meta-analysis on kindergarten outcomes.

A more pertinent—although much more limited—example is the handling of recommendations for ELL students. Of the 19 studies that include recommendations for ELL students, only four include citations (Lawrence O. Picus & Associates, 2004, 2005b, 2006b; Odden, Picus, Archibald, et al., 2007) and only 3 discuss the findings from the research literature (Lawrence O. Picus & Associates, 2005b, 2006b; Odden, Picus, Archibald, et al., 2007). All four studies cite a peer-reviewed publication containing recommendations for improving ELL achievement (Gándara, Rumberger, Maxwell-Jolly, & Callahan, 2003). Studies conducted in Wyoming (Lawrence O. Picus & Associates, 2005b), Washington (Lawrence O. Picus & Associates, 2006b), and Wisconsin (Odden, Picus, Archibald, et al., 2007) also cite a meta-analysis on bilingual education programs (Slavin & Cheung, 2005). Although the policymaking audience of these commissioned reports may have precluded an exhaustive analysis of the literature, the lack of transparency raises questions about the veracity of the recommendations being made. This is particularly the case for special populations, such as ELL students, where the recommendations are largely based on broad or vague generalizations of the literature.

Although most of the studies use a traditional EB format, two of these studies, both led by a research team from the American Institutes for Research (Chambers et al., 2004, 2008), use what they call a "hybrid model" that consists of giving panelists the findings from a more limited or modified EB approach. The recommendations given to panelists in the New York adequacy study (Chamber et al., 2004) draw on the EB findings from a costing out study in Kentucky (Lawrence O. Picus & Associates, 2003b) and differs only in its recommendation of school-based mentorship programs. Although the New Mexico study also uses a "hybrid model," its design and recommendations differ substantially from traditional EB approaches (Chambers et al., 2008). Instead of canvassing the literature, the

authors distributed five brief reports written by nationally recognized scholars and practitioners on the following topics: at-risk students, special education students, ELLs, students living in rural areas, and the characteristics of successful schools. Although this approach has the advantage of offering recommendations for specific subgroups of students that are largely overlooked in the school finance literature, these recommendations do not include concrete suggestions (i.e., average costs, per pupil weight, or teacher-to-student ratios) about how resources should be allocated at the school or district level. These briefs also lack a high level of detail on how the research was selected and synthesized, likely due to their policymaking (not research) audience.

Another variation on the EB approach methods was an adequacy study conducted in Hawaii that generated funding recommendations by comparing the costs for a baseline elementary, middle, and high school with the estimated costs for meeting measures of adequacy outlined by the state (Grant Thornton, 2005). To achieve adequacy, the authors relied on three summaries of the research literature, two that were conducted for the state of Oregon (ECONorthwest & The Center for Educational Policy Research, 2005a, 2005b) and one produced by the Educational Testing Service (Barton, 2003). Adequacy for ELLs was defined as providing intensive language acquisition programs by reducing the student-to-teacher ratio, which—in theory—would reduce the time it took ELL students to master English.

Funding recommendations for ELL students in the evidence-based approach. Given that EB studies are grounded in generating best practices based on the available research literature, recommendations for ELL students are primarily in the form of teacher-to-student ratios instead of in absolute spending recommendations. In some studies the recommendations appear to be a standalone component of the report (Lawrence O. Picus & Associates, 2003a, 2006b; Odden, Picus, Archibald, et al., 2007; Odden, Picus, & Goetz, 2007). The EB funding recommendations for ELLs are largely consistent, although there is substantial variance in per pupil funding, ranging from a low of $41 per ELL in Arizona (Lawrence O. Picus & Associates, 2005a) to a high of $700 per ELL in Wisconsin (Odden, Picus, Archibald, et al., 2007) and $719 per ELL (aggregated) nationally (Odden et al., 2008). Many studies recommended additional resources for ELLs (as well as other students with special needs) in the form of one-on-one tutoring (Chambers et al., 2004; Lawrence O. Picus & Associates, 2003a, 2003b, 2004, 2005a, 2006b, 2006c; Odden, Picus, & Goetz, 2007; Odden et al., 2010). The adequacy study conducted in Arizona (Lawrence O. Picus & Associates, 2004) was the first to also assigned a staff position for ELLs—an additional 1.4 teacher positions be tied to every 100 low-income ELL students. This is the only study to aggregate resources based on ELL *and* poverty status; other studies recommended 1.0 teacher positions per 100 ELL students (see Lawrence O. Picus & Associates, 2005b, 2006b; Odden, Picus, Archibald, et al., 2007; Odden, Picus, & Goetz, 2007; Odden et al., 2010).

A recent funding formula study in New Mexico provided the most detailed recommendations for ELLs (Augenblick, Palaich, & Associates, 2006d). Using a hybrid PJP approach, panel members received an expert brief that recommended a per pupil weight of 0.90 for ELL students, as well as detailed assessments for different levels of proficiency, professional development activities that specifically focused on ELL content and assessment development, a supportive curriculum focusing on language

development and providing strategies for language acquisition and the incorporation of native languages and culture, and strategies to foster home and parental involvement. There was little overlap between the research literature cited in this brief and the literature cited in the other EB studies, which may be due to its focus on classroom instructional practices for ELL students rather than on school- or district-level resources.

Another recent study conducted in Nevada also distributed EB recommendations compiled by two national experts to panelists, but their recommendations were not included in the report and there was not enough detail on how the panel used those recommendations to inform its work (Augenblick, Palaich, & Associates, 2006c). These studies, although representing nontraditional EB methods, highlight larger concerns about the method itself, namely, how research studies are gathered, the criteria for determining whether or not a study has shown sufficient evidence of efficacy, and how these recommendations are incorporated into the final costing out formula.

How to improve the evidence-based approach to accommodate ELLs. Like the previous two costing out methods, an EB approach could easily be modified to accommodate the unique needs of the diverse ELL student population. A costing out study using an EB approach could supplement its research by broadening its scope to review the empirical literature on policies, programs, and practices that were consistently correlated with ELL student success. The results from this type of literature review could then be used to inform PJP panel deliberations or support SSM findings. Furthermore, EB studies should attempt to include research that addresses the complexity and heterogeneity of the ELL student population.

Cost Function Analysis

The CFA approach is the newest of the four costing out methodologies and has been most recently used in Hawaii (Baker & Thomas, 2006), California (Imazeki, 2007), Missouri (Duncombe, 2007), and Ohio and Texas (Baker, 2009). Nineteen CFA studies were identified, spanning nine states. Cost function studies were much more likely to be peer reviewed than the other costing out methods, with roughly half of the studies reviewed published in peer-reviewed journals. These studies were usually based on commissioned reports, and different findings from original reports were published in multiple journals. Unlike other methods, the authors of these studies tended to be from universities instead of the private sector, which may explain why many of these reports were later submitted for peer-review publication. In each case, the cost function was the sole method for costing out district resources.

Despite the technical complexity of the cost function approach, the technique is fairly transparent. All of the studies provided an overview of the method, followed by a detailed description of inputs and outputs, and then an analysis of the data, with any caveats or limitations noted. Although the structures of these studies were similar, there was substantial variance in the quality and breadth of data available as well as in the types of data used to construct the cost function formula. This statistical approach depends on access to reliable district-level data on expenditures (e.g., per pupil expenditures, teacher salaries), student characteristics and

performance outcomes, and geographic cost differences (Gándara & Rumberger, 2007). These data are used first to create a measure (costs indices or per pupil weights) to capture the effect of external factors on spending to meet a specified performance outcome and then to determine how much funding is needed across districts to meet any given performance level (Duncombe, 2002). The general formula for a cost function is

$$Sit = h(Tit, Pit, Zit, Fit, \varepsilon it, uit), \quad (1)$$

where expenditures in district *i* during year *t* (*Sit*) are a function of performance outcomes (*Tit*), input prices (*Pit*), student characteristics (*Zit*), district characteristics (*Fit*), unobserved district characteristics (*εit*) and random error (*uit*). The cost function formula allows researchers to estimate the minimum amount of funding needed to meet performance goals, given the student characteristics of each district, by holding the performance outcomes constant and adjusting for the characteristics of each district.

Using multiple outcome measures, the cost function is a statistically sound and relatively straightforward method to estimate, and account for, spending across districts (Gronberg et al., 2004). In addition to using actual, district-level data, cost functions require researchers and policymakers to be explicit about the inputs and outputs used in the model and about all assumptions. The strengths of this approach can also become weaknesses, as the accuracy of the model is dependent on quality data and the specificity of the model (Baker & Duncombe, 2004; Duncombe & Yinger, 2005b; Gronberg et al., 2004; Imazeki, 2007). The complexity of the formula can make it difficult for policymakers to interpret the results, and the results themselves are more predictive than descriptive and do not tell policymakers how resources should be used (Duncombe, 2002; Gronberg et al., 2004; Imazeki, 2007). State policymakers may be reluctant to adopt a CFA approach because it limits their political control over the allocation of costs (Baker & Duncombe, 2004). In response to criticisms over the technical complexity of CFA, advocates of the method argue that the accuracy of the method should be the primary concern, not stakeholder accessibility (Duncombe, Lukemeyer, & Yinger, 2003); that is, the veracity of the research is more important than concerns about difficulty in articulating the findings.

Research design and data set. All CFA studies used some combination of per pupil expenditures, student outcomes, and district characteristics to make spending predictions. Definitions of outcomes and district characteristics varied across studies. This variance in inputs likely reflected the level of access to reliable data. Prior to the passage of NCLB, many states did not administer standardized state tests on an annual basis or have detailed performance data on specific subgroups of students, such as ELLs. The earlier cost studies reflect this limitation with the state test data. An early CFA study of Arizona school districts, for example, looked at the change in test scores on the state standardized exam but for two different cohorts of students because the test was only administered in the 6th and 12th grades (Downes & Pogue, 1994). To avoid this issue, a Wisconsin study used the state's biannual state test to compare the test outcomes of 8th graders in 1993–1994 to the test outcomes of 10th graders in 1995–1996 (Reschovsky & Imazeki,

1997). Instead of relying solely on state test scores, Duncombe and Yinger (1998) used three performance measures to create their outcome variable for their New York cost function study—average performance on state exams administered to 3rd and 6th graders, percentage of students graduating with a Regents diploma, and percentage of students not dropping out of high school. Although state exam performance did not have a value-added component, the authors attempted to include performance measures that they determined were of value to tax payers.

Given the limitations of most state data systems in tracking individual yearly annual performance at the time of these studies, it makes sense that researchers would look for alternative measures of performance in order to refine their cost function formulas. Alternative measures include performance on the ACT or SAT (Imazeki & Reschovsky, 2003, 2004; Reschovsky & Imazeki, 2001, 2003), enrollment or completion of advanced placement courses (Gronberg et al., 2004; Reschovsky & Imazeki, 2001), and cohort graduation rate (Duncombe & Yinger, 2005b). Although states are more attuned to assessing the academic outcomes of student subgroups, usually through the use of standardized tests, none of the studies included subgroup performance in their cost function formulas. As pointed out in a Texas CFA study, the high correlation between subgroup student performance and other student characteristics prevents student subgroups from being included in the cost function as a separate student performance measure (Imazeki & Reschovsky, 2004).

Despite not being able to account for subgroup performance, all of the CFA studies attempted to include ELL students in their cost function formulas except for Reschovsky and Imazeki's (1997) Wisconsin cost study. The majority of studies used percentage of ELL students enrolled in each district as their measure, although several studies use a 2-year average to reduce annual fluctuations in the data (Duncombe, 2002; Duncombe & Yinger, 2005a; Imazeki, 2007). Gronberg et al.'s (2004) Texas cost study limited ELL data to the percentage of non–high school ELL students over concern that there was substantial variation in the high school ELL population due to dropouts. Concerns over the quality of the data were raised in three other studies (Baker & Thomas, 2006; Duncombe, 2007; Kansas Legislative Division of Post Audit, 2006). Although Baker and Thomas's (2006) costing out study in Hawaii included measures of ELL enrollment, the authors questioned whether schools were reporting the data accurately because of inconsistent and highly variable reporting over time. Similarly, when Duncombe (2007) compared the percentage of ELL students reported by Missouri school districts to the percentage of students reported on the 2000 census as living in household where English is not spoken at home, the data suggested that districts were inaccurately reporting ELL status.

Imazeki's (2007) treatment of ELL students in her study of California school districts was unique in that she distinguished between Spanish and non-Spanish ELL students. This study included two measures of ELL status, a 2-year average of Spanish-speaking ELL students, and a 2-year average of non-Spanish-speaking ELLs. At the time this study was conducted, more than 50 other languages were represented in California's schools, although the majority of ELL students spoke Spanish. By disaggregating the ELL measure by language, Imazeki attempted to represent the economies of scale reflected in the costs associated with each subgroup. That is, as the number of Spanish-speaking ELL students increase so should the associated per pupil cost decrease.

Although all of the cost function studies include various measures and indices to control for teacher background, student and district characteristics, efficiency, and in some cases neighborhood characteristics, none of the studies included additional measures targeting ELL students or resources for ELL students. However, three studies with more complex measures of teacher costs included data on teacher certification (Duncombe, 2002; Duncombe & Yinger, 1998, 2005a). Several New York cost studies drew on the same data set and included data on the teacher's type of appointment, teaching assignment, teacher certification test scores, number of attempts, and selectivity of college attendance (Duncombe, 2002; Duncombe et al., 2003; Duncombe & Yinger, 2005a). It could not be determined whether these data, while adding to the robustness of the overall cost function, accounted for ELL students in any way.

Funding recommendations for ELL students in cost function analysis. Eight of the 19 CFA studies reviewed included a funding recommendation for ELL students, and consistent with the previous costing out methods, there was considerable variation in the recommended funding levels and per pupil weights. In some cases, ELL students were aggregated with low-income students (Downes & Pogue, 1994), whereas in others the funding recommendations varied by region (Duncombe, 2002) or estimation model (Duncombe & Yinger, 2005a). The lack of recommendations for ELL students, and the substantial variation in those studies that provided funding recommendations, makes comparisons across studies for this costing out method a challenge.

How to improve cost function analysis studies to accommodate ELLs. Cost function studies rely on access to quality data. These types of studies are typically limited by what type of data the state collects, the number of years for which data are available, and how consistently the data are reported at the institutional and district levels. Any study would require access to accurate and detailed district data on ELLs as well as taking district characteristics into account, such as urbanicity (Imazeki & Reschovsky, 2003). Almost all of the CFA studies reviewed here included the percentage of students classified as ELL in their CFA analyses, although only one study disaggregated the data by Spanish-speaking ELLs and non-Spanish-speaking ELLs (Imazeki, 2007). Like the previous methods, collecting comprehensive data on ELLs in the state (i.e., primary language, grade level, language proficiency level, subgroup performance on state outcome measures, etc.) would strengthen the ELL component of a CFA study.

Summary of Cost Study Literature and the Treatment of ELLs

Table 2 provides a summary of key findings from our review of the cost study literature. Although all of the costing out methods are fairly transparent, their consideration and inclusion of ELLs varies greatly. Some methods are naturally better suited for addressing students with special needs; PJP and CFA studies can easily integrate information and data on ELLs, whereas SSM studies are designed to look at schools or districts that typically end up having the smallest proportion of students with special needs. It is not surprising that recommendations vary considerably across studies, as each of these studies are tailored to specific state, district,

TABLE 2
Summary of major findings

Method	Strengths	Critiques	Recommendations for ELLs	Recommendations to improve method
PJP	Overall method is fairly transparent Findings easily articulated to policymaking audience Reflects experiences of people in the field Frequently includes ELLs	Estimated costs may not be tied to specific outcomes Recommendations may be overestimated Panelist configuration changes recommendations Often does not include outcomes for ELLs	Per pupil weights ranged from 0.39 to 2.0 above base cost	Provide information on panelists' qualifications, construction of panels, how ELL recommendations were incorporated into final recommendations, and "prototypical" ELLs panelists were asked to consider
SSM	Overall method is fairly transparent Findings easily articulated to policymaking audience Reflects actual costs of districts meeting the state standards	Lacks relevancy to large, urban school districts or schools/districts with larger proportions of students with special needs Typically excludes outliers, which skew analysis	Not enough detail was provided to produce funding recommendations	Consider successful schools/districts with high proportions of ELL students as well as those that serve diverse ELL populations
EB	Overall method is fairly transparent Findings easily articulated to policymaking audienceGrounded in empirical evidence	Depends on how the literature is selected and how effects are measured Estimated costs may not be tied to specific outcomes Can quickly become dated	Per pupil funding ranged from $41 to $700 per ELL; one-on-one tutoring also recommended 1.0 teacher positions per 100 ELL	Review empirical literature on policies, programs, and practices that support ELL student success Provide citations
CFA	Overall method is fairly transparent Relies on a comprehensive set of student and institutional variables	Technical complexity may be difficult to interpret Dependent on quality and breadth of data available	Funding recommendations vary by region or estimation model; ELLs aggregated with low-income students in some studies	Include additional variables in the model to account for ELL diversity (native language, number of years in United States, grade level, etc.)

Note. ELL = English language learner; PJP = professional judgment panel; SSM = successful school model; EB = evidenced-based approach; CFA = cost function analysis.

and political contexts. Our broad recommendations based on this review of the cost study literature call for a focus on the *transparency* of the process and the *contextualization* of ELL students. The following section outlines more specific recommendations for better positioning cost studies to more effectively serve the needs of ELL students.

Discussion

This review of the cost study literature reveals that cost studies, regardless of methodological approach, share similarities when addressing the treatment of ELL students. First, although the majority of studies acknowledge ELL students in their model, they do not necessarily account for them in their cost analyses or funding recommendations. The failure to account for ELLs is both an artifact of the method employed (i.e., SSM) and a reliance on gross outcome measures that obfuscate the presence and diversity of the ELL student population. In addition, other language minority students who are not ELL students need to be taken into account (i.e., redesignated FEP). We contend that this must happen even if the percentage of ELLs is relatively small in a particular state, because the sooner states begin to focus on ELLs and their specific needs, the better prepared they will be when the critical mass of population grows, as all demographic data are suggesting. In other words, ELLs are minimized by omission or commission due to the aggregate analysis of most studies and methodology employed that inherently do not allow the complexity of ELLs to be taken into account.

Second, the studies reviewed universally recommended increases to per pupil base costs and categorical aid to students with special needs. Despite consensus on the need for additional funding to adequately educate ELLs, funding recommendations—if made—varied considerably across states and methodologies. Although this is not entirely surprising, given the variations in state contexts and student characteristics, it underscores both the general lack of concerted inquiry and overall complexity of determining how much ELLs cost to educate. Lack of access to complete or reliable data was cited as a main barrier for conducting a more thorough analysis of ELL educational costs (Maine State Board of Education, 1999) or, in the case of SSM studies, enough schools or districts that met the performance criteria (Augenblick, Palaich, & Associates, 2003a).

A more telling finding is that only 4 of 70 empirical cost studies specifically focused on ELLs (Arizona Department of Education, 2001; Gándara & Rumberger, 2008; META, 2008; National Conference of State Legislators, 2005). Two of these studies were conducted in Arizona, but both had several methodological limitations that inhibited their empirical usefulness. As mentioned previously in this analysis, the court-ordered costing out study conducted by the National Council for State Legislatures (2005) failed to assign a per pupil weight for ELLs, although it did recommend that additional funds be distributed based on grade level. This study was later criticized by the some state legislators for the limited number of survey respondents, the methodological approach, and the qualifications of the professional judgment panelists. The earlier study, conducted by the Arizona Department of Education (2001), was a modified and very limited SSM approach focusing on programs offered in one Arizona school district. Although this district had a high proportion of ELL students, the study did not look specifically at schools that had been successful at increasing ELL student success on state standardized tests.

Recent ELL costing out studies conducted in California (Gándara & Rumberger, 2007) and New York (META, 2008) serve as better examples of how costing out studies could be modified to focus on the needs of ELL students in particular. In the California study, a SSM was used to examine schools with high ELL scores on state tests. Consideration was given to select schools that reflected both geographic and curricular diversity. Although this study did not make any funding recommendations, the authors presented six different ways to think about and define educational adequacy for ELL students. Conceptually, this study could serve as a reference for future ELL costing out studies. What this study lacks in concrete funding recommendations, the New York study makes up for in comprehensiveness. Using three costing out approaches to triangulate recommendations (PJP, EB, and SSM), the authors attempted to provide a thorough picture of the direct and indirect factors contributing to ELL student success. Beginning with a definition of adequacy for ELL students in New York, the study looked at the empirical literature through an ELL lens and constructed panels that provided a diversity of ELL experience and backgrounds. Together, these studies can serve as key references in the development of a framework for future ELL cost studies.

There is little consensus on the best method for conducting a cost study. As illustrated in this article, the literature is largely silent on how ELL students should be treated. Each of the four primary costing out methodologies reviewed in this article have their strengthens and weaknesses. Authentically accounting for ELLs adds a new layer of challenge to the costing out process. To account for ELLs, cost studies would need first to define *adequacy* for this population and then to design the data collection around ELLs (panelists, empirical literature, successful schools and districts with high proportions of ELLs, or capturing enough detailed data on ELLs). Given the growing proportion of students classified as ELL, school finance studies could proactively account for their costs by making methodological modifications that would provide states with a more accurate picture of the costs associated with providing an adequate education to ELLs. The following recommendations provide some ideas toward a framework for conducting cost studies that more authentically account for ELL students:

Addressing Adequacy

Although the majority of costing out studies attempted to account for ELL students, they used broad measures of adequacy that may not be as applicable or relevant to ELLs. Defining what adequacy means, and from whom, is a particularly important first step when considering ELL students, given their concrete possibility of dual language acquisition and academic performance. Ideally, costing out studies—regardless of methodological approach—would clearly articulate the explicit and implicit outcomes expected of ELL students, such as performance on standardized tests or English/second-language fluency. One way for states to address what adequacy means for ELL students is to use the ELL performance standards outlined by Gándara and Rumberger (2008). However, each of the four standards listed earlier in this article would present its own level of financial and pedagogical implications.

Using Multiple Methods

Each of the four costing out methods focuses on a different aspect of school finance, which is why multiple costing out methods can be used together to derive the most accurate base and categorical aid costs. Studies using three or four methods have been conducted in Pennsylvania (Augenblick, Palaich, & Associates, 2007a), Washington (Educational Policy Improvement Center, 2007), and Rhode Island (R. C. Wood & Associates, 2007). Although the primary methodology varies across these studies, each recognizes the importance and value in using multiple techniques at determining educational costs. For example, the CFA approach relies on actual expenditure data and could provide the initial background information on district-level costs in a costing out study. These data could then be supplemented with an EB approach that focused on practices, programs, and policies that have been shown to improve ELL student success. At the same time, high-performing schools or districts with high proportions of ELL students could be profiled to ascertain how funds are allocated and to identify what programs, instructional materials, and staffing resources have contributed to their high success rates. The findings from these three methods could then be used to develop the prototypical districts for a PJP approach. Panelists would be selected based on demonstrated professional expertise working with ELL students and curricula. The panels should also strive to include locale experts from a diversity of districts (small, moderate, and large; rural, suburban, and urban).

Conclusion

The findings in this integrative review of the cost study literature reveal an area in the school finance literature that is currently understudied, the treatment of ELLs. Costing out studies are largely used by researchers, state legislators, and the courts to determine the base cost and marginal costs of providing an adequate education to the general public school population. Given that nonnative English speakers are the fastest growing school-age population, cost studies—and states—would benefit from refining resource estimates for this segment of students. The purpose of this review of the literature was twofold:

- to understand the cost study literature as it relates to the treatment of ELL students in the four major costing out methodologies and
- to present future avenues for ELL cost study research.

The research reviewed in this article provides insight into the ways in which ELL students are treated—or not treated—in costing out studies. Of the 70 empirical studies reviewed, only four focused specifically on ELLs. Although each of the costing out methodologies accounted for ELLs in some way, the level of consideration and detail varied substantially across methodologies. In addition, there are several important patterns evident in the cost study literature:

1. States are not allocating sufficient funds to adequately education the general K–12 population,

2. ELLs are inconsistently addressed across the cost study literature, and
3. current costing out methods need to be adapted to better account for the diverse and complex needs of the ELL student population.

The theoretical, research, and policy implications and recommendations derived from our analysis are discussed below.

Theoretical

Underlying the construction of costing out studies are explicit and implicit definitions of educational adequacy as well as assumptions about who ELLs are and what their needs might be. Current definitions of adequacy typically rely on standardized test performance and are limited to the general student population. Costing out studies need to better account for and define adequacy as it pertains ELLs in order to sufficiently capture the diverse needs of this special population of students. We have highlighted two studies that have initiated this discussion (Gándara & Rumberger, 2008; META, 2008) and recommend that future cost studies further explore and define measures of adequacy for ELLs. The most costly definition of adequacy—ensuring ELLs earn a passing score across academic subjects, resulting in a closing of the achievement gap—is also consistent with the underlying goals of NCLB; namely, states should strive to ensure that all students are meeting the specified performance outcomes. For ELL students, this means developing biliteracy so that they can fully benefit from classroom instruction and meet state performance measures. Further exploring definitions of adequacy for ELLs will help alleviate the "silence" in the cost study literature and hopefully lead to adequate levels of funding.

Research

Contextualizing the diversity of ELL students in cost study research protocols is another way to further include ELLs in each of these methodological approaches. For example, assembling panels that represent a diversity of ELL experts at both the state and national levels would strengthen PJP studies. The identification of high-performing, high-ELL, and highly diverse ELL schools and districts would allow SSM studies to evaluate the funding and resources needed to successfully serve ELLs. EB studies should rely on recent empirical evidence from interventions and programs that have been proven to positively influence ELL student outcomes, which may warrant a meta-analysis of the existing literature. Likewise, advances in state longitudinal data systems will allow CFA studies to incorporate a more accurate and comprehensive set of student-, school-, and district-level variables.

Although costing out studies can be modified to better capture the costs associated with providing an adequate education for ELLs, they cannot tell us whether the allocated funding is being used appropriately or efficiently. Researchers conducting cost studies can supplement their analyses with ELL-specific recommendations by making adjustments to the study methodology. Additional research is needed to assess whether and how districts are using the categorical aid allocated to ELLs. Discussion on how to account for and distribute funds to districts, especially when there are large increases in categorical aid allocations, is also warranted. It may be the case that districts with high proportions of special need students would benefit from scaling up aid over time to better control how the resources are used and to what end (Reschovsky & Imazeki, 2003).

Determining the cost of educating ELLs is particularly relevant given the current national climate of student accountability and the growing population of ELLs. Although the majority of ELL students are located in California, Texas, and New York, ELLs represent an increasing share of the K–12 population in the Midwest and South. By obtaining a fuller picture of the costs associated with educating ELLs, states and policymakers will have a more accurate picture of categorical aid costs and will be better positioned to develop funding systems that provide adequate preparation for all students, including ELLs. Although this brings an additional layer of complexity to an already politicized process, it is in the best interest of states and cost study researchers to proactively account for the varied backgrounds, academic histories, and educational needs of ELL students.

Producing an accurate picture of the funding needed to provide ELLs with an adequate education is inherently an issue of social justice (Levin, 2009). It is too easy to diminish or obscure the needs and diversity of ELL students in funding formulas and costing out processes, as this review of the literature has shown. As the number and diversity of the ELL student population continues to grow, it has become even more important that state educational agencies and legislative bodies ensure that ELLs, and the schools and teachers that serve them, are provided with equitable resources. Expanding costing out methodologies to incorporate a more contextualized understanding of ELLs, their range of experiences, and their needs will be one step toward achieving educational equity.

(text continues on p. 224)

Appendix

TABLE A1
Costing out studies employing a professional judgment panel approach

Study	Peer reviewed	Method(s)	ELL recommendations	ELL panelist(s)	ELL students addressed in panel
Massachusetts Business Alliance, 1991	No	PJP	Not specified	Not specified	Not specified
Oregon Quality Education Commission, 2000	No	PJP	No funding increase; 0.5 FTE ELL staff	Not specified	Not specified
Augenblick & Myers, 2001b	No	PJPSSM	1.0 per pupil weight; $6,612 per LEP	Not specified	Yes, but panels had difficulty assigning a weight
Management Analysis and Planning, 2001	No	PJP	No weight assigned	Not specified	Panel instructed to include ELL students in prototypical schools
Augenblick & Myers, 2002a	No	PJP	No weight assigned	Not specified	Not specified
Augenblick & Myers, 2002b	No	PJP SSM	0.14–1.03 depending on size of district; $1,200–$6,000 per ELL student, varies by district size	Not specified	Not specified
Norman 2002	No	PJP	Additional $2,300 per pupil	Yes	Yes
Augenblick & Myers, 2003	No	PJP SSM	1.25–0.70 depending on size of district; $4,837–$20,436 per ELL; varies by district size	Not specified	ELLs included in calculations
Augenblick, Paliach, & Associates, 2003a	No	PJP	2.04–0.91 depending on size of district; $4,651–$13,279 per pupil; varies by district size	Not specified	ELLs included in calculations

(continued)

TABLE A1 (continued)

Study	Peer reviewed	Method(s)	ELL recommendations	ELL panelist(s)	ELL students addressed in panel
Augenblick, Paliach, & Associates, 2003b	No	PJP SSM	0.79–0.47 depending on size of district; $2,904–$5,247 per pupil; varies by district size	Not specified	ELLs included in calculations
Lawrence O. Picus & Associates, 2003a	No	PJP EB	0.4 teachers for every 100 ELL students	Not specified	ELLs included in calculations
Lawrence O. Picus & Associates, 2003c	No	PJP	Base of 1.0 FTE adjusted by enrollment	Not specified	ELLs included in calculations
Verstegen, 2004	Yes	PJP	$672–$962 per ELL; varies by district size and grade level	Not specified	ELLs included in calculations
Augenblick, Palaich, & Associates, 2004	No	PJP	0.60–0.90 depending on district size	Not specified	Yes, 2 separate panels for students with special needs
Chambers et al., 2004	No	(Hybrid model) PJP SSM EB	Ratio of students to ELL teacher of 60:1 in elementary school; 75:1 in high school; $9,899–$10,795 per pupil; varies by percent ELL and school level	Not specified	Not specified
Lawrence O. Picus & Associates, 2004	No	PJP EB	1.4 additional teachers for every 100 low-income ELL student	Yes	ELL recommendations came from EB model
Augenblick, Paliach, & Associates, 2005	No	PJP SSM	0.76	Yes	ELLs included in calculations

(continued)

TABLE A1 (continued)

Study	Peer reviewed	Method(s)	ELL recommendations	ELL panelist(s)	ELL students addressed in panel
National Conference of State Legislatures, 2005	No	PJP Student-level data School district data Site visits	No weight assigned; $1,026–$2,571 per ELL, varies by grade level	Yes	Study focused solely on ELL students
R. C. Wood & Associates, 2005	No	PJP SSM EB	25% discount; additional $1,193–$2.385; varies by grade level	Not specified	ELL aggregated with free/reduced-price lunch
Lawrence O. Picus & Associates, 2005b	No	PJP EB	1 additional FTE teacher position for every 100 ELL	Yes	Not specified
Lawrence O. Picus & Associates, 2005a	No	PJP EB	0.4 teachers for every 100 ELL students who are also from poverty families: 1.0 per pupil weight; $41 per ELL	Yes	Not specified
Augenblick, Paliach, & Associates, 2006a	No	PJP SSM	0.50 per pupil weight; $113.7–$141.1 million	Not specified	1 special needs panel
Augenblick, Paliach, & Associates, 2006b	No	PJP SSM	0.39–1.18; $3,156–$7,144 per pupil, varies by district size	Not specified	ELLs included in calculations

(continued)

TABLE A1 (continued)

Study	Peer reviewed	Method(s)	ELL recommendations	ELL panelist(s)	ELL students addressed in panel
Augenblick, Paliach, & Associates, 2006c	No	PJP SSM EB	1.21–0.47 per pupil weight; $3,409–$13,691 per ELL pupil; varies by district size	Not specified	1 special needs panel; not clear if this included ELL students
Verstegen, 2006	Yes	PJP	No weight assigned; additional funds depending on district size	Not specified	Panelists asked to consider ELL students, not specified how they did this
Augenblick, Paliach, & Associates, 2007a	No	PJP SSM EB CFA	(–.023 × [LN of 2005–2006 enrollment] + 3.753) × number of ELL students; 1.48–2.43 depending on district size	Yes	Panelists asked to consider ELL students, not specified how they did this
Chambers, Levin, & DeLancey, 2007	No	PJP	Created a need index; ELL costs increase for very small and small districts	Yes	1 subpanel focused on ELL students
EPIC, 2007	No	PJP SSM EB CFA	Additional $43.09 per ELL student1.21–3.48 additional FTE depending on school type	Not specified	Not specified
Augenblick, Paliach, & Associates, 2007b	No	PJP SSM	ELL 0.82–0.50 depending on size (small to very large)	Yes	2 special needs panels; not clear if this included ELL students

(continued)

TABLE A1 (continued)

Study	Peer reviewed	Method(s)	ELL recommendations	ELL panelist(s)	ELL students addressed in panel
Sonstelie, 2007	No	PJP	Model coefficient ranging from 0.76 to 43 depending on school size	Not specified	ELLs included in calculations
R. C. Wood & Associates, 2007	No	PJP SSM EB Production function	1.302	Not specified	ELLs included in calculations
Chambers, Levin, DeLancey, & Manship, 2008	No	(Hybrid model) PJP SSM EB	Created an index to be added to the base cost = (English Learner Index)$^{0.094}$	Not specified	Each panel received an expert brief on ELL students
Multicultural Education Training and Advocacy, 2008	No	EB PJP SSM (modified)	2.0 per pupil weight; \$2.30–\$2.35 billion; \$7,580–\$11,527 per ELL, depending on panel	Yes	Study focused solely on ELL students
Augenblick, Paliach, & Associates, 2011	No	PJP SSM EB (limited)	\$4,269 per student	Yes	Yes, 2 separate panels for students with special needs

Note. ELL = English language learner; FTE = full-time equivalent; LEP = limited English proficient; PJP = professional judgment panel; SSM = successful school model; EB = evidenced-based approach; CFA = cost function analysis.

TABLE A2
Costing out studies employing a successful school model approach

Study	Peer reviewed	Methods	SSM selection criteria	Outcome measures (static or trend/AYP)	Accounting for ELLs	Recommended funding for ELLs using this method
Augenblick, Van de Waters, & Myers, 1993	No	SSM	School size, assessed valuation per pupil, percentage receiving free lunch, local revenues, district expenditures on instruction, administration, plant operation and maintenance, and ancillary support; outliers and districts that did not meet state accreditation standards were excluded	Not specified	Not specified	Not specified using this method
Augenblick & Myers, 1998	No	SSM	Inputs: teachers per 1,000 pupils, other professional staff per 1,000 pupils, administrators per 1,000 pupils, starting teacher salary, and average teacher salary; outputs: attendance, dropout rate, average percentage scoring advanced, proficient, and basic on state tests	Not specified	Not specified	Not specified using this method

(continued)

TABLE A2 (continued)

Study	Peer reviewed	Methods	SSM selection criteria	Outcome measures (static or trend/AYP)	Accounting for ELLs	Recommended funding for ELLs using this method
Maine State Board of Education, 1999	No	SSM	Average test scores above state average; percentage scoring at "basic" or above (75%)	Trend (3 year)	Not specified	Funding not specified using this method; based on a review of the literature: 1.15 per pupil expenditure weighting for each LEP student
Arizona Department of Education, 2001	No	SSM (modified)	Not specified Focused on ELLs	N/A	Not specified	Not specified using this method
Augenblick & Myers 2001a	No	SSM	Increase in state test scores; participation rate (80%); efficiency score	Trend (2 year)	Excluded expenditures	Funding not specified Weight for at-risk students 0.438–0.506, depending on percentage of population at risk

(continued)

TABLE A2 (continued)

Study	Peer reviewed	Methods	SSM selection criteria	Outcome measures (static or trend/AYP)	Accounting for ELLs	Recommended funding for ELLs using this method
Augenblick & Myers 2001b	No	PJP SSM	Met performance standard; performance index score (attendance, dropout rate, curriculum)	Static	Excluded expenditures	Funding not specified using this method; based on PJP: 1.0 per pupil expenditure weighting for each LEP student
Augenblick & Myers 2002b	No	PJP SSM	Met performance standards	Trend (2 year)	Excluded expenditures	Funding not specified using this method; based on PJP: 0.14–1.03, depending on size of district
Augenblick & Myers 2003	No	PJP SSM	(Using both the absolute and the 1-year change approaches); filtered for the proportion of students taking the state test, dropout rate, graduation rate, Title 1 schools needing improvement	First used static, then used trend (AYP)	Excluded expenditures	Not specified using this method
Augenblick, Palaich, & Associates 2003b	No	PJP SSM	Met 28 of the 33 state indicators (performance on state academic achievement tests, value-added tests, promotion/attendance/ dropout, passed gateway tests in algebra and biology)	Both	Excluded expenditures	Funding not specified using this method; based on a review of the literature: 0.60–0.90, depending on district size

(continued)

TABLE A2 (continued)

Study	Peer reviewed	Methods	SSM selection criteria	Outcome measures (static or trend/AYP)	Accounting for ELLs	Recommended funding for ELLs using this method
Chambers et al., 2004	Yes	(Hybrid model) PJP SSM EB	Maintained superior performance over 4 years; attendance rate; high school dropout rate; pass rate on English and math exams for subpopulations	Trend (4 year)	Not specified	Not specified using this method
Standard & Poor's School Evaluation Services, 2004	No	SSM	Met performance standards on 15 state indicators; high school retention rates; graduation rates	Trend	Reviewed the literature to generate weight	Funding not specified using this method; used 1.2 per pupil weight to determine base cost
Augenblick, Palaich, & Associates, 2005	No	PJP SSM	Met "proficient" level 3 consecutive years	Met AYP	Excluded expenditures	Not specified using this method
R. C. Wood & Associates, 2005	No	PJP SSM EB	Met various performance standards; graduation rate; student-to-teacher ratio; student-to-staff ratio; accreditation status	Both	25% discount	Not specified using this method

(continued)

TABLE A2 (continued)

Study	Peer reviewed	Methods	SSM selection criteria	Outcome measures (static or trend/AYP)	Accounting for ELLs	Recommended funding for ELLs using this method
Augenblick, Palaich, & Associates, 2006a	No	PJP SSM	On target to meet proficiency goal by 2013–2014; met accreditation standards	Met AYP	Not specified	Not specified using this method
Augenblick, Palaich, & Associates, 2006b	No	PJP SSM	Met AYP goals; outperformed over districts; increase in performance over time	Both	25%	Not specified using this method
Augenblick, Palaich, & Associates, 2006c	No	PJP SSM EB	Met AYP goals; met 2 of the 6 special population performance objectives	Trend (3 year)	Excluded expenditures	Not specified using this method
Augenblick, Palaich, & Associates, 2006d	No	SSM EB	Met AYP goals; met 2 of the 6 special population performance objectives	Trend	Excluded expenditures	Not specified using this method
Lawrence O. Picus & Associates, 2006a	No	SSM (modified)	Met 24 of the 36 state performance criteria	Both; trend (3 year)	Not specified	Not specified using this method
Augenblick, Palaich, & Associates, 2007a	No	PJP SSM EB CFA	In compliance with state test exam standards (81% proficient in reading, 78% proficient in math); average percentage increase in performance over time	Both	Used 0.75 ELL weight to account for districts with high ELL enrollment	Not specified using this method

(continued)

TABLE A2 (continued)

Study	Peer reviewed	Methods	SSM selection criteria	Outcome measures (static or trend/AYP)	Accounting for ELLs	Recommended funding for ELLs using this method
Augenblick, Palaich, & Associates, 2007b	No	PJP SSM	Met performance standards	Both; trend (2 year)	Excluded expenditures	Not specified using this method
EPIC, 2007	No	PJP SSM EB CFA	Attained 2004–2005 AYP goals as defined by NCLB; progress for subgroups included as well (including ELL)	Trend	Not specified	Not specified using this method
Gándara & Rumberger, 2007	No	SSM (modified)	Focuses on ELLs; high ELL scores on state tests; geographic diversity; curricular diversity	Trend	Not specified	Not specified using this method
Perez et al., 2007	No	SSM	Met performance standards on state standardized tests; progress on subgroups included as well (including ELL)	Trend (elementary/middle school, 4 year; high school, 3 year)	Not specified	Not specified using this method
R. C. Wood & Associates, 2007	No	PJP SSM EB Production function	Met performance standards	Not specified	25%	Not specified using this method

(continued)

TABLE A2 (continued)

Study	Peer reviewed	Methods	SSM selection criteria	Outcome measures (static or trend/AYP)	Accounting for ELLs	Recommended funding for ELLs using this method
Gándara & Rumberger, 2008	Yes	SSM	Five schools with high performing ELL students	Not specified	Not specified	Not specified using this method
Chambers, Levin, DeLancey, & Manship, 2008	No	(Hybrid model) PJP SSM EB	Met performance standards on state standardized tests; progress on subgroups included as well (including ELL)	Trend	Not specified	Not specified using this method
Multicultural Education Training and Advocacy, 2008	No	PJP SSM EB (Modified; relied on previous study)	Focused on ELLs; met performance standards	Static	Not specified	Increasing ELL funding rate from 1.5 to 2.0 of regular education students.
Augenblick, Palaich, & Associates, 2011	No	PJP SSM	Identified by state as "Accredited with Distinction"	Linked to state's accreditation system; AYP	Excluded expenditures; discount rate of 25%	Not specified using this method

Note. AYP = adequate yearly progress; ELL = English language learner; LEP = limited English proficient; NCLB = No Child Left Behind; PJP = professional judgment panel; SSM = successful school model; EB = evidenced-based approach; CFA = cost function analysis.

TABLE A3
Costing out studies employing a evidenced-based approach

Study	Peer reviewed	Methods	Selection of research	ELL recommendations
Management Analysis & Planning, 2000	No	EB	Not specified	Not specified
Lawrence O. Picus & Associates, 2003a	No	PJP EB	Not specified	1.4 FTE teacher position for ELL and poor students (1.0 for poor, so 0.4 for ELL)
Lawrence O. Picus & Associates, 2003b	No	EB	Not specified	One fully licensed teacher tutor for every 20% of students in poverty (ELL students are included in this category)
Lawrence O. Picus & Associates, 2004	No	PJP EB	1. Randomized design 2. Quasi-experimental methods that can help determine program effects 3. Best practices/impact studies at the local district/school level	0.4 additional teachers for every 100 ELL/ low-income students
Chambers et al., 2004	No	(Hybrid model) PJP SSM EB	Draws on work of Odden, Archibald, & Fermanich, 2003	ELLs would benefit from one-to-one tutoring
Grant Thornton, 2005	No	EB	Three summaries of effective interventions selected; no discussion of selection criteria	Reduction in student-to-teacher ratio; $595 per student
Lawrence O. Picus & Associates, 2005a	No	PJP EB	1. Randomized design 2. Quasi-experimental methods that can help determine program effects 3. Best practices/impact studies at the local district/school level	Additional help for struggling students (one-on-one tutoring, focus on reading, 20 minutes per day); $41/student

(continued)

TABLE A3 (continued)

Study	Peer reviewed	Methods	Selection of research	ELL recommendations
Lawrence O. Picus & Associates, 2005b	No	PJP EB	1. Randomized design 2. Quasi-experimental methods that can help determine program effects 3. Best practices/impact studies at the local district/school level	One additional FTE teacher position for every 100 ELL
R. C. Wood & Associates, 2005	No	PJP SSM EB	Authors' professional judgment	Not specified
Augenblick, Palaich, & Associates, 2006c	No	PJP SSM EB	Relied on 2 national experts to identify research	2.8 to 5.0 classroom teachers for ELLs, depending on school size and level
Augenblick, Palaich, & Associates, 2006d	No	SSM EB	Authors' previous work in 3 other states; calculated for a school of 500 students	LEP weight of 0.90
Lawrence O. Picus & Associates, 2006b	No	EB	1. Randomized design 2. Quasi-experimental methods that can help determine program effects 3. Best practices/impact studies at the local district/school level	1.00 to 1.35 FTE positions for every 100 ELL students; Washington had 1.35 FTE already
Lawrence O. Picus & Associates, 2006c	No	EB	Not specified	0.4 to 1.0 additional support position per 100 ELLs; $542 per ELL
Augenblick, Palaich, & Associates, 2007a	No	PJP SSM EB CFA	1. Identified educational strategies for direct evidence of success 2. Reviewed strategies that may have indirect impacts on success	Used 0.75 per pupil weight; 2.7% of total cost allocated to ELLs

(continued)

TABLE A3 (continued)

Study	Peer reviewed	Methods	Selection of research	ELL recommendations
EPIC, 2007	No	PJP SSM EB CFA	Review of empirical literature on interventions that 1. had direct evidence of success and 2. had indirect evidence on performance	Additional 1.21 FTE teacher position for ELL; $200 per pupil
Odden, Picus, Archibald, et al., 2007	No	EB	1. Randomized design 2. Quasi-experimental methods that can help determine program effects 3. Best practices/impact studies at the local district/school level	Additional 1.0 FTE teachers for every 100 ELL students; $700 per ELL
Odden, Picus, & Goetz, 2007	No	EB	Not specified	Additional 1.0 FTE teachers for every 100 ELL students; $653 per ELL
R. C. Wood & Associates, 2007	No	PJP SSM EB Production function	Not specified	Effective strategies for ELLs: 1. Bilingual Cooperative Integrated Reading and Composition program 2. Enhanced proactive reading 3. Fast ForWord Language computer program 4. Instructional conversations and literature logs 5. Read Well reading curriculum

(continued)

TABLE A3 (continued)

Study	Peer reviewed	Methods	Selection of research	ELL recommendations
Chambers, Levin, DeLancey, & Manship, 2008	No	(Hybrid model) PJP SSM EB	Relied on 5 national experts who each focused on a special topic; 1 expert focused on ELLs	For ELLs: 1. Curriculum that includes appropriate supports and strategies for ELLs 2. Assessments to monitor and identify instructional needs at their level 3. Professional development to tailor content and assessments to ELLs 4. Dedicated English language development instruction focusing on basic grammar/ communications for students in the early stages of second-language development 5. Use of native language and culture 6. Cultural strategies for home/parental involvement
Multicultural Education Training and Advocacy, 2008	No	PJP SSM (modified) EB	Draws on work of Odden, Archibald, & Fermanich, 2003	For ELLs: 1. Smaller class size 2. Extended learning time 3. Preschool 4. Tutoring 5. Student and family support 6. Use of instructional technology 7. Professional development 8. Professional support 9. Adequate materials
Odden, Goetz, & Picus, 2008	Yes	EB	Authors' professional judgment Strategies widely suggested by practitioners/researchers	Additional 1.0 teachers for every 100 ELL students: 0.46–0.64; 4 teachers in a prototypical district of 3,744 students; approximately $719 per ELL
Odden, Picus, & Goetz, 2010	Yes	EB	Not specified	Not specified

Note. ELL = English language learner; FTE = full-time equivalent; LEP = limited English proficient; PJP = professional judgment panel; SSM = successful school model; EB = evidenced-based approach; CFA = cost function analysis; NCLB = No Child Left Behind.

TABLE A4
Costing out studies employing a cost–function analysis approach

Study	Peer reviewed	Methods	ELL data collected	Recommendations for ELL using this method
Downes & Pogue, 1994	Yes	CFA	% ELL	ELL and poverty combined; additional $73–$2,632 per pupil
Reschovsky & Imazeki, 1997	No	CFA	Not specified	Not specified (poverty weight 1.59)
Duncombe & Yinger, 1998	Yes	CFA	% ELL teacher certification	Not specified
Reschovsky & Imazeki, 2001	Yes	CFA	% ELL	Not specified
Duncombe, 2002	No	CFA	% ELL (2-year average)	1.08–1.18 by region; $10,129–$11,008 per student
Duncombe, Lukemeyer, & Yinger, 2003	No	CFA	Not specified	Not specified
Imazeki & Reschovsky, 2003	Yes	CFA	% ELL	Costs are lower in districts with higher proportions of LEP/ low-income students
Reschovsky & Imazeki, 2003	Yes	CFA	% ELL	Not specified
Gronberg, Jansen, Taylor, & Booker, 2004	No	CFA	% ELL (non–high school)	$1,248 additional needed for ELL
Imazeki & Reschovsky, 2004	No	CFA	% ELL	Not specified
Duncombe & Yinger, 2005a	Yes	CFA	% ELL (2-year average)	1.01–1.42, depending on the model used (average, enrollment weighted, directly estimated)
Duncombe & Yinger, 2005b	No	CFA	% ELL	0.14 per pupil weight

(continued)

TABLE A4 (continued)

Study	Peer reviewed	Methods	ELL data collected	Recommendations for ELL using this method
Baker & Thomas, 2006	No	CFA	% ELL	Not specified
Kansas Legislative Division of Post Audit, 2006	No	CFA	% ELL	0.100 per ELL
Augenblick, Palaich, & Associates, 2007a	No	PJP SSM EB CFA	% ELL	1.48–2.43, depending on district size
Duncombe, 2007	No	CFA	Not specified	Not specified
EPIC, 2007	Yes	PJP SSM EB CFA	% ELL (1 year of data)	Not specified
Imazeki, 2007	No	CFA	% ELL Spanish (2-year average) % ELL other (2-year average)	0.08 per pupil weight (Spanish speakers) 0.24 per pupil weight (non–Spanish speakers)
Baker, 2009	Yes	CFA	% ELL (5 years of data)	Not specified

Note. ELL = English language learner; LEP = limited English proficient; PJP = professional judgment panel; SSM = successful school model; EB = evidenced-based approach; CFA = cost function analysis.

Notes

[1]The No Child Left Behind Act was the name given to the 2001 reauthorization of the Elementary and Secondary Education Act of 1965.

[2]Eligibility for free or reduced-price lunch is the federal measure for low-income status.

[3]The following search terms were used to identify the cost study literature: *cost study, costing out, cost accounting, cost effectiveness and English (second language), English language learners, adequate education,* and *adequacy studies*.

[4]Although this study failed to make an overall funding recommendation, both the state and national panels generated incremental costs. The state panel recommended an incremental increase of $1,785 per ELL student in Grades K–2 and $1,447 per ELL student in Grades 3–12. The national panel recommended that funding vary by student age and level of need, with incremental costs ranging from $1,026 to $2,571. The legislature criticized the panel's recommendations as being too high.

References

Arizona Department of Education. (2001). *English acquisition program cost study—Phases I through IV.* Phoenix: Author.

Arizona State Senate. (2008). *Flores v. Arizona* (Issue paper). Phoenix: Author.

Augenblick, J., Van de Waters, X., & Myers, J. (1993). *School finance in Mississippi: A proposal for an alternate system*. Prepared for the Task Force on Restructuring the Minimum Education Program, Mississippi Department of Education.

Augenblick & Myers. (1998). *Alternative approaches for determining a base figure and pupil-weighted adjustments for use in a school finance system in New Hampshire.* Prepared for the Adequate Education Costs and Municipal Grant Distribution Commission of New Hampshire. Denver, CO: Author.

Augenblick & Myers. (2001a). *A procedure for calculating a base cost figure and an adjustment for at-risk pupils that could be used in the Illinois school finance system.* Prepared for the Education Funding Advisory Board. Retrieved from http://www.isbe.net/EFAB/archive/PDFs/fullreport.pdf

Augenblick & Myers. (2001b). *Calculation of the cost of an adequate education in Maryland in 1999–2000 using two different analytic approaches*. Prepared for the Maryland Commission on Education Finance, Equity and Excellence (Thornton Commission). Retrieved from http://www.stateinnovation.org/Research/Education/Adequacy-Based-School-Funding/MarylandAdequacyStudysummary.aspx

Augenblick & Myers. (2002a). *Calculation of the cost of an adequate education in Indiana in 2001-2002 using the professional judgment approach.* Prepared for the Indiana State Teachers Association. Denver, CO: Author.

Augenblick & Myers. (2002b). *Calculation of the cost of a suitable education in Kansas in 2000–2001 using two different analytic approaches.* Prepared for the Legislative Coordinating Council. Retrieved from http://skyways.lib.ks.us/ksleg/KLRD/Publications/SchoolFinanceFinalReport.pdf

Augenblick & Myers. (2003). *Calculation of the cost of an adequate education in Colorado using the professional judgment and the successful school district approaches.* Prepared for the Colorado School Finance Project. Retrieved from http://www.schoolfunding.info/states/co/CO-03AdequacyStudy.pdf

Augenblick, J., Myers, J., & Anderson, A. (1997). Equity and adequacy in school funding. *Future of Children, 7*(3), 63–78.

Augenblick, Palaich, & Associates. (2003a). *Calculation of the cost of an adequate education in North Dakota in 2002–2003 using the professional judgment approach and an estimation of the total cost of implementing the results of the school finance adequacy study.* Prepared for the North Dakota Department of Public Instruction. Retrieved from http://www.schoolfunding.info/states/nd/NDCosting-OutStudy.pdf

Augenblick, Palaich, & Associates. (2003b). *Calculation of the cost of an adequate education in Tennessee in 2001-2002 using the professional judgment approach and the successful school district approach.* Prepared for the Coalition for Tennessee's Future. Retrieved from http://www.schoolfunding.info/states/tn/TN-Adequacy%20Study%20Final%20Rpt-2003.pdf

Augenblick, Palaich, & Associates. (2004). *An estimation of the total cost in 2002-03 of implementing the results of the school finance adequacy study undertaken by Augenblick, Palaich and Associates, Inc.* Prepared for the Coalition for Tennessee's Future. Retrieved from http://www.schoolfunding.info/states/tn/TN-Adequacy%20Study%20-%20Phase%20II%202004.pdf

Augenblick, Palaich, & Associates. (2005). *Estimating the cost of an adequate education in Connecticut*. Prepared for the Connecticut Coalition for Justice in Educational Funding. Retrieved from http://www.schoolfunding.info/states/ct/CT-adequacystudy.pdf

Augenblick, Palaich, & Associates. (2006a). *Estimating Colorado school district costs to meet state and federal education accountability requirements*. Prepared for the Colorado School Finance Project. Retrieved from http://www.cosfp.org/AdeqUpdate/AdequacyWork/AdeqWorkUpdate2006.pdf

Augenblick, Palaich, & Associates. (2006b). *Estimating the cost of an adequate education in South Dakota*. Prepared for the South Dakota Alliance for Education. Retrieved from http://www.schoolfunding.info/states/sd/SD-augenbl-2006.pdf

Augenblick, Palaich, & Associates. (2006c). *Estimating the cost of an adequate education in Nevada*. Report prepared for Nevada Legislative Commission's Committee to Study School Financing Adequacy. Retrieved from http://www.nevadahomeschoolnetwork.com/Estimating_the_Cost_of_an_Adequate_Education_in_Nevada.pdf

Augenblick, Palaich, & Associates. (2006d). *Estimating the cost of an adequate education in Minnesota.* Prepared for P.S. Minnesota. Retrieved from http://www.schoolsforequity.org/files/40606985.pdf

Augenblick, Palaich, & Associates. (2007a). *Costing out the resources needed to meet Pennsylvania's public education goals*. Prepared for the Pennsylvania State Board of Education. Retrieved from https://www.epiconline.org/files/pdf/PA_Costing_Out_Study_Final%20(APA).pdf

Augenblick, Palaich, & Associates. (2007b). *Estimating the cost of an adequate education in Montana*. Prepared for the Montana Quality Education Coalition. Retrieved from http://www.apaconsulting.net/uploads/reports/5.pdf

Augenblick, Palaich, & Associates. (2011). *Costing out the resources needed to meet Colorado educations standards and requirements*. Prepared for Children's Voices. Retrieved from http://www.ednewscolorado.org/wp-content/uploads/2011/08/APACostStudy80811.pdf

Baker, B. (2009). Within-district resource allocation and the marginal costs of providing equal educational opportunity: Evidence from Texas and Ohio. *Education Policy Analysis Archives, 17*(3).

Baker, B., & Duncombe, W. (2004). Balancing district needs and student needs: The role of economies of scale adjustment and pupil need weights in school finance formulas. *Journal of Education Finance, 29*, 195–222.

Baker, B., & Thomas, S. (2006). *Review of Hawai'i's weighted student formula*. Prepared for the Hawai'i Board of Education. Honolulu, HI: Department of Education.

Barton, P. (2003). *Parsing the achievement gap: Baselines for tracking progress.* Princeton, NJ: Educational Testing Service Policy Information Center.

Belfield, C. R., & Levin, H. M. (Eds.). (2007). *The price we pay: Economic and social consequences of inadequate education*. Washington, DC: Brookings Institution Press.

Berne, R., & Stiefel, L. (1994). Measuring equity at the school level: The finance perspective. *Educational Evaluation and Policy Analysis, 16*, 405–421.

Berne, R., & Stiefel, L. (1999). Concepts of school finance equity: 1970 to the present. In H. F. Ladd, R. Chalk, & J. S. Hansen (Eds.), *Equity and adequacy in education finance: Issues and perspectives* (pp. 7–33). Washington, DC: National Academy Press.

Castañeda v. Pickard, 648 F. 2d 989 (Tex. 1981)

Chambers, J., & Levin, J. (2006). Funding California's schools, Part II: Resource adequacy and efficiency. In B. Hass (Ed.), *Crucial issues in California education 2006: Rekindling reform* (pp. 27–50). Stanford, CA: Policy Analysis for California Education.

Chambers, J., Levin, J., & DeLancey, D. (2007). Efficiency and adequacy in California school finance: A professional judgment approach. In S. Loeb, A. Bryk, & E. Hanushek (Eds.). *Getting down to facts: A research project examining California's school governance and finance systems*. Stanford, CA: Stanford University, Institute for Research on Education Policy and Practice.

Chambers, J., Levin, J., DeLancey, D., & Manship, K. (2008). *An independent comprehensive study of the New Mexico public school funding formula: Volume II—technical report.* Prepared for New Mexico State Legislature Funding Formula Study Task Force. Palo Alto, CA: American Institutes for Research.

Chambers, J., Parrish, T., Levin, J., Guthrie, J., Smith, J., & Seder, R. (2004). *The New York adequacy study: Determining the cost of providing all children in New York an adequate education, Volume I—final report.* Prepared for the Campaign for Fiscal Equity CFE. Palo Alto, CA: American Institutes for Research AIR/Management Analysis and Planning (MAP).

Civil Rights Act of 1964 § 7, 42 U.S.C. § 2000e et seq (1964).

Common Core State Standards Initiative. (2010). *Application of common core standards for English language learners.* Retrieved from www.corestandards.org/assets/application-for-english-learners.pdf

Cooper, H. M. (1982). Scientific guidelines for conducting integrative research reviews. *Review of Educational Research, 52*, 291–302.

Downes, Y., & Pogue, T. (1994). Adjusting school aid formulas for the higher cost of educating disadvantaged students. *National Tax Journal, 47*, 89–110.

Duncombe, W. (2002). *Estimating the cost of an adequate education in New York* (Working paper). Retrieved from ERIC database. (ED465001)

Duncombe, W. (2006). Responding to the charge of alchemy: Strategies for evaluating the reliability and validity of costing-out research. *Journal of Education Finance, 32*, 137–169.

Duncombe, W. (2007). *Estimating the cost of meeting student performance standards in the St. Louis public schools.* Prepared for the Board of Education, City of St. Louis. Retrieved from http://cpr.maxwell.syr.edu/efap/Publications/Duncombe_technical_report4.pdf

Duncombe, W., Lukemeyer, A., & Yinger, J. (2003). Financing an adequate education: A case study of New York. In W. J. Fowler Jr. (Ed)., *Developments in school finance 2001–2002* (pp. 127–154). Washington, DC: U.S. Department of Education, National Center for Education Statistics.

Duncombe, W., & Yinger, J. (1998). School finance reform: Aid formulas and equity objectives. *National Tax Journal, 51*, 239–262.

Duncombe, W., & Yinger, J. (2005a). How much more does a disadvantaged student cost? *Economics of Education Review, 24*, 513–532.

Duncombe, W., & Yinger, J. (2005b). *Estimating the costs of meeting performance outcomes adopted by the Kansas State Board of Education.* Prepared for the Kansas Legislative Division of Post Audit. Retrieved from http://cpr.maxwell.syr.edu/efap/Publications/Kansas_Report.pdf

ECONorthwest & The Center for Educational Policy Research. (2005a). *Improving quality: Evidence on resource based policies and student achievement.* Portland, OR: Chalkboard Project.

ECONorthwest & The Center for Educational Policy Research. (2005b). *Strengthening accountability: Evidence on regulatory and market-based strategies to improve student achievement.* Portland, OR: Chalkboard Project.

Education Alliance. (2006). *Teaching diverse learners*. Retrieved from http://www.alliance.brown.edu/tdl/index.shtml

Educational Policy Improvement Center. (2007). *Washington adequacy funding study*. Eugene: Center for Educational Policy Research, University of Oregon.

Equal Educational Opportunities Act of 1974, PL93-380, 20 U.S.C. §1703.

Gándara, P., & Rumberger, R. (2007). *Resource needs for California English learners. Getting down to facts project summary.* Stanford, CA: Institute for Research on Education Policy & Practice, Stanford University.

Gándara, P., & Rumberger, R. (2008). Defining an adequate education for English learners. *Education Finance and Policy, 3*, 130–148.

Gándara, P., Rumberger, R., Maxwell-Jolly, J., & Callahan, R. (2003). English learners in California schools: Unequal resources, unequal outcomes. *Education Policy Analysis Archives, 11*(3).

Gomez v. Illinois State Board of Education, 811 F. 2d 1030 (Ill. 1987).

Grant Thornton. (2005). *Adequacy funding study.* Prepared for the State of Hawai'i, Department of Education. Honolulu, HI: Department of Education.

Gronberg, T., Jansen, D., Taylor, L., & Booker, K. (2004). *School outcomes and school costs: The cost function approach*. Prepared for the Joint Select Committee on Public School Finance. Retrieved from http://www.schoolfunding.info/states/tx/march4%20cost%20study.pdf

Hanushek, E. (2005, October). *The alchemy of "costing out" an adequate education.* Paper presented at Adequacy Lawsuits: Their Growing Impact on American Education, Kennedy School of Government, Harvard University, Cambridge, MA.

Hanushek, E. (2007). *Is the "evidence-based approach" a good guide to school finance policy?* Retrieved from http://www.washingtonlearns.wa.gov/materials/hanushek-evidence-basedfinal6.pdf

Horne v. Flores, 129 S. Ct. 2579 (Ariz. 2009).

Imazeki, J. (2007). Assessing the costs of K–12 education in California's public schools. In S. Loeb, A. Bryk, & E. Hanushek (Eds.), *Getting down to facts: A research project examining California's school governance and finance systems.* Stanford, CA: Institute for Research on Education Policy and Practice, Stanford University. Retrieved from http://irepp.stanford.edu/documents/GDF/STUDIES/18-Imazeki/18-Imazeki(3-07).pdf

Imazeki, J., & Reschovsky, A. (2003). Financing adequate education in rural settings. *Journal of Education Finance, 29*(2), 137–156.

Imazeki, J., & Reschovsky, A. (2004). *Estimating the costs of meeting the Texas educational accountability standards.* Prepared for plaintiffs in the *West Orange Cove v. Neeley* school funding litigation. Retrieved from http://www.schoolfunding.info/states/tx/costingout_tx.php3

Kansas Legislative Division of Post Audit. (2006). *Elementary and secondary education in Kansas: Estimating the costs of K–12 education using two approaches.* Prepared for Legislative Post Audit Committee, State of Kansas. Retrieved from http://skyways.lib.ks.us/ksleg/KLRD/Publications/Education_Cost_Study/Cost_Study_Report.pdf

King Rice, J. (1997). Cost analysis in education: *Paradox* and possibility. *Educational Evaluation and Policy Analysis, 19*, 309–317.

Ladd, H. (2008). *Reflections on equity, adequacy and weight student funding* (Working Paper Series SAN08-04). Durham, NC: Terry Sanford Institute of Public Policy at Duke University.

Lawrence O. Picus & Associates. (2003a). *An evidence-based approach to school finance* adequacy *in Arkansas*. Prepared for the Arkansas Joint Committee on Educational Adequacy. Retrieved from http://www.lopassociates.com/PDFs/AR%202003%20EB%20Report.pdf

Lawrence O. Picus & Associates. (2003b). *A state-of-the-art approach to school finance adequacy in Kentucky*. Prepared for the Kentucky Department of Education by. Retrieved from http://www.schoolfunding.info/states/ky/KySEEKStudy.PDF

Lawrence O. Picus & Associates. (2003c). *A professional judgment approach to school finance adequacy in Kentucky*. Prepared for the Kentucky Department of Education. Retrieved from http://www.education.ky.gov/search/results.html?terms=&affiliateId=&cx=002259339780532511197%3A8do6a4vdyd0&cof=FORID%3A11&ie=UTF-8&q=A+professional+judgment+approach+to+school+finance+adequacy+in+Kentucky

Lawrence O. Picus & Associates. (2004). *An evidence-based approach to school finance adequacy in Arizona*. Prepared for the Steering Committee of the Arizona School Finance Adequacy Study. Retrieved from http://www.lopassociates.com/PDFs/AFSFinalAOLong1.pdf

Lawrence O. Picus & Associates. (2005a). *Lead with five*. Scottsdale: Rodel Foundation of Arizona.

Lawrence O. Picus & Associates. (2005b). *An evidenced-based approach to recalibrating Wyoming's block grant school funding formula*. Prepared for the Wyoming Legislative Select Committee on Recalibration. Retrieved from http://legisweb.state.wy.us/2008/interim/schoolfinance/WYRecalibration.pdf

Lawrence O. Picus & Associates. (2006a). *Washington Learns: Successful school district study: Final report.* Prepared for Washington Learns. Retrieved from http://www.washingtonlearns.wa.gov/materials/SuccessfulDistReport9-11-06Final_000.pdf

Lawrence O. Picus & Associates. (2006b). *An evidence-based approach to school finance adequacy in Washington*. Prepared for Washington Learns. Retrieved from http://www.washingtonlearns.wa.gov/materials/EvidenceBasedReportFinal9-11-06_000.pdf

Lawrence O. Picus & Associates. (2006c). *Recalibrating the Arkansas school funding structure*. Prepared for the Adequacy Study Oversight Sub-Committee of the House and Senate Interim Committees on Education of the Arkansas General Assembly. Retrieved from http://www.educationjustice.org/assets/files/pdf/Policy/Cost%20Studies/Arkansas.pdf

Levin, H. (2009). The economic payoff to investing in educational justice. *Educational Researcher, 38*, 5–20.

Maine State Board of Education. (1999). *Essential programs and services: Equity and adequacy in funding to improve learning for all children*. Prepared for the Maine Legislature. Augusta: Author.

Management Analysis & Planning. (2000). *An exploration of educational and demographic conditions affecting New Hampshire's adequacy aid*. Prepared for the New Hampshire Adequate Education and Education Financing Commission. Retrieved from http://www.edconsultants.com/documents/nh-final-report.pdf

Management Analysis & Planning. (2001). *A professional judgment approach to determining adequate education funding in Maryland*. Prepared for the Commission on

Education Finance, Equity, and Excellence (Thornton Commission). Retrieved from http://www.schoolfunding.info/states/md/MD_MAPFinalReport.pdf

Management Analysis & Planning. (2000). *An exploration of educational and demographic conditions affecting New Hampshire's adequacy aid.* Prepared for the New Hampshire Adequate Education and Education Financing Commission. Retrieved from http://www.edconsultants.com/documents/nh-final-report.pdf

Massachusetts Business Alliance. (1991). *Every child a winner*. Retrieved from http://www.mbae.org/uploads/13102003114120EveryChildAWinner.pdf

Multicultural Education Training and Advocacy, Inc. (2008). *Getting it right: Ensuring a quality education for English language learners in New York.* Prepared by the New York Immigration Coalition. Retrieved from http://72.34.53.249/~thenyic/sites/default/files/NYIC_ELLBRIEF_FINAL.pdf

National Commission on Excellence in Education. (1983). *A nation at risk: The imperative for educational reform: a report to the Nation and the Secretary of Education, United States Department of Education*. Washington, DC: Author.

National Conference of State Legislatures. (2005). *Arizona English language learner cost study*. Prepared for the Arizona Legislative Council. Retrieved from http://www.schoolfunding.info/states/az/AZ-NCSLenglanglearn2005.pdf

No Child Left Behind Act of 2001, Title III part A U.S.C. § 3102 (2001).

Norman, J. (2002). *Funding our future: An adequacy model for Wisconsin school finance*. Prepared for the Institute for Wisconsin's Future. Retrieved from http://www.excellentschools.org/resources/CostOut.pdf

Odden, A., Archibald, S., & Fermanich, M. (2003). Rethinking the finance system for improved student achievement. *Yearbook of the National Society for the Study of Education, 102*(1), 82–113.

Odden, A., Goetz, M., & Picus, L. (2008). Using available evidence to estimate the cost of educational adequacy. *Education Finance and Policy, 3*, 374–397.

Odden, A., Picus, L., Archibald, S., Goetz, M., Mangan, M., & Aportela, A. (2007). *Moving from good to great in Wisconsin: Funding schools adequately and doubling student performance.* Prepared for Wisconsin State and Local Policymakers, Educators and Citizens. Madison: Consortium for Policy Research in Education, Wisconsin Center for Education Research, University of Wisconsin-Madison. Retrieved from http://cpre.wceruw.org/finance/WI%20March%201%202007%20Adequacy%20Report1.pdf

Odden, A., Picus, L., & Goetz, M. (2007). *Paying for school finance adequacy with the national average expenditure per pupil* (School Finance Redesign Project Working Paper No. 2). Center for Reinventing Public Education, Daniel J. Evans School of Public Policy, University of Washington, Seattle.

Odden, A., Picus, L., & Goetz, M. (2010). A 50-state strategy to achieve school finance adequacy. *Educational Policy, 24*, 628–654

Oregon Quality Education Commission. (2000). *Oregon quality education model—2000*. Prepared for the Oregon Governor John Kitzhaber and Schools Superintendent Stan Bunn. Salem: Author.

Perez, M., Anand, P., Speroni, C., Parrish, T., Esra, P., Socias, M., et al. (2007). *Successful California schools in the context of educational adequacy*. Washington, DC: American Institutes for Research.

R. C. Wood & Associates. (2005). *Determining the cost of providing an adequate education in the state of Montana*. Prepared for the Quality Schools Interim Committee and the Montana State Legislature. Retrieved from http://www.schoolfunding.info/states/mt/MT-Wood2005.pdf

R. C. Wood & Associates. (2007*). State of Rhode Island adequacy study: Initial report for review and comment by the committee.* Prepared for the Joint Committee to Establish a Permanent Education Foundation Aid Formula for Rhode Island. Gainesville, FL: Author.

Rebell, M. A. (2002). Education adequacy, democracy, and the courts. In T. Ready, C. Edley Jr., & C. E. Snow (Eds.), *Achieving high educational standards for all: Conference summary* (pp. 218–268). Washington, DC: National Academy Press.

Rebell, M. (2007). Professional rigor, public engagement, and judicial review: A proposal for enhancing the validity of educational advocacy studies. *Teachers College Record, 109*, 1303-1373.

Reschovsky, A., & Imazeki, J. (1997). The development of school finance formulas to guarantee the provision of adequate education to low-income students. In W. J. Fowler Jr. (Ed.), *Developments in school finance* (pp. 121–148). Washington, DC: U.S. Department of Education. National Center for Education Statistics.

Reschovsky, A., & Imazeki. J. (2001). Achieving educational adequacy through school finance reform. *Journal of Educational Finance, 26*(4), 373–396.

Reschovsky, A., & Imazeki, J. (2003). Let no child be left behind: Determining the cost of improving student performance. *Public Finance Review, 31*, 263–290.

Rodriguez v. San Antonio Independent School District, 411 U.S. 1 (1973).

Serna v. Portales Municipal Schools, 499 F. 2d 1147 (10th Cir. 1974).

Slavin, R., & Cheung, A. (2005). A synthesis of research on language of reading instruction for English language learners. *Review of Educational Research, 75*(2), 247–284.

Sonstelie, J. (2007). *Aligning school finance with academic standards: A weighted-student formula based on a survey of practitioners.* San Francisco: Public Policy Institute of California.

Standard & Poor's School Evaluation Services. (2004). *Resource adequacy study for the New York State Commission on Education Reform.* New York: Author.

Torraco, R. J. (2005). Writing integrative literature reviews: Guidelines and examples. *Human Resource Development Review, 4,* 356–367.

U.S. Department of Education. (2010). *Characteristics of public, private, and Bureau of Indian education elementary and secondary schools in the United States.* National Center for Education Statistics, Schools and Staffing Survey (SASS), "Public School, BIE School, and Private School Data Files," 2007–08, Table 2. Washington, DC: Author.

U.S. Department of Education. (2011). *The condition of education 2011* (NCES 2011-033), National Center for Education Statistics, Indicator 6. Washington, DC: Author.

Verstegen, D. (2004). Calculation of the cost of an adequate education in Kentucky: A professional judgment approach. *Education Policy Analysis Archives, 12*(8). Retrieved from http://epaa.asu.edu/epaa/v12n8/

Verstegen, D. (2006). A framework for determining the cost of an adequate education: A tale of two states. *Journal of Education Finance, 32*(2), 202–236.

Zehr, M. (2010, September 28). Groups say ELLs got short shrift in race to the top. *EdWeek*. Retrieved from http://www2.ed.gov/programs/racetothetop-assessment/eligibility.html

Authors

OSCAR JIMENEZ-CASTELLANOS is an assistant professor at Arizona State University, Mary Lou Fulton Teachers College, PO Box 37100, Phoenix, AZ 85069-7100; e-mail: *jimenezcastellanos@asu.edu*. He has published extensively in the area

of education policy as it relates to education finance and parent engagement, and its impact on opportunity and outcomes for low-income, ethnically and linguistically diverse populations.

AMELIA M. TOPPER is a doctoral student at Arizona State UniversityMary Lou Fulton Teachers College, PO Box 37100, Phoenix, AZ 85069-7100; e-mail: *amy .topper@asu.edu.* Her research interests include policy issues of K-20 student access and success, the intersection of pedagogy and student outcomes.