



Measuring the Alignment between States' Finance and Accountability Policies: The Opportunity Gap

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Citation: Della Sala, M. R., & Knoeppel, R. C. (2015). Measuring the alignment between states' finance and accountability policies: The opportunity gap. *Education Policy Analysis Archives*, 23(61). <http://dx.doi.org/10.14507/epaa.v23.1782>

Abstract: The research described in this paper expands on attempts to conceptualize, measure, and evaluate the degree to which states have aligned their finance systems with their respective accountability policies. State education finance and accountability policies serve as levers to provide equal educational opportunities for all students – scholars have called for the alignment of education finance and accountability policies as a means for states to meet the demands of educational adequacy. A metric titled the “opportunity gap” was developed, calculated, and tested to represent the degree of misalignment between the equity of states’ finance systems and the intended equity of student performance outcomes defined in accountability policies. School finance and student performance data from nine states were collected for this analysis. Findings indicated that none of the states were delivering simultaneous equity in finance and accountability systems – none of the states provided both equity of finance inputs and equity of student performance outputs. Implications for future research on measuring the alignment

between finance and accountability policies are provided by the authors.

Keywords: educational finance; educational equity; accountability policy

La Medición de la Alineación entre las Políticas de Financiamiento y Rendición de Cuentas de los Estados: La Brecha de Oportunidades

Resumen: La investigación descrita en este trabajo intenta conceptualizar, medir y evaluar el grado en que los estados han adaptado sus sistemas financieros a sus respectivas políticas de rendición de cuentas. Políticas de financiación de la educación estatal y de rendición de cuentas sirven como palancas para proporcionar igualdad de oportunidades educativas para todos los estudiantes - los investigadores han llamado a la alineación de las políticas de financiación de la educación y la rendición de cuentas como un medio para que los estados cumplan con las exigencias de adecuación educativa. Desarrollamos la métrica "brecha de oportunidades" y calculamos y probamos representar el grado de desajustes entre la equidad de los sistemas de financiación de los estados y el capital previsto de los resultados del desempeño de los estudiantes definidos en las políticas de rendición de cuentas. Datos de financiamiento de escuelas y el desempeño estudiantil de nueve estados se recogieron para este análisis. Los resultados indican que ninguno de los estados obtuvieron resultados simultáneos en los sistemas de financiación y rendición de cuentas - ninguno de los estados generaron tanto equidad de recursos financieros y equidad de los resultados de rendimiento de los estudiantes. Implicaciones para la investigación futura sobre la medición de la alineación entre las políticas de financiamiento y rendición de cuentas son proporcionados por los autores.

Palabras clave: Financiación de la educación; equidad educativa; política de rendición de cuentas

A Medição do Alinhamento entre as Políticas de Financiamento e Prestação de Contas dos Estados: A Lacuna de Oportunidade

Resumo: A pesquisa descrita neste artigo tenta conceitualizar, medir e avaliar a medida em que os estados adaptaram seus sistemas financeiros à sua respectiva política de prestação de contas.. Financiamento e prestação de contas das políticas de educação estaduais servem como alavancas para fornecer oportunidades educacionais iguais para todos os alunos - pesquisadores têm chamado o alinhamento das políticas de financiamento e de prestação de contas como um meio para que os Estados cumpram os requisitos de adequação educacional. Uma métrica denominada "lacuna de oportunidade" foi desenvolvida, calculada e testada para representar o grau de incompatibilidade entre a equidade dos sistemas de finanças dos estados e a equidade desejada nos resultados de desempenho estudiantil definidos nas políticas de prestação de contas.. Dados de financiamento escolar e de desempenho dos alunos em nove estados foram coletadas para análise. Os resultados indicaram que em nenhum dos estados havia obtido equidade simultânea entre sistemas de financiamento e prestação de contas - nenhum dos estados havia gerado equidade no financiamento e nos resultados dos estudantes. Implicações para futuras pesquisas sobre a medição do alinhamento entre as políticas de financiamento e prestação de contas são fornecidos pelos autores.

Palavras-chave: Financiamento da educação; equidade educacional; responsabilidade política

Introduction

Historically, state legislatures have enacted education finance and accountability systems as levers to provide equal educational opportunities for all students. Specifically, state finance systems were designed to achieve equity of resource inputs while accountability policies were enacted to ensure equity of student performance outputs (King, Swanson, & Sweetland, 2005). Despite the seemingly interrelated goals of these policies, limited uniformity exists in how both systems were aligned to produce their desired outcomes. This may be due, in part, to the fact that the majority of

finance and accountability systems were designed and implemented at different points in time. Indeed, judicial interpretations regarding the adequacy of state education systems have been made in light of the intersection between finance and accountability policies (*Hoke County Board of Education v. State*, 2004; *Lobato v. State*, 2009); thus, the degree of coherence between both policies has become even more meaningful as states strive to provide equal opportunities for all students.

To meet courts' mandates for the provision of an adequate educational system, scholars have recently called for the alignment of education finance and accountability policies (Adams, 2008; Ryan, 2008; Superfine, 2009; Verstegen, 2002, 2011). School finance class action suits have resulted in demands for states to provide equal opportunities by reformulating their finance systems to distribute sufficient educational resources to students with differential learning needs. Similarly, accountability policies, including the development and implementation of academic standards and statewide testing systems, serve as mechanisms for states to assess the degree to which students have been provided the opportunity to obtain the knowledge and skills necessary to participate in economic and political life. However, despite tremendous reform efforts to ensure opportunity through state and federal accountability policies, little has changed in the ways states finance public education (Verstegen & Knoepfel, 2012). Many state finance systems remain premised on antiquated notions of horizontal equity, which seek to distribute comparable funding amounts to school districts. Given the demands for the alignment between finance and accountability policies, further research is needed about the degree of misalignment between states' finance systems and the intended student performance outcomes to inform policymakers and the judiciary about states' progress in providing opportunity.

The research described in this paper expands on previous attempts to conceptualize, measure, and evaluate the degree to which states have aligned their finance systems with their specific accountability policies (Knoepfel & Della Sala, 2013; Knoepfel, First, Della Sala, & Ordu, 2014). Previous research has centered on the calculation and testing of an equity ratio to discern states' progress toward providing an educational system that yields equitable student performance outcomes given equitable resource inputs. Yet, findings from these studies have been mixed, yielding inconclusive results. Given the policy and litigation implications of coherence between states' finance and accountability systems to provide and ensure equal educational opportunities, the present study builds on previous attempts to conceptualize opportunity through the lenses of finance and accountability policies. We see our analysis as the first step in discerning the degree to which states provided opportunity from a state-level policy perspective. First, we reviewed the literature describing the roles of states' education finance systems and accountability policies in providing and ensuring equal educational opportunities. We then developed a metric titled the "opportunity gap" to allow for a comprehensive interpretation of the alignment between both policies and test the sufficiency of the metric to derive implications for policymaking and litigation purposes.

The Role of State Education Finance Systems in Providing Opportunity

State education finance systems were developed as an attempt to provide opportunity through equity, or fairness, in the distribution of funding to school districts. In order to meet state constitutional clauses that mandated *thorough and efficient* or *general and uniform* public education systems, states established finance formulae that distributed funds to all school districts; these distribution systems were devised to meet demands for horizontal equity, which refers to the equal treatment of students living under similar circumstances (Berne & Stiefel, 1984). However, with research detailing the educational resources required to help students reach proficiency targets, the emphasis on equity has shifted to an emphasis on states' deployment of adequate resources to

support students' differential learning needs. In most instances, advocates have based their arguments for equality of educational opportunity on notions of equity and adequacy of inputs, with adequacy-based claims having been the primary focus of litigation since the late 1980s (Roellke, Green, & Zielewski, 2004).

In school finance policy and litigation, the concept of equality of educational opportunity has shifted to be characterized as vertical equity (King et al., 2005). Vertical equity entails "the differential treatment of individuals or groups of students with identifiably and measurably different educational needs" (Baker, Green, & Richards, 2008, p. 98). Although vertical equity and adequacy are often defined similarly, Ladd (2008) argued that the notion of adequacy connotes more than the differential treatment of students with special circumstances, but also the sufficiency of resources to help those students meet specific learning goals. Indeed, King, Swanson, and Sweetland's (2005) definition mirrors that of Ladd's (2008) interpretation of adequacy, requiring that "sufficient resources are available in all districts/schools to enable school personnel to create the learning conditions within which each student can reach a proficient or higher level of performance on assessments that are aligned with state standards" (p. 3).

Baker's (2005) multidimensional conception of adequacy demonstrates a holistic description of Ladd's (2008) and King's et al. (2005) definitions of the term. Deriving from principles of economic theory, Baker's (2005) conception of educational adequacy consists of two components: absolute standards of adequacy and relative standards of adequacy. Whereas absolute standards of adequacy are concerned with the overall level of funding for education, relative standards of adequacy focus on "the differences in costs of achieving outcomes for children with different educational needs or children learning in different educational contexts" (Baker, 2005, p. 259). In particular, Baker was concerned with measuring additional costs associated with providing an adequate education to students situated in varying social and economic contexts – school districts serving students with higher intensities of services to meet their learning needs will require more funds to achieve learning goals established in accountability policies.

Despite the differences in equity and adequacy interpretations of equality of opportunity within the school finance literature, Houck and Eom (2013) concluded that "the right to equal education cannot be guaranteed without providing adequate educational resources at a minimum level" (p. 46). The courts have echoed these sentiments, recognizing the need for all students, regardless of their learning needs, economic backgrounds, or geographic locations, to have access to sufficient resources that provide them with the same opportunities to achieve academic proficiency. With the evolution of accountability policies that focus on improving students' academic achievement, state finance systems must be repurposed to allocate funds to school districts that align with state-defined learning goals. Additionally, because the notion of equality of opportunity in the school finance literature is defined as the achievement of equity and adequacy of funding inputs toward specific student performance goals, the alignment between the equity of resource inputs and student performance outcomes serves as a framework to assess whether opportunity was provided for all students within a state. Indeed, research by Verstegen (2011) and Verstegen and Knoeppel (2012) found that despite sweeping changes in the mission of public schools, as articulated in consequential accountability policy, little has changed in the way that states finance public education.

Consequential Accountability, Standards, and the Provision of Opportunity

Whereas states' education finance systems were designed to provide equal opportunities through finance inputs, statewide accountability policies were implemented to ensure that all students were provided opportunities through the examination of student performance outcomes. All states have implemented some form of consequential accountability since the 1990's. Kress,

Zechmann, and Schmitten (2011) defined consequential accountability as a model of education reform that includes explicit standards for students, testing students based on their knowledge of standards, and consequences assigned to schools for failure to meet those standards. Implied in the adoption of state standards is the provision of opportunity. Standards represent the mechanism by which students are guaranteed access to similar content and skills. The achievement of proficiency, then, serves as an indication of mastery of skills that would enable all students to make a successful transition to higher education or the workforce, allowing them to be citizens and competitors in the global economy.

Scholars have noted that the current context of educational accountability reform can be traced to two social and historical forces: the civil rights movement and concern for national security and the vital role of education in ensuring it (Kress, Zechmann, & Schmitten, 2011). These historical events, shifts in thinking about the role of education in society, and ensuing legislation focused national attention on the need to provide equity in the education of all students, particularly students of color. Later, the publication of *A Nation at Risk* brought national attention to the need for states to improve both rigor and achievement in public schools as a matter of global economic competitiveness. Initially, educational reforms focused on the provision of additional resources, such as highly-qualified teachers and additional expenditures for education. That changed in the early 1990's when states began to introduce standards-based reforms. Standards were seen as the means by which all students would be granted access to similar content; mastery of such content was seen as a way for students to have similar opportunities to achieve economic and political well-being.

By affixing consequences to standards-based reform efforts, it was thought that schools would be motivated to improve performance. However, comparing student performance across states can be problematic given differences in student demographic characteristics, the provision of preschool services, and differences in resources such as teacher quality. Furthermore, there is no uniform measure of success since each state makes use of different assessments (Kress, Zechmann & Schmitten, 2011). One consistent measure that can be used to compare student performance across states is the National Assessment of Education Progress (NAEP); however not all students take this exam. Additionally, research has shown that states with a consequential accountability system have seen positive increases in measures of student performance to include NAEP scores (Carnoy & Loeb, 2002; Hanushek & Raymond, 2005). Of particular note was the finding that states with strong accountability systems attached to the most stringent sanctions demonstrated the most growth. Similarly, a study by Grissmer, Flanagan, Kawata, and Williamson (2000) found that states that pioneered consequential accountability systems have shown the greatest amount of growth in measures of student performance.

Despite the documented growth in performance for children in subgroups that has been associated with consequential accountability policy, a pitfall of the policy is the downward pressure that it may place on performance and content standards (Kress, Zechmann, & Schmitten, 2011). Under consequential accountability policy, states are given the authority to define content standards and proficiency targets. It is entirely possible for states to lower the definition of proficiency in order to increase the number of students classified as proficient, thereby, reducing the number of failing schools. To date, the National Center of Education Statistics (NCES) has published three studies that align state proficiency standards with NAEP as a means to measure the rigor of each state's standards (Bandeira de Mello, 2011; Bandeira de Mello, Blankenship, & McLaughlin, 2009; McLaughlin et al., 2008). These researchers found that states' differing definitions of proficiency impacted the degree to which opportunity was provided for all students. Given the role of accountability systems in ensuring that all students learned the necessary content standards, an integral aspect of the degree to which states

provided equal educational opportunities is the level of proficiency and equity of student performance outcomes.

Measuring States' Progress toward Equality of Opportunity

Research on opportunity in the school finance literature, as it relates to how states distribute educational resources to meet the needs of students living under differential circumstances, can be traced to James Coleman's (1966) report, *Equality of Educational Opportunity*. Since then, Berne and Steifel (1984), among many other scholars, have developed statistics to calculate the horizontal and vertical equity of inputs using measures of dispersion to discern opportunity. These measures included the range, restricted range, federal range ratio, Coefficient of Variance, Gini Coefficient, McLoone Index, and Verstegen Index. The coefficient of variance and McLoone Index are of particular interest because they are often used by researchers to assess the equity of state finance systems. The coefficient of variance measures the amount of variation around the mean and accounts for all cases within a distribution, rather than a specified range. Furthermore, Odden and Picus (2004) noted that an acceptable standard of equity for the coefficient of variance of finance systems is less than or equal to 0.10. Similarly, the McLoone Index measures the amount of variation at the bottom half of a distribution. An index of .95 or greater indicates that the bottom half of a distribution is equitable (Verstegen, 2013).

Opportunity has also been assessed in terms of student performance outputs. These approaches have typically been undertaken through the examination of state achievement gaps and trends in data (Cronin, Dahlin, Adkins, & Kingsbury, 2007). However, a limitation of such approaches is that they ignore measures of dispersion and distribution. Because no standard existed to discern the equity of student performance measures, Knoeppel and Rinehart (2011) applied traditional finance equity statistics, like the coefficient of variance, McLoone Index, and Verstegen Index, to district-level measures of student performance in Kentucky. They indicated that the use of equity statistics were appropriate for researchers to determine states' progress in meeting equality of educational opportunity goals; however, an acceptable standard of equity needed to be established for student performance outcomes.

Knoeppel and Della Sala (2013) reasoned that the linkage between the equity of funding inputs and student performance outcomes was a key aspect of adequacy-based school finance litigation and policy and merited an examination of the appropriateness of standards of equity. Their investigation of the equity of finance systems and student performance outcomes relied on the 0.10 standard for the coefficient of variance as suggested in the literature. They reasoned that the standard of 0.10 was too large for finance systems and student performance, allowing for substantial variation around the mean. Rather, the authors advocated for a coefficient of variance approaching .05 for the finance system and a coefficient of variance approaching 0.03 for student performance as standards of equity for both inputs and outcomes. In addition, measures of distribution were deemed as necessary factors to be considered in order to discern the equity of finance systems and student performance outcomes.

In justifying their changes to the traditional standards of equity, Knoeppel and Della Sala (2013) examined the practical implications of the use of a coefficient of variance of 0.10 to measure the equity of finance systems and student performance outcomes. For the equity of finance systems, they reasoned:

...given the standard of .10, a state finance system is equitable when about 68% of its districts are within 10% of the mean and about 95% of its districts are within 20% of the mean...[which] results in a wide range of revenues available to districts across a state. (p. 48)

Although variability in district per-pupil revenue was anticipated due to considerations of vertical equity and adequacy to provide sufficient resources for students with differential needs, the degree of disparity with a 0.10 standard was deemed substantially large. Rather, the authors noted that a standard coefficient of variance of 0.05 would result in 68% of district revenues within 5% of the mean and 95% of revenues within 10% of the mean. Similarly, Knoeppel and Della Sala (2013) reasoned that a .03 standard for student performance outcomes would result in 68% of districts' scores within 3% of the mean and 95% of the districts within 6% of the mean. Furthermore, this standard would permit sufficient variability that allows for students to score above proficiency while ensuring that the mean of the distribution is near states' proficiency targets.

Knoeppel and Della Sala (2013) also made use of other measures of dispersion and distribution to examine states' progress toward achieving equity-related student achievement policy goals. In doing so, they described an ideal distribution of student performance (see Figure 1) that mirrors policy goals and judicial interpretations, where "most districts...cluster around proficiency and other districts that scored higher...tail off from the distribution" (p. 49). In addition to the 0.03 standard for the coefficient of variance, the McLoone Index was suggested to be at 0.98 and the distribution should be positively skewed and leptokurtic.

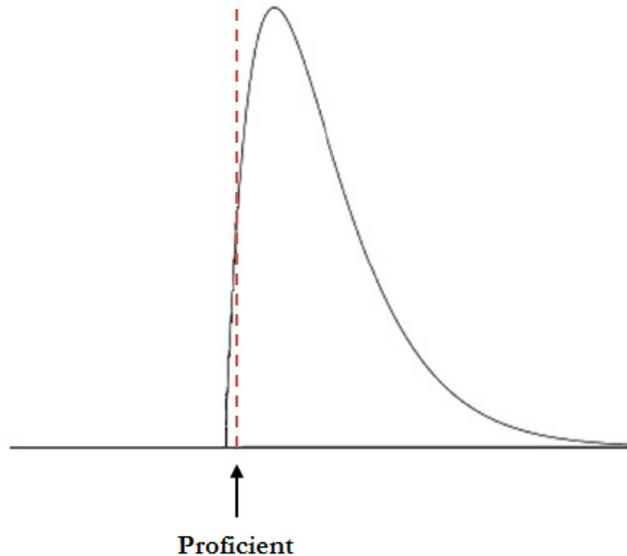


Figure 1. Ideal student performance distribution from Knoeppel and Della Sala (2013).

Next, Knoeppel and Della Sala (2013) introduced an equity ratio to represent a measure of policy alignment that was suitable for all states. In particular, the ratio combined the equity of finance inputs and student performance outcomes to discern the degree to which finance inputs have been aligned with accountability policy outcomes. They argued that the standard for the equity ratio, which is calculated by dividing the coefficient of variance for student performance by the coefficient of variance for the finance system, could range between 0.00 and 0.60. This range was determined because the coefficient of variance for student performance, or the numerator, could have a value of zero if every student scored the same on the assessment. If this were to occur, then the equity ratio would be calculated to be zero. Because a coefficient of variance for student performance ranging from zero to 0.03 would be considered satisfactory, as long as the mean is at proficiency, an acceptable equity ratio could range from 0.00 to 0.60. However, the authors found that this range could be achieved with inequitable finance and inequitable student performance coefficient of variances; therefore, the equity ratio was deemed to be only suitable for interpretation

if both finance and student performance coefficients were approaching the 0.05 and 0.03 equity standards.

Building on this work, Knoepfel, First, Della Sala, and Ordu (2014) investigated the particularities of the equity ratio in light of varying notions of equality of educational opportunity and judicial interpretations of states' constitutional language and adequacy-based finance litigation. They concluded that factors such as states' differing finance and accountability policy goals, interpretations of court decisions and equality of educational opportunity, definitions of proficiency, and finance and accountability policy coherence complicated explanations of the equity ratio. These factors complicated the interpretation of a standard range for the equity ratio for all states and should be considered in future research; however, the ratio still served as a tool to assess the provision of opportunity from a broader state-by-state basis.

Beyond the use of traditional finance statistics to measure equality of opportunity, other scholars have introduced economic indicators, such as income mobility, as variables that merit consideration. Chetty, Hendren, Kline, and Saez (2013) studied intergenerational income mobility for children born in the United States in the 1980's and who were citizens as of 2013. The authors calculated two types of income mobility: a) expected economic outcomes between children from high income and low income families, and b) measures of expected economic outcomes of children for children from families with incomes less than 30,000 dollars. The study reported significant correlations between intergenerational mobility and income inequality, economic and racial residential segregation, measures of school quality, social capital indices, and family structure. Interestingly, these economic indicators have been found to be correlated with lower achievement in schools, representing the challenges that states must address as part of their efforts to align resources with achievement to provide an adequate system of public education. These indicators, coupled with the policy factors described above, necessitated the creation of a measure that allows for a comprehensive interpretation of the alignment between finance and accountability policies while accounting for the particularities of each state's policy context.

Method

Goal of the Study

The goal of the present study was to expand on previous attempts to conceptualize, measure, and evaluate the alignment between states' education finance and accountability policies. In addition, we sought to contextualize the degree to which both policies were aligned in each state in light of courts' conceptualizations of equality of educational opportunity as well as their social and economic circumstances. As noted in the literature, researchers have called for the alignment of education finance and accountability policies to meet courts' mandates for the provision of an adequate educational system (Adams, 2008; Ryan, 2008; Superfine, 2009; Verstegen, 2002, 2011). Education finance systems were devised to provide equality of educational opportunity in terms of equitable and adequate finance inputs. Similarly, state accountability policies were crafted to provide opportunity in terms of equitable student performance outcomes. Given the similarities of the equity goals of both policies and judicial interpretations constructed to determine the adequacy of states' education finance systems, we postulated that an alignment of both policies would meet the demands of opportunity through equality of inputs and outputs (Isbister, 2001) and would be evidenced by the simultaneous achievement of equity for both goals. Indeed, our conceptualization of policy alignment was from a broad perspective and therefore could not alone be used to determine whether the two policies were designed in support of one another. Therefore, our

framework did not lend itself to an analysis of the mediating factors that influence the equity of student performance outcomes. Additionally, the results of our analysis should not be used for comparative purposes due to states' varying circumstances that may influence the degree to which alignment can be met. Rather, we suggest that as a result of a broader analysis of the equity of both policies, researchers, policymakers, and the courts could further investigate individual states' specific provisions of resources to identify particularities of states' policies to develop resource allocation strategies in support of their specific accountability goals.

Data

To test the alignment of states' finance and accountability policies, data were collected from nine states within the United States – Colorado, Kentucky, Massachusetts, Minnesota, New York, Ohio, South Carolina, Texas, and Washington. All nine states experienced adequacy-based school finance cases that questioned the degree to which each respective state provided equal educational opportunities through finance inputs and student performance outcomes. State's education clauses of their constitutions also required some form of an equitable system of public education, whether they mandated equity of inputs, equity of outputs, or both. In addition, the selection of these cases enabled researchers to conduct a cases-by-case analysis comprising of diversity in each state's social, economic, and geographic contexts. All states in the analysis used a foundation program or a combination/tiered system that included a base foundation level to fund public education (Verstegen & Knoepfel, 2012). Each state's type of funding formula, language from the education clause, education finance variables, and student performance measures can be seen in Table 1.

To measure the equity of inputs and outputs, school finance and student performance data were collected from each state's Department of Education website. Finance data included each school district's combined local and state per-pupil revenue from each state's foundation program from the last year reported; federal funding was not included in the analysis. Additionally, school district performance data included student achievement measures that each state used for accountability policy purposes. School districts' mean scale scores in reading and math on the states' standardized tests were used by the majority of states. Some states reported performance indices, which are comprised of multiple measures of students' scores on different content areas from their standardized tests. Additional data were collected to illustrate each state's social and economic circumstances and the degree to which the equity of each state's finance distribution system and student performance is associated with those circumstances. Data collected from the U. S. Census Bureau (2014) were used to detail states' social and economic circumstances. These measures included each state's median income, percentage of individuals who are unemployed, percentage of individuals below the poverty line, percentage of individuals with a bachelor's degree or higher, and the major industry in the state other than educational and health services.

Table 1
Information for States used in the Analysis

State	Funding Formula Type	Keywords of Education Clause	Finance Data (Year)	Student Performance Data (Year)
Colorado	Foundation Program	“The general assembly shall...provide for the establishment and maintenance of a thorough and uniform system of free public schools”	Local + State Per-pupil revenue (2011)	Mean Scale Scores in Reading and Math (2011)
Kentucky	Base Foundation Program with Optional Two Tiers	“The General Assembly shall...provide for an efficient system of common schools throughout the State.”	Local + State Per-pupil revenue (2008)	Mean Scale Scores in Reading and Math (2008)
Massachusetts	Foundation Program	“Wisdom, and knowledge, as well as virtue, diffused generally among the body of the people, being necessary for the preservation of their rights and liberties...”	Local + State Per-pupil revenue (2011)	Mean Scale Scores in Reading and Math (2011)
Minnesota	Foundation Program	“...it is the duty of the legislature to establish a general and uniform system of public schools.”	Local + State Per-pupil revenue (2012)	Mean Scale Scores in Math (2012)
New York	Foundation Program	“The legislature shall provide for the maintenance and support of a system of free common schools, wherein all the children of this state may be educated.”	Local + State Per-pupil revenue (2011)	Mean Scale Scores in Reading and Math (2011)
Ohio	Foundation Program	“The General Assembly shall...secure a thorough and efficient system of common schools throughout the state...”	Local + State Per-pupil revenue (2011)	Performance Index Score (2011)
South Carolina	Foundation Program	“The General Assembly shall provide for the maintenance and support of a system of free public schools open to all children in the State”	Local + State Per-pupil revenue (2012)	ESEA Index Score (2012)
Texas	Base Foundation Program with Optional Tier	“A general diffusion of knowledge...to establish...an efficient system of public free schools.”	Local + State Per-pupil revenue (2012)	Mean Scale Scores in Reading and Math (2012)
Washington	Foundation Program	“The legislature shall provide for a general and uniform system of public schools.”	Local + State Per-pupil revenue (2011)	Performance Index Score in Math and Reading (2011)

Measurement of Finance Inputs and Student Performance Outcomes

The analysis of finance and student performance data was conducted using measures of distribution and dispersion. These measures included the mean, median, skew, kurtosis, range, coefficient of variance, and McLoone Index. The coefficient of variance and McLoone Index has been used by finance scholars to assess the horizontal equity of finance systems (Berne & Stiefel, 1984; Brimley, Versteegen, & Garfield, 2012; Odden & Picus, 2004). The coefficient of variance is used to describe the variation about the mean and varies from zero to one. The measure is calculated by dividing the standard deviation of a distribution by the mean (SD/M). The McLoone Index represents the equity of the bottom of the distribution only. It is calculated as the ratio of the sum of all values below the 50th percentile to the sum of those observations if they had the value of the median [$(\sum \text{ values below } Mdn) / (Mdn \text{ value} * \text{ number of observations below } Mdn)$]. In addition, the mean of each state's finance revenue was examined to account for the amount of funding each state provides for educational purposes. The equity ratio was calculated using a standard of 0.05 for the coefficient of variance for each state's finance system and a standard of 0.03 for the coefficient of variance for student performance. This metric was used to discern the degree to which the equity of finance inputs have been aligned with equitable accountability policy outcomes as well as for the calculation of the opportunity gap.

Opportunity Gap

In addition to the traditional finance measures used in this analysis, researchers developed and calculated a metric titled the "opportunity gap" to represent the degree of misalignment between the equity of states' education finance systems and the intended student performance outcomes of accountability policies. Because court decisions have often emphasized equality of inputs or outputs as sufficient to meet equality of educational opportunity (Knoepfel et al., 2014), the opportunity gap was created to represent either inequities in finance inputs, student performance outcomes, or a misalignment of both policies. Whereas current finance measures can be used to independently measure the equity of inputs and outputs, the opportunity gap was intended to measure the simultaneous equity of both and is represented as the difference between an ideal alignment of each state's finance inputs with student performance outputs and states' actual measures of finance and student performance. To calculate the opportunity gap, the area of an ideal alignment of the coefficient of variances for finance systems and student performance outcomes was discerned, which was equal to 0.0015 (0.03 for student performance multiplied by 0.05 for finance systems). Then, the area of the actual alignment of finance and performance (a) for each state was calculated and divided by the area of the ideal alignment (a divided by 0.0015). To standardize each state's opportunity gap, the area of the ideal alignment was set at one; the ideal area of one was subtracted from the actual alignment of finance and performance. States that had an ideal alignment of finance and performance would have an opportunity gap of zero. The opportunity gap grows when there is inequity in the finance system, student performance, or both. Therefore, a larger gap is indicative of low alignment between the two policies. To visualize the opportunity gap, the coefficient of variance for finance inputs and the coefficient of variance for student performance outcomes were plotted on a chart, with the vertical axis representing the equity of finance and the horizontal axis representing the equity of student performance.

Findings

State demographics and economic indicators appear in Table 2 and measures of opportunity appear in Table 3. For descriptive purposes, states were placed in three groups based on the economic characteristics as depicted in the census data: low, moderate, and greater economic hardship. Groups were defined using measures including median household income, percentage of people living below the poverty level, and the unemployment rate. States with greater economic hardship included Ohio, Kentucky, and South Carolina. States with moderate economic hardship included Washington, New York, and Texas. States with low economic hardship included Minnesota, Massachusetts, and Colorado. As illustrated in Table 2, each state has a unique set of circumstances with regards to their graduation rates, percentage of citizens with college degrees, and major industries. Graduation rates are relatively similar across the states. For the most part, the percentage of citizens with a college degree tended to mirror the classification for economic hardship. States with the lowest economic hardship had the highest percentage of individuals with a bachelor's degree while states with the most need had the lowest percentage of individuals with a degree. In general, states where manufacturing was the predominant industry tended to be among the states with the greatest economic hardship.

Using definitions in the school finance literature, opportunity was conceptualized as equity of inputs, equity of outputs, or the simultaneous equity of the two policies. Measures of states' finance equity, performance equity, and opportunity gaps appear in Table 3. The only two states that were found to have equitable finance systems were South Carolina and Kentucky. The coefficient of variance in South Carolina was 0.02 while the McLoone Index was 0.99. In Kentucky, the coefficient of variance for the finance system was 0.06, approaching the standard of 0.05 and the McLoone Index was 0.97. No other state had an equitable finance system.

Greater equity was found in measures of students' performance outcomes across the states. Of the states with low economic hardship, Massachusetts was found to have performance equity in both reading and math while Colorado had performance equity in reading and was approaching performance equity in math. Minnesota was well below the standard with a coefficient of variance of .28 and a McLoone Index of 0.81, suggesting wider variation in student achievement with the bottom part of the distribution performing well below the average of the state. Of the states with moderate economic hardship, New York and Texas were found to have performance equity in both reading and math – performance equity was not found in Washington. In the states with the greatest economic hardship, none of the states were found to have performance equity. In Kentucky, the coefficient of variance for reading was 0.06 while the coefficient of variance for math was 0.11. In Ohio, the coefficient of variance for the performance index was 0.16 while the coefficient of variance for performance in South Carolina was 0.19. Different levels of performance equity, however, may have been tempered by the rigor of each state's standards. Only Massachusetts has consequential accountability standards that aligned with NAEP standards of proficient. Of the remaining states that were found to have performance equity, all standards corresponded to NAEP scores of Below Basic or Basic.

Table 2
Student Demographics and State Economic Indicators

	CO	KY	MA	MN	NY	OH	SC	TX	WA
# of School Districts	182	174	392	332	723	613	83	1193	295
Enrollment	832,368	649,688	955,563	825,873	3,914,196	1,885,618	727,130	4,998,579	1,041,222
%Free/Reduced Lunch	38	56.5	34.2	37.85	32.14	41.11	56.76	60.28	43.41
%ELL	11	N/A	7.1	7.37	5.28	N/A	N/A	16.77	8.61
%IEP	10	N/A	17	15.15	N/A	14.89	13.7	8.82	13.04
Economic Hardship Group	Low	Greater	Low	Low	Moderate	Greater	Greater	Moderate	Moderate
State Median Income	\$57,685	\$42,248	\$65,981	\$58,476	\$56,951	\$48,071	\$44,587	\$50,920	\$58,890
%Unemployed	5.2	5.3	5.5	4.9	5.2	6	6.3	4.7	5.4
%Individuals below Poverty Level	12.5	18.1	10.7	11	14.5	14.8	17	17	12.5
%Graduation Rate	74	77	83	77	77	80	74	86	76
%Bachelor degrees or higher	36.3	20.6	38.7	31.8	32.5	24.5	24.2	26.1	31.4
Major Industry	Professional, scientific, and management	Manufacturing	Professional, scientific, and management	Manufacturing	Professional, scientific, and management	Manufacturing	Manufacturing	Retail Trade	Professional, scientific, and management
Mobility	Low-Moderate	Low	Moderate	High	Moderate	Low	Low	Moderate	Moderate
NAEP Reading	Below Basic	Below Basic	Basic	Below Basic	Below Basic	Below Basic	Below Basic	Below Basic	Below Basic
NAEP Math	Below Basic	Basic	Proficient	Basic	Below Basic	Basic	Basic	Basic	Basic

Table 3
Measures of Opportunity for each State

	CO	KY	MA	MN	NY	OH	SC	TX	WA
CV Finance Revenue	.29	.06	.25	.28	.48	.25	.02	.36	.42
CV performance	Rdg: .03 Mth: .04	Rdg: .06 Mth: .11	Rdg: .02 Mth: .02	.28	Rdg: .01 Mth: .01	Index: .16	.19	Rdg: .03 Mth: .03	Rdg: .09 Mth: .13
Equity Ratio	Rdg: .10 Mth: .14	Rdg: 1.05 Mth: 1.81	Rdg: .08 Mth: .08	1.00	Rdg: .03 Mth: .02	Index: .63	12.02	Rdg: .07 Mth: .08	Rdg: .22 Mth: .31
Opportunity Gap	Rdg: 4.8 Mth: 6.7	Rdg: 1.4 Mth: 3.4	Rdg: 2.3 Mth: 2.3	51.3	Rdg: 2.3 Mth: 2.3	25.7	1.53	Rdg: 6.2 Mth: 6.2	Rdg: 24.2 Mth: 35.4
Mean Finance Revenue	\$9,654	\$5,255	\$12,088	\$9,968	\$21,518	\$5,636	\$2,365	\$9,216	\$6,456
McLoone Finance	.87	.97	.91	.91	.57	.91	.99	.88	.92
McLoone Performance	Rdg: .97 Mth: .96	Rdg: .97 Mth: .93	Rdg: .98 Mth: .98	.81	Rdg: .99 Mth: .99	.83	.82	Rdg: .98 Mth: .98	Rdg: .92 Mth: .90
Mean Performance	Rdg: 625.06 Mth: 534.96	Rdg: 91.73 Mth: 82.88	Rdg: 246.97 Mth: 245.47	600.41	Rdg: 665.95 Mth: 684.04	91.15	80.73	Rdg: 1554 Mth: 1563	Rdg: 2.82 Mth: 2.41
Median Performance	Rdg: 628.38 Mth: 537.53	Rdg: 91.59 Mth: 82.75	Rdg: 247.24 Mth: 245.30	557.90	Rdg: 665.5 Mth: 683.67	96.50	85.60	Rdg: 1553 Mth: 1563	Rdg: 2.84 Mth: 2.42
Skew	Rdg: -1.17 Mth: -.85	Rdg: .26 Mth: .62	Rdg: -.17 Mth: -.04	.036	Rdg: .18 Mth: .26	-1.22	-1.59	Rdg: -.46 Mth: -.25	Rdg: -2.95 Mth: -.22
Kurtosis	Rdg: 4.58 Mth: 2.78	Rdg: 1.53 Mth: 2.45	Rdg: .21 Mth: .36	-1.25	Rdg: .11 Mth: .30	.996	1.73	Rdg: 3.35 Mth: 1.96	Rdg: .51 Mth: .69
Performance Range	Rdg: 143.82 Mth: 162.78	Rdg: 38.97 Mth: 67.68	Rdg: 29.42 Mth: 37.43	536.10	Rdg: 27.8 Mth: 49.43	80.45	65.5	Rdg: 413 Mth: 437	Rdg: 1.60 Mth: 2.00
NAEP Reading Standards	Below Basic	Below Basic	Basic	Below Basic	Below Basic	Below Basic	Below Basic	Below Basic	Below Basic
NAEP Math Standards	Below Basic	Basic	Proficient	Basic	Below Basic	Basic	Basic	Basic	Basic
Mean at Proficient?	N	N	Y	N	Y	N	N	N	N

Because none of the states included in this study had finance and performance equity, the equity ratio statistic was not a useful tool in discerning alignment. The opportunity gap was conceptualized as the simultaneous equity of finance systems and student performance outcomes. Results of the opportunity gap revealed a lack of alignment more clearly than the equity ratio and appear in Table 3. Interestingly, the smallest opportunity gap was found in two of the states with greater economic hardship, Kentucky and South Carolina. In states with moderate economic hardship, there was a large range of scores in the opportunity gap. The gap in New York was found to be 2.3 for both reading and math; in Washington, the gap was found to be 24.2 in reading and 35.4 in math. There was also a range in the opportunity gap in states with low economic hardship ranging from 2.3 in Massachusetts for reading and math to 51.3 in Minnesota.

The plot of each state's opportunity gap can be viewed in Figure 2. States were placed into quadrants based on the equity of their respective finance systems inputs and student performance outputs. States that had coefficient of variances for both finance and student performance that were less than 0.10 were placed in the quadrant titled *Approaching Alignment*. States that had student performance coefficient of variances less than 0.10 were placed in the quadrant titled *Output Equity*. Similarly, states that had coefficient variances less than 0.10 for finance inputs were placed in the quadrant titled *Input Equity*. Lastly, states that had neither finance inputs nor student performance outputs with coefficients of variances less than 0.10 were placed in the quadrant titled *Inadequate*. Kentucky was the only state placed in the *Approaching Alignment* quadrant. Similarly, South Carolina was the only state that provided *Input Equity*. The majority of the states, Colorado, Massachusetts, New York, Texas, and Washington, met *Output Equity*. Minnesota and Ohio were placed in the quadrant titled *Inadequate* because they did not have coefficients of variances less than .10 for finance inputs and student performance outputs. Policy and research implications for states' opportunity gaps are discussed in the following section.

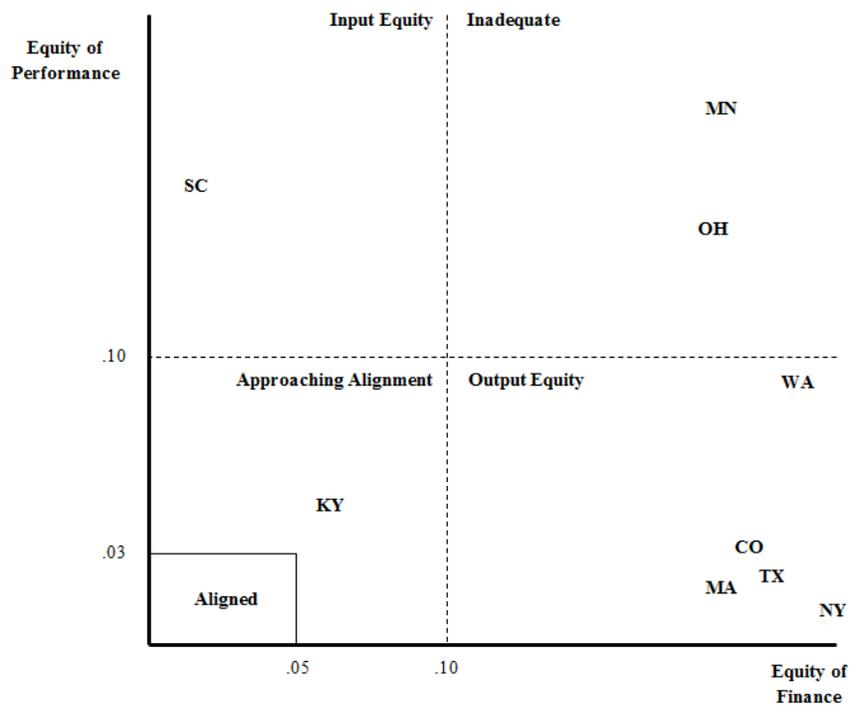


Figure 2. Plot of each state's opportunity gap.

Discussion

Findings from the present study contextualized states' progress toward providing equal educational opportunities to students situated in varying social and economic circumstances. In particular, the present study served as an attempt to measure lost opportunity for children that may result from the failure on behalf of states to provide equitable finance systems and yield equitable student performance outcomes. Three explanations emerged as to why an opportunity gap existed in each state: a) there was inequity in the education finance system, b) there was inequity in the measure(s) of student performance, and c) there was inequity in both the finance system and student performance outcomes.

Four states had inequitable finance systems and equitable measures of student performance. Those states included Colorado, Massachusetts, New York, Texas, and Washington. Two of these five states, Massachusetts and New York, were found to have students performing at proficiency while Massachusetts had the most rigorous standards of the nine states that were studied, as defined by NAEP. Despite the finding of equitable student performance outcomes, which is the overall policy goal for states, we argue that the equity of finance inputs holds value when considering whether equal opportunities were provided by these states and suggest that opportunity had not been provided on behalf of the states' education finance systems. Furthermore, we note that Massachusetts and New York were among the states with the highest percentage of citizens holding a bachelor's degree. It has been postulated in studies examining economic efficiency that the use of standardized test scores may be a poor dependent variable (Ruggiero, 2007), especially when proficiency targets are low. In efficiency simulations, researchers found that schools were overspending to achieve lower standards when the actual cost of education may have been higher when considering other school and community goals. Massachusetts and New York have high rates of college completion; thus, the inequitable funding may be the result of additional funds being allocated to schools to achieve other education-related goals. All four states that were found to have inequitable funding systems had the greatest cultural diversity of the nine states examined in this study. Texas and Colorado had the highest percentage of English Language Learners, Massachusetts has the highest percentage of students with an Individualized Education Plan, and Texas and New York rank near the top of individuals living below the poverty level. If finance systems were created to allocate greater resources to students from these underrepresented populations, then increased inequity would be permissible. This would be what Springer, Liu, and Guthrie (2009) termed the "right kind of inequity."

Only one state, South Carolina, was found to have an equitable finance system and inequitable measures of student performance. The coefficient of variance for the finance system in South Carolina was found to be 0.02; however, when addressing the amount of funds provided by the state, we found that the high degree of equity was likely due to the fact that the foundation amount was relatively low, about \$2,365, and the pupil weightings within the finance formula are small relative to other states. The state of South Carolina was second in the percentage of students qualifying for free and reduced lunch, was third in the percentage of students qualifying for an Individualized Education Plan, had the second highest percent of individuals living below the poverty level, had the second lowest percentage of individuals holding a college degree, and had the highest unemployment rate. The negative skew in the measures of student performance illustrates the lack of success in meeting the persistent challenges associated with educating students living in unique economic circumstances. Although the finance system was equitable, we question the sufficiency of the funding and suggest two implications: a) either the funding was not sufficient, or b) the means by which those funds were distributed were not serving students in underrepresented populations. This is a question of adequacy.

Two states, Ohio and Minnesota, were found to have both inequitable finance systems and inequitable measures of student performance. In considering the degree to which opportunity was lost in these states, it is important to note that the coefficients of variance for performance were well above the 0.03 standard – the closest measure was found in Ohio's performance index (0.16) and the widest dispersion was found in Minnesota (0.28). The opportunity gap in these states was significantly larger than the rest of the states in the analysis. The dispersions in finance and performance in these states may be attributed to a combination of the previous causes. For Minnesota, the coefficient of variance may have been high due to the design of the accountability measures. Minnesota's assessments include a wide range of possible scores, which had an effect on the coefficient of variance. Whereas the range of scores in New York was 27.8 in reading and 49.43 in math, the range of scores for Minnesota was 536.1. Therefore, the coefficient of variance was expected to be larger in Minnesota than states with fewer ranges of possible scores; the degree to which opportunity was provided in Minnesota was difficult to determine.

No emerging pattern was found when examining the economic indicators for Ohio and Minnesota. Each state represented one of the three groupings that were based on intensity of economic hardship. However, by contextualizing the alignment of finance and accountability policy within each state's economic circumstances, the degree to which opportunity is provided in these states becomes uneven. For example, Ohio had a relatively large proportion of individuals below the poverty level and the second highest percentage of unemployed individuals. Therefore, the degree to which equity of finance and performance outcomes was provided in Ohio may have had substantial effects on students' educational opportunities when compared to Minnesota, which had relatively lower economic hardship.

In Kentucky, the equity of finance and performance outcomes was found to be closest to the standards of 0.05 and 0.03, respectively and the opportunity gap for reading was the lowest in the study. Although the economic indicators in Kentucky indicate high need, equity in finance and performance signifies that the policies are meeting the needs of the students. This may be due to the fact that the Kentucky Education Reform Act (KERA) of 1990 required the state to recreate its accountability and finance systems. Consequentially, the coefficients of variance for finance and performance are closely aligned when compared to other states in the analysis. In the aggregate, students in Kentucky's public schools are not performing at proficiency, but the distribution of their scores meets the threshold for equity. The McLoone Index of 0.97 in reading indicates that the lower portion of the population is scoring close to the mean; additionally, the distribution is leptokurtic and positively skewed.

Conceptualizing, measuring, and evaluating the degree to which states have aligned their finance systems with their specific accountability policies has proven elusive. Attempts have been made by states to provide equitable resources and ensure equitable student performance outcomes as a means to ensure equality of educational opportunity for all students. Although the literature points to the fact that equality of educational opportunity can be measured through an examination of inputs and outputs of schooling, attempts to compare states based on their individual policies is difficult due to differences in judicial interpretations of equity and adequacy, rigor of state standards, and components of each states' testing systems. Notwithstanding this limitation, our analysis served as an initial inquiry to discern the degree to which states have provided equal educational opportunities through finance inputs and student performance outcomes.

Given the nature of our inquiry, the present analysis did not lend itself to provide answers for several questions that could be investigated in future research to improve the conceptualization and measurement of the alignment between finance and accountability policies. For instance, the design of the study did not allow for us to address questions related to the reasons why some states achieved output equity without input equity and the mediating factors that link inputs to outcomes.

Further inquiries could address the quality and quantity of educational resources that are purchased with funds and how those inputs affect student performance outcomes to provide insight into the simultaneous equity measures of both policies. Similarly, while our analysis included contextual and demographic differences among states, future research could be conducted to model the effects of these factors on the measures of dispersion to determine the extent to which they are related to inequities in both inputs and outcomes. Moreover, our analysis was framed using definitions of equity and equality of educational opportunity that stem from the school finance literature. Other conceptualizations of opportunity along with more precise measurements of the degree of misalignment between states' finance and accountability policies may further the knowledge base in support of states' efforts to align resources with student achievement to achieve educational adequacy.

References

- Adams, Jr., J. E. (2008). *Funding student learning: How to align education resources with student learning goals*, a report prepared for the School Finance Redesign Project, retrieved from http://www.crpe.org/sites/default/files/pub_sfrp_wrkgrp_oct08_0.pdf
- Amrein, A.L. & Berliner, D.C. (2002). High-stakes testing, uncertainty, and student learning *Education Policy Analysis Archives*, 10(18). Retrieved [July 8, 2007] from <http://epaa.asu.edu/epaa/v10n18/>.
- Baker, B. D. (2005). The emerging shape of educational adequacy: From theoretical assumptions to empirical evidence. *Journal of Education Finance*, 30(3), 259-287.
- Baker, B. D., Green, P., & Richards, C. E. (2008). *Financing education systems*. Columbus, OH: Upper Saddle River.
- Bandeira de Mello, V. (2011). *Mapping State Proficiency Standards Onto NAEP Scales: Variation and Change in State Standards for Reading and Mathematics 2005-2009* (NCES 2011-458). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC: Government Printing Office.
- Bandeira de Mello, V., Blankenship, C., & McLaughlin, D.H. (2009). *Mapping State Proficiency Standards Onto NAEP Scales: 2005-2007* (NCES 2010-456). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC.
- Berliner, D. C. (2005). Our impoverished view of educational reform. *Teachers College Record* [Electronic Version]. Retrieved February 6, 2006 from <http://www.tcrecord.org/content.asp?contentid=12106>
- Berne, R. & Stiefel, L. (1984). *The Measurement of Equity in School Finance*. Baltimore, MD: Johns Hopkins University Press.
- Brimley, V. R., Verstegen, D. A., & Garfield, R. R. (2012). *Financing education in a climate of change*. Upper Saddle River, NJ: Pearson.
- Card, A. & Kruger, A.B. (1992). Does school quality matter? Returns to education and the characteristics of public schools in the United States, *The Journal of Political Economy*, 100(1), 1-40. <http://dx.doi.org/10.1086/261805>
- Carnoy, M. & Loeb, S. (2002). Does external accountability affect student outcomes? A cross-state analysis, *Educational Evaluation and Policy Analysis*, 24(5), 305-331. <http://dx.doi.org/10.3102/01623737024004305>
- Chetty, R., Friedman, J. N., & Saez, E. (2012). Using differences in knowledge across neighborhoods to uncover the impacts of the EITC on earnings. Retrieved from http://obs.rc.fas.harvard.edu/chetty/eitc_nbhd.pdf

- Chetty, R., Hendren, N., Kline, P., & Saez, E. (n.d.). *Equality of opportunity project*. Retrieved from <http://www.equality-of-opportunity.org/> on October 13, 2013.
- Darling-Hammond, L. (1997). *The right to learn: A blueprint for creating schools that work*. San Francisco, CA: Jossey-Bass.
- Elmore, R.F. (2000, Winter). *Building a new structure for school leadership*. Washington, DC: Albert Shanker Institute.
- Fennimore, B.S. (2005). Brown and the failure of civic responsibility. *Teachers College Record*, 107(9), 1905-1932. <http://dx.doi.org/10.1111/j.1467-9620.2005.00579.x>
- Fink, S. & Thomspson, S. (2001). Standards and whole system change. *Teaching and Change*, 83(3), 237-247.
- Finn, Jr., C.E. & Kanstoroom, M. (2001). State academic standards. In D. Ravitch (Ed.), *Brookings Papers on Education Policy 2001*. Washington, DC: Brookings Institution Press. <http://dx.doi.org/10.1353/pep.2001.0005>
- Goertz, M. E. (2001). Standards-based accountability: Horse trade or horse whip? In L. Corno (Ed.), *Education across a century: The centennial volume*. NSSE Yearbook, 100(1), 39-59.
- Grissmer, D., Flanagan, A., Kawata, J., & Williamson, S. (2000). *Improving student achievement: What state NAEP test scores tell us*. Retrieved from http://www.rand.org/pubs/monograph_reports/MR924.html
- Hanushek, E.A., & Raymond, M.E. (2005). Does school accountability lead to improved student performance? *Journal of Policy Analysis and Management*, 24(2, Spring), 297-327.
- Hoke County Board of Education, et al. v. State of North Carolina, 358 N.C. 605, 599 S.E.2d 365 (2004).
- Houck, E. A., & Eom, M. (2013). Resource and output equity as a mechanism for assessing educational opportunity in Korean middle school education. *Journal of Education Finance*, 38(1), 18-51.
- Howard, J. (2000). Still at risk: The causes and costs of failure to educate poor and minority children for the twenty-first century. In D.T. Gordon [Ed.] *A nation reformed?: American education 20 years after A Nation at Risk*. Cambridge, MA: Harvard University Press.
- Isbister, J. (2001). *Capitalism and Justice: Envisioning Social and Economic Fairness*. Bloomfield, CT: Kumarian Press.
- Jordan, W.J., & Cooper, R. (2003). High school reform and black male students: Limits and possibilities of policy and practice. *Urban Education*, 38(2), 196-216. <http://dx.doi.org/10.1177/0042085902250485>
- King, R., Swanson, A. D., & Sweetland, S. R. (2005), Designing finance structures to satisfy equity and adequacy goals. *Education Policy Analysis Archives*, 13(15). <http://dx.doi.org/10.14507/epaa.v13n15.2005>
- Knoeppel, R. C., First, P. F., Della Sala, M. R., & Ordu, C. A. (2014). Finance equity, student achievement, and justice: A five state analysis of equality of opportunity. *Journal of Educational Administration*, 52(6), 812-832. <http://dx.doi.org/10.1108/JEA-02-2013-0019>
- Knoeppel, R. C., & Della Sala, M. R. (2013). Measuring Equity: Creating the New Standard for Inputs and Outputs. *Educational Considerations*, 40(2), 45-53.
- Knoeppel, R. C., & Rinehart, J. S. (2011). Finance and performance equity: The quest to establish a standard for measuring equity in achievement. Paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA.
- Kress, S. Zechmann, S. & Schmitt, J. M. (2011). When performance matters: The past, present, and future of consequential accountability in public education. *Harvard Journal on Legislation*, 48(1), 185-234.

- Ladd, H. F. (2008). Reflections on equity, adequacy, and weighted student funding. *Education Finance and Policy*, 3(4), 402-423. <http://dx.doi.org/10.1162/edfp.2008.3.4.402>
- Levin, H. M., & Kelley, C. (1994). Can education do it alone? *Economics of Education Review* 13 (2), 97-108. [http://dx.doi.org/10.1016/0272-7757\(94\)90001-9](http://dx.doi.org/10.1016/0272-7757(94)90001-9)
- Linn, R. L. (2000). Assessments and accountability. *Educational Researcher*, 29(2), 4-16. <http://dx.doi.org/10.3102/0013189X029002004>
- Lobato v. State, 218 P.3d 358 (2009).
- Murray, S. E., Evans, W. N., & Schwab, R. M. (1998), Education-finance reform and the distribution of education resources. *American Economic Review*, 88(4), 789-812.
- McLaughlin, D.H., Bandeira de Mello, V., Blankenship, C., Chaney, K., Esra, P., Hikawa, H., ... & Wolman, M. (2008a). *Comparison Between NAEP and State Mathematics Assessment Results: 2003* (NCES 2008-475). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC.
- Nichols, S. & Berliner, D. C. (2005, March). *The inevitable corruption of indicators and educators through high-stakes testing*. EPSSL-0503-101-EPRU. Retrieved July 8, 2007 from, <http://www.greatlakescenter.org/pdf/EPSSL-0503-101-EPRU.pdf>
- Nichols, S.L., Glass, G.V., & Berliner, D. (2006). High-stakes testing and student achievement: Does accountability pressure increase student learning? *Education Policy Analysis Archives*, 14(1), 1-172. <http://dx.doi.org/10.14507/epaa.v14n1.2006>
- Odden, A. R. & Picus, L. O. (2004). *School Finance: A Policy Perspective* (3rd ed), New York, NY: McGraw-Hill.
- Roellke, C., Green, P., & Zielewski, E. H. (2004). School finance litigation: The promises and limitations of the third wave. *Peabody Journal of Education*, 79(2), 104-133. http://dx.doi.org/10.1207/s15327930pje7903_6
- Ruggiero, J. (2007). Measuring the cost of meeting minimum educational standards: An application of data envelopment analysis. *Education Economics*, 15(1), 1-13. <http://dx.doi.org/10.1080/09645290601133845>
- Ryan, J. (2008), Standards, testing, and school finance. *Texas Law Review*, 86, 1223-1262.
- Spillane, J.P. (1999). State and local government relations in the era of standards-based reform: Standards, state policy instruments, and local instructional policy making. *Educational Policy* 13(4), 546-573. <http://dx.doi.org/10.1177/0895904899013004004>
- Springer, M. G., Liu, K., & Guthrie, J. W. (2009). The impact of school finance litigation on resource distribution: A comparison of court-mandated equity and adequacy reforms. *Education Economics*, 17(4) 421-444. <http://dx.doi.org/10.1080/09645290802069269>
- U. S. Census Bureau. (2014). American factfinder. Retrieved from <http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>
- Verstegen, D. A. (2002). Financing the new adequacy: Towards new models of state education finance systems that support standards-based reform. *Journal of Education Finance*, 27(3) 749-781.
- Verstegen, D. A. (2011). Public education finance systems in the United States and funding policies for populations with special educational needs. *Education Policy Analysis Archives*, 19(21), 1-26. <http://dx.doi.org/10.14507/epaa.v19n21.2011>
- Verstegen, D. A. (2013). Leaving equity behind? A quantitative analysis of fiscal equity in Nevada's public education finance system. *Journal of Education Finance* 39(2), 132-149.
- Verstegen, D.A. & Knoepfel, R.C. (2012). Financing Education: A Survey of Finance Policies and Programs Across the 50 States. *Journal of Education Finance* 38(2), 145-166

Weiss, I.R., Knapp, M.S., Hollweg, K.S., & Burrill, G. (Eds.), (2001). *Investigating the influence of standards: A framework for research in mathematics, science, and technology education*, Washington, DC: National Academy Press.

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education policy analysis archives

Volume 23 Number 61

June 29th, 2015

ISSN 1068-2341



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