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Assessing the Educational Opportunity of Emergent Bilingual Students: Why are Some State School Finance Systems More Equitable than Others?

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ABSTRACT

Despite the rapid increase in enrollment of students who speak a language other than English at home, little prior research examines whether school districts receive adequate funding for instructional programs for emergent bilinguals. We show that prior to the Great Recession, districts with greater proportions of students classified as English language learners (ELL) received approximately 10 percent more funding than otherwise similar low-ELL districts. However, recessionary budget cuts disproportionately impacted high-ELL districts, effectively removing resource advantages. Cross-state analyses suggest that states using direct reimbursement methods and those with smaller ELL student weights in their formula funding tend to have less equitable finance systems. Finally, we draw on data from Texas to show that high-ELL districts actually levy higher local property taxes, but have lower property values. Despite greater taxing effort, disparities in local property values prevent high-ELL districts from receiving an equitable share of state funding.

Key words: school finance; equity; budgeting; emergent bilinguals; English language learners

Assessing the Educational Opportunity of Emergent Bilingual Students: Why are Some State School Finance Systems More Equitable than Others?

U.S. schools have seen a dramatic increase in enrollment of students who speak a language other than English in the home over the past three decades (National Center for Education Statistics 2012). Emergent bilinguals – students whose heritage language is not English – are now the fastest growing student group in the United States (Valentino and Reardon 2015). Under federal policy, non-native English speakers who gain proficiency in English are reclassified from an English Language Learner (ELL) to English proficient. On average, students who are classified as ELL perform lower on standardized exams, scoring about one grade level below their non-ELL peers (Reardon and Galindo 2009).

One of the key mechanisms for promoting equal educational opportunity is providing students with adequate funding levels (Baker 2012; Card and Payne 2002; Jackson, Johnson and Perscio 2014). Although scholars debate the appropriate level of funding for K-12 education, there is general consensus that effective state school finance systems provide compensatory funding for students with greater needs (Odden and Picus 2013; Verstegen 2011). For emergent bilingual students – additional funding may be used for teacher professional development, curricular materials, and bilingual aides to help educators draw on the assets emergent bilinguals bring to schools, such as linguistic capital and cultural diversity (Gándara, Rumberger, Maxwell-Jolly, and Callahan 2003; Jimenez-Castellanos and Topper 2012; Parrish 1994). In short, schools serving greater numbers of emergent bilingual students or students in poverty require additional funding to provide equitable learning opportunities.

The Great Recession had substantial impacts on state school finance systems and most states have not restored funding back to pre-recession levels (Leachman, Albares, Masterson and Wallace 2016). Moreover, studies show recessionary budget cuts disproportionately impacted

districts and schools serving greater proportions of students of color and in poverty (Baker 2014; Identifying Reference 2016). For example, faced with serious budget shortfalls following the Great Recession, Texas cut state education funding in a way that primarily affected high-poverty districts (Identifying Reference 2016). In 2012, over 600 school districts sued the state for violating the state constitutional mandate of providing an adequate education for all students (Collier 2016). Ultimately, the Texas Supreme Court ruled the finance system constitutional in May of 2016; however, the court's opinion labeled the system antiquated and urged the legislator to overhaul the state's school funding mechanism.[i]

Given the significant declines in educational funding in recent years, and the growing population of emergent bilinguals in U.S. schools, inquiry into the extent to which ELLs receive equitable educational opportunities is needed. Surprisingly, there is little research that directly evaluates the extent to which states compensate school districts for larger populations of ELLs (Rolle and Jimenez-Castellanos 2012). This study examines whether emergent bilingual students have equal educational opportunity, as measured by funding, spending, and staffing ratios, explores how resource and achievement gaps have changed over time, and identifies state characteristics associated with more equitable finance systems. The analysis then uses more detailed data from Texas – a state with a large ELL population that has recently made significant state funding cuts – to explore potential underlying causes of funding gaps such as local property values and voter approved tax rates. The study addresses the following research questions:

1. To what extent do state school finance systems provide equitable resource levels for ELLs, and how has funding for ELLs changed since the Great Recession?
2. What state school finance funding mechanisms are associated with more equitable funding patterns across high- and low-ELL districts?
3. How do property values and local taxing effort differ between high- and otherwise similar low-ELL districts in Texas?

Findings show that prior to the Great Recession, districts with greater proportions of students classified as ELL received more funding per student, had higher average teacher salaries, and employed more teachers and other staff per student compared to otherwise similar low-ELL districts in the same state. However, by the end of the recessionary budget cuts, districts did not receive any additional funding or other resources as the proportion of ELLs increased – and in some cases received less – after taking into account other district characteristics including the percent of students in poverty. Analyses of state school finance systems suggest that smaller funding weights for ELLs and the use of direct reimbursement to fund bilingual education are both associated with less equitable funding patterns. States in which ELL populations are more economically disadvantaged or that spend less on K-12 education also have less equitable resource allocation patterns, whereas stronger teachers' unions and the use of either formula funding or categorical funding are not associated with state school finance equity.

These findings provide evidence of growth in funding gaps following the Great Recession and identify state characteristics associated with larger gaps. However, in order to get inside the black box of a school finance system, analyses should examine differences in how revenue is actually generated. In the final portion of the analysis, we focus specifically on Texas, where more fine-grained data on the school finance system are available. We first show that funding gaps for high-ELL districts in Texas followed a similar pattern to national average, despite the modest student funding weights embedded in Texas school finance policy. We then show that high-ELL districts in Texas actually levied higher tax rates, but had lower property values relative to otherwise similar low-ELL districts. As a result, high-ELL districts received far less local tax revenues. State and federal funding sources were not progressive enough to make up for the funding disparity created by differences in local property values.

In what follows, we first present background literature and describe how the current study addresses important research gaps. The following section provides additional information on the policy context of this study. Subsequent sections describe the data, analytic approach, findings, and we conclude with discussion and policy implications.

Background Literature and Theoretical Framework

Two Perspectives on Effective Programs for ELLs

Emergent bilinguals represent a diverse group of students with a wide range of cultural and linguistic assets (García, Kleifgen and Falchi 2008). Two divergent theoretical perspectives exist among scholars and practitioners pertaining to effective instruction for ELLs. On the one hand, researchers posit that ELLs should be exposed to as much English language instruction as possible through programs such as English immersion (Porter 2000). English immersion adopts a sink or swim model in which students are expected to learn the English language as they learn other content related to subject areas (Berliner and Glass 2014). Districts do not necessarily require additional funding for English immersion, since the curricula are identical to the regular education program (Odden 2012). On the other hand, some scholars contend that students learning English need support in their heritage language (Collier 1992). Without developing academic literacy in a student's home language, students may not have the opportunity to draw connections between languages for which underlying proficiencies are similar (Cummins 1979; 2000).

Transitional (or early-exit) bilingual programs use all-ELL classrooms and begin with instruction provided in the home language, but transition to English-only instruction within two to three years. Developmental (or late-exit) bilingual programs are similar, except that transition to English-only instruction takes place over five years. Dual-immersion or dual language

instruction is different in that (a) classrooms may include both ELLs and native English speakers; (b) instruction in both languages is maintained throughout the program; and (c) native English speakers also learn a second language. Dual language programs provide ELLs greater opportunity to engage with native English speaking peers, while non-ELLs learn a second language in part through interactions with their ELL peers (Collier and Thomas 2014).

Although substantial evidence supports the use of two languages in instructional programs for ELLs, researchers have not reached consensus on the most effective instructional models (Slavin, Madden, Calderon, Chamberlain and Hennessy 2011). Contextual factors influence how effective programs will be in a particular setting (Gutiérrez, Zepeda and Castro 2010). Many schools currently use English Immersion and parents sometimes prefer this instructional approach as a way to maximize their child's exposure to English (Karabenick and Noda 2004).

Given the role of parental choice in students' program enrollment, identifying causal estimates of program effects has proven difficult. Valentino and Reardon (2015) compared test scores of students in four different instructional programs for ELLs, where over-enrollment in each program required random assignment of students. Students in transitional bilingual and developmental bilingual programs had average test scores in math and English greater than students in English Immersion. Students assigned to dual language had the highest long-term achievement growth among the four instructional models studied. Several meta-analyses provide additional evidence that bilingual education, particularly dual immersion, is the most effected instructional programs for ELLs (August and Pease-Alvarez 1996; Lindholm-Leary and Borsato 2006; Slavin et al. 2011; Greene 1997).

Cost of ELL Instructional Programs

Despite the large literature on program effects, very few studies compare the costs of instructional programs for ELLs. One study compared the per-student costs of maintaining transitional and developmental bilingual programs, pull-out English language courses for ELLs (i.e., English as a second language, ESL), dual language, and a program called Sheltered English in which teachers use activity-based lessons and limit the use of English (Parrish 1994). ELL programs added only minimal classroom costs. Most of the additional costs associated with ELL instructional programs were outside the classroom, resulting from staff time of special resource teachers and administrative staff. In total, ELL programs resulted in approximately a 30% increase in costs per student, on average, across programs. Although ESL and Sheltered English were the most and least costly, respectively, differences in cost stemmed primarily from local decisions rather than specific program design (Parrish 1994). That is, the primary drivers of costs were more related to local resource allocation decisions and less related to the particular instructional model being implemented. These results are similar to a more recent statewide analysis of the cost of dual language programs in Texas (Lara-Alecio et al. 2005). The authors found that dual language programs result in increases in costs that exceed transitional bilingual, but substantial variation in costs exists across sites using the same model.

Other methods used to assess cost in education focus on the additional costs associated with an additional ELL student (as opposed to the additional cost of ELL instructional programs).[ii] These studies have direct policy relevance for state legislators charged with designing school finance systems because the findings provide insights into how much additional funding districts should receive for each additional ELL student. For instance, Duncombe and Yinger (2008) find that each ELL student is associated with an increase in per-student cost of 20% to reach the same state academic standards as non-ELL students. Presumably, these

additional costs are allocated to instructional programs or interventions that improve outcomes for ELLs.

Funding for ELL Programs

While a small portion of federal funding supports bilingual education through Title III grants, the majority of funds allocated specifically for English language learners comes from state sources (Verstegen and Jordan 2009; U.S. Department of Education 2012). States provide supplementary funding for bilingual education or other programs for emergent bilinguals through formula funding, categorical funding outside general formula funding, through direct reimbursement, or have no specific funding mechanism. Funding formula mechanisms include student weights, dollar amounts, and teacher allocations (Odden and Picus 2015). For example, the 0.10 student weight used in Texas implies that districts receive 10% more funding over above the base per-pupil allotment ($5,040 for 2014-15) for each ELL student. In Washington, districts receive an additional $930 per ELL student, whereas in Alaska, 20 ELL students generate an additional teacher (Millard 2015). Theoretically, student weights should be based on the marginal costs associated with instructional programs for ELLs described above. Scholars argue that the weights currently established in state school finance systems are often too low, and likely determined based on political and budgetary considerations rather than empirical evidence of actual cost (Duncombe and Yinger 2008).

A total of 46 states have specific mechanisms for providing funding for students learning English (Millard 2015; Verstegen 2011). Of the 34 states that rely on formula funding, most use student weights that range from a low of 0.096 (in Kentucky) to as high as 0.990 in Maryland (Verstegen 2011). Categorical funding for ELLs is used in nine states, three states use direct reimbursement of expenditures, and four states have no specific mechanism for funding ELL

students (Millard 2015).

Little research exists on the extent to which districts serving greater proportions of ELLs actually receive additional funding, or how state school finance mechanisms influence funding equity for ELLs. (Gándara, Rumberger, Maxwell-Jolly and Callahan 2003). One study found that, of the eight states that had at least 10 percent of its student population classified as ELLs, five spent less in high-ELL districts compared to low-ELL districts, two spent about the same, and only Alaska allocated greater funding levels to districts with the highest percent of ELL students (Arroyo 2008). Gándara et al. (2003) show that ELLs in California have less access to high-quality teachers, attend schools with inadequate facilities, and are provided with poor curricular materials. Two other studies focused just on Texas found no significant relationship between state and local funding and the percent of students receiving bilingual education in Texas school districts (Rolle and Jimenez-Castellanos 2012; Rolle, Torres and Eason 2010).

Most other studies of state school finance equity focus on differences among districts with lower per-pupil property wealth or serving a greater percent of student in poverty or of color (e.g., Baker, Sciarra and Farrie 2015; Berne and Stiefrel 1994; Ushomirsky and Williams 2015). No studies that we are aware of compare funding for ELLs across otherwise similar districts (i.e., past studies do not adjust expenditures or funding levels for differences in local cost). Finally, the literature has not explored the underlying mechanisms of funding disparities beyond comparisons of local, state, and federal funding or explored how these relationships change over time, particularly following the Great Recession spending cuts (see Baker 2014, Chakrabarti, Livingston and Roy 2012, and Identifying Reference 2016, for analyses of how the recession impacted family income-based funding disparities).

Despite the lack of empirical research comparing features of state school finance systems

associated with greater funding equity, the literature identifies state characteristics that may, in theory, influence relative funding levels across districts. The degree of student segregation across schools likely affects the magnitude of funding disparities because funding gaps cannot exist in a state with completely integrated school districts (Orfield, Kucsera and Siegel-Hawley 2012). Second, because teachers' unions lobby state legislatures on matters pertaining to school finance (Marianno 2015), states' union strength may be associated with district funding equity (Hoxby 1996; Malin 2016; Winkler, Scull and Zeehandelaar 2012). States that spend less on education generally, and rely more on local property tax revenues for funding school districts may also have greater funding disparities if high-ELL districts have lower property values. Last, states in which ELL populations are more economically disadvantaged, or states with lower overall percentages of ELLs may have less equitable funding systems because these characteristics are associated with political capital and bargaining power (Gándara and Rumberger 2009).

This study builds on the literature by comparing funding rates between high- and low-ELL districts that have otherwise similar student demographics and local cost factors. We further build on past work by assessing equity in both dollar resources and actual educational resources such as the number of teachers, support staff, and guidance counselors. We also provide the first evidence of how differences in the mechanisms through which state school finance systems provide supplemental funding for ELLs are associated with variation in state school finance equity for high-ELL districts. Finally, detailed analyses of the Texas school finance system show specifically how differences in local tax rates and property values influence funding gaps between high- and low-ELL districts. The study thus provides valuable insights into how policymakers can address school funding disparities for emergent bilingual students in the U.S.

Defining School Finance Equity

Educational equity is a subjective term with a wide array of interpretations in the literature (Stone 2012). Researchers define school finance equity as the provision of resources sufficient to meet diverse student needs (Baker and Green 2015). School districts receive local, state, and federal funding, and the majority of funds are governed by state school finance systems. Analyses of school district funding equity therefore compare districts within the same state (Card and Payne 2002). Although the most recent wave of school finance litigation has focused on the concept of adequacy, which assesses whether districts receive sufficient funding to meet state standards, the concepts of equity and adequacy are closely related (Candelaria and Shores 2017). An adequate school finance system provides vertical equity, in which the allocation of funding accounts for the needs of students (Jimenez-Catellanos and Topper 2012). Given research on the cost associated with instructional programs for emergent bilinguals, school finance equity for this student group implies that districts receive greater levels of funding and other resources as the percent of students classified as ELL increases.

Policy Context

School Finance Systems

Rather than relying on sales or income tax revenues, which may be vulnerable to economic business cycles, schools are funded through local property taxes, a far more stable source of tax revenues, (Brunori 2005). In most U.S. states, school finance systems provide additional state funding to districts that generate less local tax revenues per student due to lower property values (Odden and Picus 2015). In other words, state funding is used to fill in the inequities inherent in a finance system based solely on local property values. Assessing the sum of state and local funding levels together across school districts within a state thus provides an accurate depiction of the extent to which a state school finance system equitably allocates

resources. Federal funding is generally designed to supplement what is already an equitable system (Gordon 2008). The Great Recession differed from prior economic downturns in that property values and home ownership declined dramatically (Baker 2015). As a result, states struggled to maintain school funding and few have restored funding back to pre-recession levels (Leachman et al. 2016).

As noted earlier, state education funding cuts disproportionately impacted high-poverty schools and the funding gap increased more in Texas than most other states (Identifying Reference 2016). Understanding the underlying mechanism of a state school finance system sheds light on why budget cuts may differentially impact school districts. Given our focus on Texas for the third research question, we provide additional background on the Texas finance system in the subsection below.

The Texas School Finance System

Texas has three separate components designed to provide adequate and equitable funding for all school districts. The first is the Foundation School Program, which allocates a base level of funding per "weighted" student for all districts. Students are given extra weight for funding purposes if they fall into certain categories such as low-income, special education, or emergent bilingual. Districts raise revenues by levying a local property tax for the maintenance and operations of schools (called M&O taxes), and the state pays the difference between the revenues raised through local M&O taxes and the pre-determined foundation level of funding, which in 2013-14 was $4,950 per weighted student.

Districts can supplement the base level of funding through additional local tax increases. The second component of state aid, established through Senate Bill 7 of 1993, equalizes the tax base for additional increases in the M&O tax rate. That is, the state ensures that each 1% increase

in the local property tax (up to 1.06%) yields the amount of revenue raised in the Austin Independent School District, which was the district at the 95th percentile of property wealth when Senate Bill 7 passed. In school year 2013-14, this amount was $59.97 per weighted student. Beyond 1.06% up to the statutory maximum M&O tax rate of 1.17%, the state provides only $29.97 per weighted student of matching funds for each additional 1% M&O tax increase. The state also provides equalization funding for bond repayments, called Interest and Sinking taxes (I&S), but only up to $35 per weighted student and only for districts selected through an application process.

The third component of the Texas school finance system, called Chapter 41 recapture, redistributes local property tax revenues from high- to low-wealth districts. The policy is often referred to as the Robin Hood plan and is unique to Texas. Tax revenues generated from the first 1.00% of M&O taxes that exceed the foundation amount of $495,000 per weighted student (which often exist for property-wealthy districts) are recaptured by the state. The revenues generated from taxes between 1.00% and 1.06% are not subject to recapture (and are therefore referred to as “golden pennies”). All revenues generated from additional tax increases from 1.07% to 1.17% that exceed $319,500 are also remitted to the state (additional local tax increases above 1.06% are referred to as “copper pennies” because they are subject to recapture). Tax revenue raised through bonds (I&S taxes) are not subject to recapture. In 2013-14, there were 228 Chapter 41 districts and approximately $1.2 billion were recaptured and used for state aid programs for lower-wealth districts. A total of 37 districts have special provisions that reduce their Chapter 41 payments.[iii]

Emergent Bilingual Student Populations

Emergent bilinguals are highly concentrated in particular states and districts. For

example, in half of all school districts, fewer than 1% of students are classified as ELL, whereas one in five students is classified as ELL in the highest-ELL districts nationally (the 638 districts at or above the 95th percentile).[iv] Table 1 shows the percent of students classified as ELL, for states that have a higher percent of ELL students than the national average of 8.9%. In 2012-13, 23% of students in California were classified as ELL, while ELLs represent about 16% of students in New Mexico, Nevada, and Texas. Emergent bilinguals are more likely than their native English-speaking peers to come from low-income families (Reardon and Galindo 2009). This trend can be seen in Figure 1, which shows the relationship between average district poverty rates and the average percent of students classified as ELL at the district level for 2012-13 in Texas (left panel) and in all other U.S. districts (right panel). Each circle represents a school district, with the size proportionate to district enrollment within each panel. The regression lines demonstrate that while both Texas and all other U.S. districts have positive relationships between poverty rates and ELL concentration, the relationship is stronger in Texas (the slope of the regression line is 0.74 in Texas and 0.33 in all other districts, a statistically significant difference).

The models we use in this study, described below, compare high-ELL districts to *otherwise similar* low-ELL districts. Our models control for local cost factors and district poverty rate so that we can compare districts that have similar poverty rates and other characteristics, but differ in their percent of ELLs. Figure 1 makes clear that although the percent of ELL students is positively correlated with poverty rate, there is not a perfect correlation – many high-ELL districts in Texas and nationally have relatively low-poverty, while many high-poverty districts have a relatively low percent of ELL students.

Table 2 shows differences in resources for districts with below 0.5% ELL students and

those with more than 10%. The first two columns show the differences in district characteristics and resources between high- and low-ELL districts in 2007-08, in Texas. The next two columns show the same differences for 2012-13. Columns 5-8 display the same information for all other U.S. school districts. In both contexts, high-ELL districts have greater proportions of students of color and in poverty, have lower graduation rates, and score lower on standardized exams. High-ELL districts also have higher enrollment and are located in higher cost of labor markets, both in Texas and nationally.

The bottom panel of Table 2 shows that high-ELL districts in Texas received $2,806 fewer dollars per student than low-ELL districts in 2007-08. By 2012-13, that gap increased to $4,181. For all other US districts, the funding gap between high- and low-ELL districts increased from $191 to $1,088 from 2007-08 to 2012-13. In contrast, in both Texas and nationally, high-ELL districts had higher average salaries than low-ELL districts; however, the salary advantage for high-ELL districts decreased in the years following the Great Recession (from 2007-08 to 2012-13). Although the per-pupil funding rates appear to increase over time, these nominal dollar values are not adjusted for inflation. The bottom four rows of Table 2 show that fewer staff members, teachers, guidance counselors, and support staff were employed per student in 2012-13 than in 2007-08. As with funding and spending rates, high-ELL districts employed fewer teachers, guidance counselors, support staff, and overall staff members per student than low-ELL districts, and the gap between high- and low-ELL districts expanded during the period of recessionary budget cuts.

These summary statistics provide cursory evidence that high-ELL districts receive less resources than low-ELL districts and that resource gaps have increased over the past six years. However, districts also face different cost factors. District enrollment size, the average cost of

labor in the region, and population sparsity all impact the cost of educational production (Duncombe and Yinger 2008; Gronberg, Jansen, Taylor and Booker 2005). Larger districts are able to reduce per-student costs through economics of scale because fixed costs such as the central office building and staff members are spread over a larger number of students. Districts in more heavily populated areas can save money on transportation costs, whereas higher labor costs increase the cost of hiring otherwise similar teachers and other personnel. In short, differences in resources levels between high- and low-ELL districts shown in Table 2 may simply reflect differences in local cost factors that are correlated with the percent of ELL students in a particular district. We employ standard methods for adjusting comparisons for local cost factors, allowing for comparisons between high-ELL and *otherwise similar* low-ELL districts. These methods are described in the following section.

Data and Analytic Approach

The analyses draw on district-level data form a variety of sources including the National Center of Education Statistics, the U.S. Census Bureau Small Area Income and Poverty Estimates, the Education Comparable Wage Index dataset (Taylor and Fowler 2006), and the Texas Education Agency Public Education Information Management System (PEIMS), for school years 2007-08 to 2012-13. The analytic dataset includes a total of 75,760 district-year observations over six years (6,108 in Texas) including 12,747 districts in 2012-13 nationally and 1,018 in Texas.

Methods for research question 1. To address research question 1, we compare funding and resource levels for high-ELL districts to low-ELL districts in the same state that have similar cost factors and student demographics. District cost factors include enrollment size, the cost of labor, urbanicity, and the proportion of students in poverty and enrolled in special education. We

regress per-pupil state and local funding rates (PPF) on the district cost factors listed above and include state and year fixed effects (φ_s and δ_t in equation 1, respectively), which allow for comparisons among districts in the same state during the same school year. We estimate the following model, indexing for district (*d*), state (*s*), and year (*t*):

$$PPF_{dst} = \%ELL_{dst}\,\alpha + \Sigma_{\tau=2009}^{2013}\,\delta_t \cdot (I_{t=\tau} + \%ELL_{dst}\,'\beta_\tau) + X_{dst}\,'\lambda + \varphi_s + \varepsilon_{dst} \quad (1)$$

The coefficient α provides an estimate of the relationship between the percent of students classified as ELL in a particular district in 2007-08 (the base year), and district funding per student. The summation includes the individual year dummy variables from 2008-09 to 2012-13 and their interactions with %ELL. These interactions show how the relationship between funding rates and the percent of ELL students differed in each subsequent year following the beginning of the Great Recession (2007-08). For example, the relationship between per-pupil funding and the percent of ELL students in a district in 2012-13 is the sum of α and β_{2013}. We track school district funding rates up to 2012-13, the most recent year in which district finance data are available nationally. Other factors related to cost are included in the vector X_{dst} and ε_{dst} represents variation in funding not captured by variables in the model.[v] Because the primary focus is on differences in funding rates in a particular year, we do not adjust nominal dollar values for inflation. Districts are weighted by enrollment size in all regression models. In order to simplify interpretation of these results, we report both the raw coefficients, and estimate predicted values for districts with 0% ELL students ("low-ELL districts") and districts with 20% of students classified as ELL, approximately the 95th percentile nationally ("high-ELL districts").

Next, we exchange the outcome measure (state and local per-pupil funding) with alternate funding and resource variables, including total funding per pupil, per-pupil expenditures, average staff salaries, and the number of teachers, counselors, support staff, and

total staff per 100 students. We also run the model individually for local, state, and federal funding, to show how each level of funding contributes to funding gaps for high-ELL districts. Each of these models is run for all states nationally, for only the 10 states for which the proportion of ELL students is above the national average (8.9%), and for only the 25 states with the highest percent of ELL students.

Methods for research question 2. Next, we run the model described above individually by state, for the 25 states with the highest percent of ELL students. We categorize states into four groups: (a) those with highly progressive / equitable funding for high-ELL districts, where at least 10% more funding is allocated to high-ELL districts; (b) moderately progressive, where high-ELL districts receive between 3% to 9% more funding than otherwise similar low-ELL districts; (c) those that provide roughly equal funding to high- and low-ELL districts; and (d) states that allocate at least 4% more funding to otherwise similar low-ELL districts. The funding gap in each state is defined as the change in funding associated with a 20% increase in the percent of students in a district classified as ELL.[vi] For each category, we examine the number and proportion of states that use each of the four general approaches to providing supplemental support for ELL students: formula funding (often through weights), categorical funding (budget items outside the funding formula), reimbursements based on submission of expenses to education ELL students, or no mechanism. We also consider four other measures that could be related to a state's funding equity for high-ELL districts: the extent to which ELLs are segregated into particular districts (based on the dissimilarity index);[vii] the correlation between the district poverty rate and the percent of ELLs (depicted in Figure 1 for Texas and all other districts), union strength, (based on state rankings reported in Winkler, Scull and Zeehandelaar 2012); and average total funding per student across districts. To simplify the values for these four

measures, we divide states into five groups corresponding to very high, high, medium, low, and very low. We supplement this analysis with a state-level regression that predicts states' 2012-13 funding gap, based on their funding mechanism for ELLs (formula funding, categorical, or other), ELL segregation, union strength, the state's correlation between district poverty rate and district percent of ELLs, total per-student funding, and the proportion of ELL students statewide.

Methods for research question 3. To address the third research question, we focus specifically on Texas, where additional data related to the school finance system are available. We first replicate the analysis for research question 1 for Texas only. We then estimate models similar to equation 1, this time predicting factors that directly influence district funding levels: local tax rates and property values. As noted above, districts in Texas choose their local property tax rates for maintenance and operations (M&O tax rates), with increases beyond 1.04% requiring voter approval. Similarly, districts that gain voter approval to pass bonds do so through interest and sinking (I&S) taxes. M&O taxes are fully subsidized by the state, whereas I&S taxes are only partially subsidized and only for a portion of districts (Texas Taxpayers and Research Association 2012). We examine whether high-ELL and otherwise similar low-ELL districts levy different tax rates or have different property values, and whether those relationships have changed over time, by running the model described in equation 1, this time substituting the outcome variable for M&O tax rates, I&S tax rates, whether the district is levying the highest possible M&O tax rate allowed in the state, and the district's local per-pupil property values. In short, these models show how high- and low-ELL districts differ in their local tax effort decisions and local property values, and how those relationships changed over time during the recessionary budget cuts.

Findings

Results are discussed in three sections in line with our research questions. We first discuss findings related changes in interdistrict funding equity for ELLs nationally, beginning one year prior to the onset of the Great Recession budget cuts (2007-08). Second, we present results of a state-by-state analysis and identify characteristics of states that are associated with more equitable resource allocation for ELLs. Finally, we show how differences in local tax rates and property values in high- and low-ELL districts contribute to funding disparities.

Funding Disparities and Changes Since the Great Recession

Findings for research question 1 are reported in Table 3. We report only the coefficients of interest and exclude from the table variables that control for local differences in cost. The first row of Column 1 shows that in 2007-08, districts received about $50.01 more in state and local funding per pupil for each one percentage point increase in the proportion of ELL students (% ELL ranges from 0 to 1). In other words, despite the funding gap shown in Table 2, in 2007-08 high-ELL districts actually received more funding than otherwise similar low-ELL districts in the same state, after accounting for local cost differences and weighting districts by enrollment size. As shown in Table 3, high-ELL districts also had higher spending, average salaries, and employed more teachers and support staff in 2007-08 (Columns 3-7) compared to otherwise similar districts in the same state. However, the interactions between year and % ELL indicate that all of the resource advantages diminished over time, from before to after the Great Recession. For example, the coefficient for the interaction between % ELL and the year 2012-13 fixed effect (5043.53) implies that the change in funding associated with each percentage point increase in ELL students was $50.44 less in 2012-13 than it was in 2007-08. Thus, in 2012-13, districts in the U.S. received slightly less funding ($0.43) for each one percentage point increase in the percent of ELLs.

In order to make these results more interpretable, Panel B shows the predicted values for districts with 0% ELL and districts with 20% ELL, corresponding to approximately the 5th and 95th percentile of % ELL nationally. Prior to the Great Recession spending cuts (in 2007-08), low-ELL districts received an average $10,669 per student, after adjusting for local cost factors, whereas otherwise similar high-ELL districts received $11,669 per student, a statistically significant difference of $1,000 (9.4% more funding). However, by the 2012-13 school year, high- and low-ELL districts received essentially the same level of state and local funding (a difference of $8.59 per student or 0.1%), shown in the bottom row of Table 3, which is not statistically significant). Moreover, by 2012-13, high-ELL districts had significantly lower total per-student funding, average teacher salaries, and staffing ratios when compared to low-ELL districts. For example, the bottom row of Table 3 shows that high-ELL districts had about 0.087 fewer teachers for each 100 students (roughly an extra 0.23 students per teacher, on average), whereas prior to the recession, high-ELL districts had 0.236 additional teachers per 100 students. Although not shown, our results are consistent when we limit the sample to the 25 states with the highest percent of ELL students or when the sample is limited to only the 10 states with a proportion of ELLs above the national average.

Exploring Differences in Funding Gaps for ELLs Across States

Tables 4 and 5 show how funding gaps vary by state and what state characteristics are associated with larger funding gap (research question 2). Table 4 ranks states by the size of the funding gap for 2012-13, for the 25 states with the highest percent of ELLs. Column 2 displays the type of funding mechanism the state uses to provide supplementary funding for ELL students. For states that allocate additional resources for ELLs through formula funding, we include the size of the student weight, the number of ELLs that generate an additional teacher, or

the additional dollar amount per ELL, depending on which method of formula funding the state uses. For states that use categorical funding for ELLs, we do not include the dollar amount because they change each budget cycle. Similarly, we exclude dollar values for states that use direct reimbursement, since this type of funding varies from year to year. The next two columns show the percent of students in the state classified as ELL and the funding gap between high- and low-ELL districts. The last four columns show the degree of segregation of ELLs across districts, the correlation between district poverty rate and district percent of ELLs (a rough measure of the extent to which ELLs in the state are economically disadvantaged), relative union strength, and average per-student total funding in the state (actual values for each state are available upon request).

Nine states provide at least 10% greater funding for high-ELL districts than for otherwise similar low-ELL districts (Panel A of Table 5). Maryland, the state with the most progressive funding for ELLs, has only 24 (county-level) school districts and the majority of ELLs are located in two large and well-funded urban districts, Montgomery County Public Schools and Prince George's County Public Schools. The high proportion of ELLs and significantly greater funding in these two districts create a large positive correlation between the percent of ELL students and funding in Maryland (results for Maryland are similar when districts are not weighted by enrollment, although funding appears more progressive in Maryland with weighted least squares regressions). The state's legislated funding weight for ELLs of 0.99 – the largest of any state in the country – implies that each student classified as ELL generates almost twice as much funding as a similar student who is not classified as ELL.

Given our definition of low- and high-ELL districts (those with 0% and 20% ELL students, respectively), states that provide 11% more funding for high-ELL districts (i.e.,

Colorado and Oregon) have an implied student weight of 0.55. This implied funding weight closely matches the legislated funding weight in Oregon (0.50), although implied and legislated funding weights often differ because of other features embedded in state school finance systems that are not accounted for in our statistical model.[viii]

A total of seven states provide between 3% and 9% greater funding for high-ELL districts. As shown in Panel B of Table 5, most of these states use formula funding with fairly large student weights (e.g., 0.25 in Oklahoma, 0.15 in Connecticut, and 0.395 in Kansas) and spend more on average than states with less equitable finance systems. Panels C and D show states that provide approximately the same level of funding for high- and low-ELL districts and states with regressive funding models, respectively. States in these categories have lower student funding weights, less overall funding on average, and for those with regressive funding patterns, more segregated student populations (with the exception of Nevada).

In order to synthesize the information shown in Table 4, we run a simple regression model predicting state funding gaps in 2012-13, based on state characteristics. These regressions are imprecise given the small sample size of 25 states (we exclude the 25 states with the lowest proportion of ELL students). We find no significant relationship between state funding gaps and the use of either categorical funding or formula funding, although the bivariate correlation between ELL student weight and the funding gap (for the 13 states that use ELL student weights) is -0.77, implying that, not surprisingly, larger student weights are associated with more equitable state funding. The three states that use either reimbursement or have no specific mechanism for funding ELL students tend to have larger funding gaps, other state characteristics held constant. States in which ELL populations are more economically disadvantaged and states that spend less on education have larger funding gaps. The results are generally similar if we

control for total state enrollment, or if we allow larger states to contribute more to the estimates (by weighting the regressions by state enrollment). The state proportion of students classified as ELL, the degree to which ELLs are segregation, and the relative strength of teachers' unions (based on rankings provided in Winkler et al. 2015) are not associated with funding gaps. In short, states with larger ELL student weights and states that spend more and have less economically disadvantaged ELL populations are more likely to provide equitable financial support for high-ELL districts.

Underlying Mechanism of Funding Disparities

The third research question examines the underlying mechanisms associated with changes in school finance equity for ELLs. The first part of the results is not surprising and consistent with much of the school finance literature: High-ELL districts received less local funding per student in 2007-08, but more state and federal funding, compared to otherwise similar low-ELL districts. However, the decline in resource equity did not happen because of a disproportionate fall in local tax revenues. Rather, changes occurred primarily because state funding became less progressive with respect to the percent of ELL students nationally. Meanwhile, federal funding for all U.S. districts also became slightly less progressive, while there were no significant changes in the relationship between local funding and the percent of ELLs in a particular district from 2007-08 to 2012-13.[ix] Thus, prior to the recession, state and local tax revenues were sufficient to make up for funding disparities that result from local funding of school districts. However, cuts in state funding following the Great Recession have resulted in inequitable funding for high-ELL districts across the country.

Results run specifically for Texas reveal a similar story, except that the pre-recession system was already somewhat inequitable. Prior to the Great Recession, high-ELL districts

received less state and local funding per student, and only slightly more *total* funding – when funds from federal sources are included. High-ELL districts in Texas spent more per student and offered higher average salaries, but had fewer teachers, guidance counselors, and support staff per student than low-ELL districts, prior to the recession. Similar to national trends, high-ELL districts in Texas were disproportionately impacted by Great Recession funding cuts. By the 2012-13 school year, *total* funding was approximately equal between high- and low-ELL districts in Texas, per-student spending was only slightly greater in high-ELL districts, and average salaries were significantly lower. High-ELL districts in Texas also had significantly fewer teachers, guidance counselors, and support staff compared to otherwise similar low-ELL districts in 2012-13.

Models that disaggregate local, state, and federal funding for just Texas are again largely consistent with prior research: while *local* funding was inequitably distributed across high- and low-ELL districts in 2007-08, state and federal funding filled in the gaps. Like the rest of country, the Great Recession did not lead to substantial declines in local funding for high-ELL districts. Instead, over the course of the recession, state funding for high-ELL districts in Texas dropped substantially, while local funding actually increased (and federal funding remained roughly constant). By the end of the recessionary budget cuts, high-ELL districts still received approximately the same level of funding as low-ELL districts in Texas, but high-ELL districts paid a far greater percentage of their total funding through local taxes, compared to before the recession. In short, high-ELL districts in Texas maintained funding in spite of (rather than as a result of) changes in state funding.

How did high-ELL districts in Texas increase local funding during the recession? The first panel of Table 6 shows the likelihood that high- and otherwise similar low-ELL districts are

choosing to assess the maximum allowed local M&O property tax of 1.17%. In 2007-08, roughly the same proportion of high- and low-ELL districts were levying the maximum M&O tax rate (about 3% of districts, Panel A, Column 1). Similarly, the average M&O tax rate was comparable between high- and low-ELL districts in 2007-08, about $1.05 (meaning $1.05 taxes per $100 of assessed property value, Panel B, Column 1). However, in the years following the Great Recession, high-ELL districts became more likely than otherwise similar low-ELL districts to assess the maximum M&O tax rate (22.8% probability for high-ELL districts, compared to 16.6% for low-ELL districts, a statistically significant difference of 6.2 percentage points). High-ELL districts also increased their local M&O tax rates at a faster rate than low-ELL districts. The final column of Panel B of Table 6 shows that high-ELL districts increased M&O tax rates by 2.4 pennies, on average, compared to 1.8 pennies for low-ELL districts.

Conversely, as shown in Panel C, low-ELL districts in Texas increased I&S tax rates at a faster rate than otherwise similar high-ELL districts, suggesting that low-ELL districts passed more bonds in the years following the Great Recession. Panel D shows that although local property values in high-ELL districts recovered from the recession more quickly, compared to low-ELL districts, a substantial gap in local property wealth persisted throughout this period.

Discussion and Policy Implications

Average Funding Gaps and Differences Across States

Our results indicate that U.S. school districts are no longer adequately funded to support equal educational opportunity for emergent bilingual students. In 2007-08, districts received additional funding for ELL students on average. By the end of the Great Recession budget cuts, that funding advantage for high-ELL districts disappeared. The same general trends hold for average spending and average salaries and the number teachers, guidance counselors and support

staff per student. In Texas, a finance system that was already moderately inequitable with respect to ELL students became less equitable during the Great Recession funding cuts. These findings follow a similar pattern observed in a previous study that compared high- and low-poverty districts, holding the percent of ELLs constant (Identifying Reference 2016). However, the current study also found that several states provide far more funding in high-ELL districts, even after the Great Recession. Those with larger student weights embedded in their state finance formula and those that spent more in general were more likely to allocate additional resources to high-ELL districts.

These findings offer several policy implications for state legislators and education agencies as well as the federal Department of Education. State legislators with large funding gaps for high-ELL districts may consider including funding for ELL students in their school finance formulas or (for states that already include funding for ELLs through formula funding) increasing the weight applied to students with an ELL classification. Increasing ELL student weights in states with large funding gaps is especially important in states with large percentages of ELL students (for example, those listed in Table 1). At the same time, state education agencies can reduce cross-district disparities by introducing regulations that reduce segregation. In 13 metropolitan areas, inter-district school integration policies aim to reduce inequalities across districts by allowing students to transfer between districts in the same metropolitan area (Finnigan and Holme 2015). The National Coalition on School Diversity recommends that state education agencies include progress toward racial and socioeconomic integration as a factor in statewide accountability systems. The group also recommends that state education agencies allocate a portion of Title I funding toward programs that foster racial and socioeconomic integration (National Coalition on School Diversity 2015). State education agencies would need

to re-envision the definition of evidence-based Title I interventions (educational programs supported through federal Title I funding) to include strategies for reducing segregation. Finally, the federal Department of Education could close resource gaps between high- and low-ELL districts by increasing Title III funds for bilingual education. Consistent with prior research conducted by the Department (U.S. Department of Education 2012), our analyses show that federal funding for ELL students is inadequate and most states provide additional funding to help fill in resource gaps.

Underlying Mechanisms

Our regression models that disaggregate total funding into federal, state, and local confirm what many past school finance studies have found for high- and low-poverty districts. Local property tax revenues are inequitably distributed across districts and, following the Great Recession funding cuts, state and federal funding is not sufficient to fill in the gaps. In both Texas and nationally, states make some effort to equalize funding between high- and low-ELL districts. However, after several years of Great Recession spending cuts, state and federal funding equalization no longer offsets the disparities that arise from local financing of K-12 education.

Analysis of the potential underlying causes of funding disparities in the Texas school finance system offer additional guidance for policymakers about how to close resource gaps. Districts with higher proportions of ELL students have lower average property values per pupil, even after controlling for student poverty. Importantly, high-ELL districts not only chose higher M&O tax rates, but increased their local property taxes at a faster rate following the Great Recession than low-ELL districts. This finding largely counters the myth that immigrant families and/or families of ELL students are less willing to support higher taxes for local school funding

(Barreto, Manzano and Segura 2012; Chua 2011; see also Lee and Zhou 2014). Despite levying higher local property tax rates, lower property values prevented high-ELL districts in Texas from raising as much local tax revenues for education as otherwise similar low-ELL districts.

At the same time, high-ELL districts appeared to pass fewer bonds, perhaps because the state does not equalize funding for bond repayments to the same extent as taxes for basic maintenance and operations.[x] Low-ELL districts, which tend to have higher property values, may also be more likely to use I&S taxes to raise revenues because these funds are not subject to Chapter 41 recapture (the Texas "Robin Hood" plan described above). Finally, relative increases in M&O taxes coupled with relative decreases in I&S taxes for high-ELL districts (compared to low-ELL districts) may also result from a growing practice called a penny swap. With the knowledge that M&O tax revenues are more heavily subsidized by the state, many savvy, low-property wealth school districts adopt plans (with voter approval) to exchange I&S property taxes, on a one-to-one basis, with M&O taxes, without increasing their community's property tax payment (Crower 2015; de Bruijin 2016).

The findings suggest that increasing base funding for ELLs through weights or other mechanisms may not be sufficient, alone, for providing equitable learning opportunities. For example, New Mexico has a relatively large funding weight for ELLs (0.50), but ultimately sends the same level of per-pupil funding to high- and otherwise similar low-ELL districts. Moreover, equalizing only one part of the tax base (e.g., the M&O taxes), without providing additional subsidies for bond repayments, will not necessarily close fiscal disparities between high- and low-ELL districts. Legislators in states that do not allocate additional funds for districts with greater concentrations of ELLs should consider reforming their school finance systems to make them less complex and more equitable and transparent.

Changes in Student Achievement Gaps

Funding cuts concentrated in high-ELL districts likely have real consequences for achievement of students learning English. In order to investigate this issue further, we run the same regression models described in equation 1, this time predicting achievement on state standardized exams, normalized across states using nationally assessments (district achievement data is provided by the Stanford Education Data Archive, Reardon et al. 2016). Achievement data include information on average district test scores for grades 3-8 in English language arts and math. Prior to the Great Recession, the achievement gap between districts with 0% ELL students and those with 20% ranged from 0.13 to 0.18 standard deviations in English language arts and from 0.04 to 0.17 in math (with achievement gaps generally higher in the early grades). During the recessionary period of budget cuts, achievement gaps between high- and low-ELL districts had expanded by an average of 0.01 standard deviations per year in both Math and ELA. The same trends in achievement held for Texas and for only states with above average proportion of ELL students.[xi] Growth in achievement gaps were likely influenced by other disproportionate impacts of the Great Recession outside of public schooling, but past research suggests that relative declines in funding likely contributed (e.g., Jackson et al. 2014).

Conclusion

Prior research has documented the central importance of equitable funding for providing equal educational opportunity. This study finds that the Great Recession-era education funding cuts inequitably impacted districts with higher rates of ELL students. However, several states diverged from this national trend. Those with larger student weights embedded in their state finance formula were more likely to allocate additional resources to high-ELL districts. The Texas finance system demonstrates that many high-ELL districts levy the highest possible tax

rates and still do not raise an equitable level of resources. Despite the student weights and tax equalization embedded in the Texas school finance system, ELL instructional programs are still likely underfunded, which may in part contribute to the widening of the achievement gap. In order to equalize educational opportunity for all students, policymakers must provide a sufficient level of funding for high-need districts.

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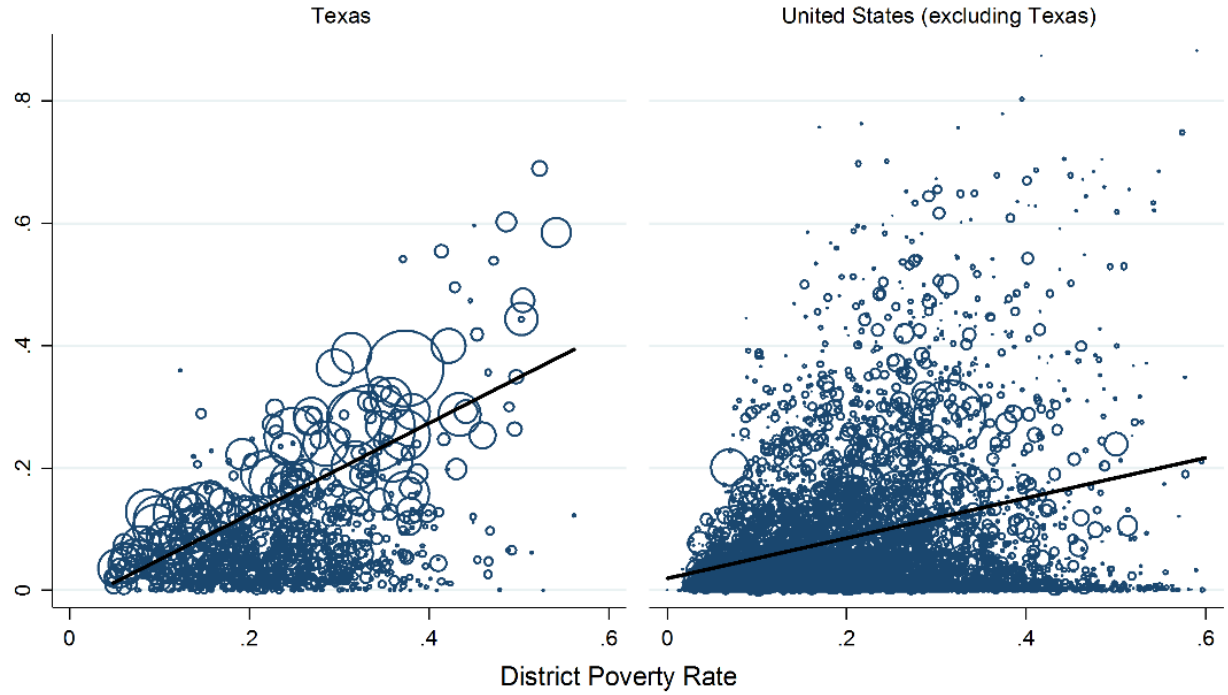
FIGURE 1

The relationship between district poverty rate and the percent of students in each district classified as English language learners in Texas and in all other school districts, 2012-13



Note: each circle represents a school district, with size proportionate to district enrollment within each panel.
Source: Authors' calculations based on U.S. Census Bureau data and NCES Common Core of Data.

TABLE 1

Percent of students classified as English Language Learners by state, 2007-08 to 2012-13

State	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	Districts (2012-13)
California	24.37	24.33	28.86	23.10	23.10	22.81	864
New Mexico	18.60	15.51	15.47	15.71	16.15	15.76	87
Nevada	10.87	17.62	16.01	19.40	19.63	15.74	17
Texas	9.74	15.17	15.00	14.98	14.92	15.11	1,018
Colorado	10.66	10.87	11.44	11.84	12.01	11.98	175
Alaska	12.83	9.17	11.12	11.32	11.13	11.32	50
D.C.	7.03	9.86	9.58	8.46	8.39	10.25	1
Illinois	7.49	9.71	8.59	8.36	8.18	9.42	830
Florida	8.74	8.62	8.77	8.71	8.81	9.03	67
Oregon	11.07	11.26	11.06	10.55	11.34	8.97	174
Washington	7.84	7.99	6.29	8.65	7.86	8.94	274
Hawaii	9.43	10.34	10.04	10.63	13.55	8.92	1
All other states	4.44	4.44	4.34	4.32	4.45	4.53	9,190
Total	8.30	8.96	9.37	8.73	8.83	8.88	12,748

Note. District of Columbia Public Schools (D.C.) excludes surrounding charter schools. All other states include those with below the 2012-13 national average % of ELL (8.9%). In each state, because larger districts tend to have higher proportions of English language learners (ELL), the average percent of ELLs across all districts in a state is lower than the state's percent of ELLs (i.e., the total number of ELLs in the state divided by total state enrollment), which is reported here.

TABLE 2

Summary statistics for districts with low % English language learners and high % English language learners, Texas and all other U.S. Districts, 2007-08 and 2012-13

	Texas school districts				All U.S. school districts[a]			
	2007-08		2012-13		2007-08		2012-13	
	≤ 0.5%	≥ 10%	≤ 0.5%	≥ 10%	≤ 0.5%	≥ 10%	≤ 0.5%	≥ 10%
Average district characteristics and student demographics / outcomes								
% Poverty	18.1%	29.1%	21.9%	28.6%	15.7%	19.6%	18.6%	24.4%
% FRL	44.1%	52.6%	51.5%	71.3%	38.9%	57.5%	44.2%	64.3%
% LEP	0.1%	18.0%	0.1%	19.3%	0.1%	25.1%	0.1%	23.3%
% SPED	12.7%	9.5%	9.7%	8.5%	14.7%	11.8%	14.8%	11.7%
% URM	18.9%	75.6%	26.6%	71.7%	11.6%	56.8%	14.1%	60.3%
Grade 3 ELA	0.018	-0.758	-0.207	-1.013	0.142	-0.767	0.108	-0.786
Grade 3 Math	-0.005	-0.373	-0.145	-0.493	0.109	-0.651	0.076	-0.721
Fresh. grad. rate	83.6%	70.3%	n/a	n/a	83.7%	73.6%	n/a	n/a
Dist. Enroll.	734	15,004	422	11,081	1,424	8,979	1,288	8,987
Cost of Wage	1.14	1.24	1.24	1.39	1.20	1.33	1.30	1.45
Num. of districts	153	123	95	256	5,831	1,416	5,273	1,418
School inputs (unadjusted outcome measures)								
Funding per Stu.	14,242	11,436	16,563	12,381	12,705	12,514	13,928	12,840
Federal	945	1,257	1,055	1,365	848	1,406	963	1,479
State	6,070	5,922	5,176	5,002	6,544	6,678	6,790	6,351
Local	7,228	4,257	10,332	6,014	5,313	4,429	6,174	5,009
Expend. Per Stu.	10,267	9,085	11,107	9,440	10,610	10,564	11,835	10,942
Avg. salaries	36,234	39,287	39,581	41,813	43,795	53,864	47,502	56,672
Staff per 100 students								
All Staff	18.2	15.6	17.6	14.9	14.4	12.0	14.6	11.4
Teachers	9.67	7.63	9.70	7.54	7.74	6.36	7.87	6.13
Guid. Coun.	0.44	0.28	0.39	0.26	0.36	0.24	0.38	0.26
Sup. Staff	0.53	0.42	0.57	0.50	0.58	0.63	0.71	0.59

[a] Excludes Hawaii and Washington D.C. because these districts are excluded from the analytic sample.

Note. FRL stands for free or reduced price lunch; ELL stands for English language learner; SPED stands for special education students; and URM stands for underrepresented minority. Grade 3 ELA and Math refer to scores on state standardized exams, normalized for national comparisons (taken from Reardon et al., 2016).

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TABLE 3

Regression coefficients showing the relationship between funding / resource levels and the percent of students classified as English Language Learners, 2007-08 to 2012-13

	Adj. state/ local PPR	Adj. total PPR	Adj. total PPE	Avg. Salaries	Staff per 100 students		
					Teachers	Gd. Coun.	Sup. Staff
Panel A: Regression coefficients							
% ELL	5000.59***	5152.19***	4356.63***	8963.65***	1.179***	-0.353	2.247*
	(597.0)	(582.7)	(446.6)	(2024.8)	(0.167)	(0.235)	(0.928)
% ELL x 2008-09	-2407.10***	-2092.95***	-1893.26***	-8992.57***	-0.571***	-0.388**	-1.209*
	(284.9)	(302.4)	(241.6)	(2232.6)	(0.072)	(0.135)	(0.563)
% ELL x 2009-10	-4029.53***	-4273.16***	-3182.55***	23981.94***	-0.949***	-0.214	-0.411
	(385.8)	(412.8)	(300.7)	(3932.5)	(0.135)	(0.195)	(0.754)
% ELL x 2010-11	-3829.89***	-3991.59***	-3545.89***	-5765.54**	-1.413***	-0.537**	-2.290***
	(361.7)	(458.3)	(288.6)	(1899.9)	(0.124)	(0.194)	(0.646)
% ELL x 2011-12	-5075.97***	-5065.82***	-4193.56***	-11594.19***	-1.495***	-0.350*	-3.002***
	(603.4)	(620.5)	(335.5)	(1991.2)	(0.178)	(0.156)	(0.715)
% ELL x 2012-13	-5043.53***	-5566.51***	-4737.98***	-14564.60***	-1.612***	-0.415*	-3.675***
	(625.7)	(611.5)	(363.5)	(2504.4)	(0.202)	(0.164)	(0.770)
R-squ.	0.703	0.690	0.782	0.773	0.723	0.377	0.453
N	75,760	75,760	75,760	75,305	74,694	71,984	71,766
Panel B: Predicted values for 2007-08							
High-ELL districts	11,669	12,644	10,743	53,473	6.392	2.150	5.051
	(98.71)	(100.86)	(80.05)	(333.26)	(0.03)	(0.04)	(0.15)
Low-ELL districts	10,669	11,613	9,871	51,680	6.157	2.221	4.601
	(83.57)	(71.99)	(55.46)	(294.82)	(0.02)	(0.03)	(0.09)
Difference	1000.12***	1030.44***	871.33***	1792.73***	0.236***	-0.071	0.449**
	(129.33)	(123.91)	(97.38)	(444.95)	(0.036)	(0.046)	(0.174)
Panel C: Predicted values for 2012-13							
High ELL districts	10,978	11,892	10,190	51,807	6.141	2.083	5.300
	(78.98)	(88.38)	(74.41)	(392.35)	(0.03)	(0.04)	(0.11)
Low-ELL districts	10,987	11,975	10,266	52,927	6.228	2.236	5.586
	(69.17)	(81.74)	(50.95)	(237.62)	(0.02)	(0.02)	(0.07)
Difference	-8.59	-82.86	-76.27	-1120.18*	-0.087*	-0.154***	-0.286*
	(104.98)	(120.38)	(90.18)	(458.69)	(0.037)	(0.043)	(0.137)

Note. PPR and PPE stand for per-pupil revenues and expenditures, respectively. Each column of Panel A represents a separate regression. Interactions in rows 2-6 show how the relationship between the proportion of ELL students and resource levels changed each year, relative to the base year (2007-08). For example, districts received $50.01 more state and local revenues per student from state and local sources during the 2007-08 school year for each one percentage point increase in the proportion of ELL students (% ELL ranges from 0 to 1). In 2012-13, districts received $50.44 *less* per student for each percentage point increase in the proportion of ELL students, relative to 2007-08 funding. Predicted values for high- and low-ELL districts in panels B and C are based on districts at the 5th and 95th percentile nationally of % ELL students in the district (0% and approximately 20% ELL). The sample includes 75,760 district-year observations or about 12,600 districts per year nationally, representing about 95% of all U.S. K-12 school districts each year (districts were excluded if they are not included in the educational cost of labor index or if they did not report student demographic or finance data). *** p<.001, ** p<.01, * p<.05.

TABLE 4

Funding gaps between high- and low-ELL districts by state and state characteristics, 2012-13

State	Funding mechanism	% ELL	Funding gap	Degree of segregation of ELLs	Correlation (poverty rate, %ELL)	Union strength	Total funding
Highly progressive / equitable (at least 10% more funding to high-ELL districts)							
Maryland	Formula (0.99)	6.4%	-56.7%	Medium	Very low	Medium	Very high
Virginia	Formula (58.8:1)	7.4%	-34.5%	High	Very low	Very low	Medium
Idaho	Categorical	7.4%	-24.6%	Low	Medium	Medium	Very low
Florida	Formula (0.147)	9.0%	-19.7%	Low	Low	Very low	Very low
Alaska	Formula (0.20)	11.3%	-15.6%	Medium	Very high	High	Very high
Colorado	Categorical	12.0%	-11.1%	High	Medium	Medium	Low
Oregon	Formula (0.50)	9.0%	-11.1%	Low	Low	Very high	Low
Group average		8.7%	-24.7%	0.392	0.13	30	$12,080
Progressive / equitable (3-9% more funding to high-ELL districts)							
Delaware	No mechanism	6.4%	-8.0%	Very low	Very high	High	High
Oklahoma	Formula (0.25)	6.9%	-4.8%	Very high	Medium	Low	Very low
Massachusetts	Formula (0.07 - 0.34)	7.3%	-4.4%	Very high	Very high	High	Very high
S. Carolina	Formula (0.20)	5.8%	-4.3%	Very low	Very low	Very low	Medium
Washington	Formula ($930/ELL)	8.9%	-3.9%	Medium	High	Very high	Medium
Utah	Categorical	5.7%	-3.8%	Medium	High	Low	Very low
Kansas	Formula (0.395)	8.8%	-3.2%	Very high	Low	Medium	Medium
Group average		7.3%	-4.6%	0.412	0.32	30	$11,852
Equal (high- and low-ELL districts within +/- 2% per-pupil funding)							
New Mexico	Formula (0.50)	15.8%	-0.8%	Very low	Medium	Low	Low
U.S. Average	n / a	8.9%	0.1%	n/a	n/a	n/a	n/a
N. Carolina	Formula (20:1)	6.6%	0.4%	Very low	Very low	Low	Very low
Texas	Formula (0.10)	15.1%	0.8%	Low	High	Low	Very low
Rhode Island	No mechanism	5.8%	1.5%	Very high	Very high	Very high	Very high
California	Formula (0.20)	22.8%	1.7%	Low	High	Very high	Low
Group average		17.7%	0.6%	0.332	0.42	26	$11,277
Regressive / unequal (more than 3% funding gap)							
Minnesota	Formula ($700/ELL)	6.4%	4.5%	High	Low	High	High
Arkansas	Formula ($305/ELL)	7.1%	5.6%	Very high	Very low	Very low	Low
Illinois	Reimbursement	9.4%	6.2%	High	Medium	Very high	High
Connecticut	Formula (0.15)	5.8%	6.7%	High	Very high	High	Very high
Nevada	Categorical	15.7%	14.3%	Very low	Low	Medium	Very low
Arizona	Formula (0.115)	6.2%	17.4%	Medium	High	Very low	Very low
Group average		8.3%	9.1%	0.387	0.29	24	$12,104

Note. High- and low-ELL districts are those in approximately the 5th and 95th percentile of percent of English language learners (ELL). Districts in Minnesota with fewer than 20 ELLs receive a $14,000 block grant. Average district funding in Washington, Arkansas, and Minnesota is $10,382, $9,126, and $12,003, so the dollar amounts equate to student weights of approximately 0.090, 0.033, and 0.058, respectively. Student weights for ELLs in Massachusetts vary by grade level. Segregation is measured as the dissimilarity index; union strength is based on state rankings reported in Winkler et al. (2012). The table include the 25 states with the highest percent of ELLs.

TABLE 5

Predicted values for high- and low-ELL districts in Texas based on models predicting whether a district levies the highest possible M&O tax rate (Panel A), M&O tax rates (Panel B), I&S tax rates (Panel C), and local per-student property values (Panel D), 2007-08 to 2012-13

	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	Diff. 2007-08 to 2012-13
Panel A: Districts with the highest possible local M & O property tax rate							
High-ELL	0.026	0.081	0.109	0.166	0.165	0.228	0.202***
	(0.017)	(0.011)	(0.011)	(0.011)	(0.012)	(0.013)	(0.021)
Low-ELL	0.029	0.034	0.081	0.086	0.113	0.166	0.137***
	(0.015)	(0.017)	(0.016)	(0.016)	(0.016)	(0.017)	(0.023)
Panel B: Local district property tax rate for maintenance and operations (M & O, fully equalized tax base)							
High-ELL	1.046	1.053	1.056	1.065	1.065	1.070	0.024***
	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
Low-ELL	1.047	1.048	1.053	1.052	1.058	1.064	0.018***
	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)
Panel C: Local district property tax rate for bond repayment (I & S, partially equalized tax base)							
High-ELL	0.250	0.252	0.250	0.247	0.247	0.248	-0.002
	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.007)
Low-ELL	0.267	0.283	0.286	0.289	0.287	0.286	0.019**
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.007)
Panel D: Local district property value per pupil ($1,000s)							
High-ELL	342.559	351.968	320.252	309.171	311.632	352.134	9.576
	(13.909)	(9.609)	(9.646)	(9.603)	(9.747)	(10.573)	(17.471)
Low-ELL	454.860	435.181	409.217	399.098	410.580	404.212	-50.648
	(12.891)	(14.181)	(13.850)	(13.842)	(13.857)	(14.053)	(19.070)
Panel E: Differences between low- and high-ELL districts							
Highest poss. M and O rate	-0.003	0.047*	0.028	0.080***	0.053**	0.062**	0.065*
	(0.023)	(0.020)	(0.020)	(0.020)	(0.020)	(0.021)	(0.031)
Avg. M and O rate	-0.001	0.005	0.003	0.012***	0.007*	0.006+	0.007
	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.005)
Avg. I and S rate	-0.016*	-0.032***	-0.036***	-0.042***	-0.040***	-0.038***	-0.021*
	(0.007)	(0.007)	(0.006)	(0.006)	(0.006)	(0.007)	(0.010)
Prop. value per pupil	-112.3***	-83.21***	-88.96***	-89.93***	-98.95***	-52.08**	60.22*
	(18.965)	(17.130)	(16.878)	(16.847)	(16.941)	(17.586)	(25.864)

Note. High- and low-ELL districts are those at the 5th and 90th percentile of % ELL for Texas school districts, respectively (0% and approximately 20% ELL). *** p<.001, ** p<.01, * p<.05.

Notes

[i] *Texas Taxpayer and Student Fairness Coalition, et al. v. Scott, Combs, and the State Board of Education*, 2016

[ii] Both the Parrish (1994) and the Lara-Alecio et al. (2005) study use the Resource Cost Method in which empirical data on resource use is collected and assigned a cost value. The ingredients methods (Levin and McEwan 2001) is a similar analytic approach, but is more often used in cost-effectiveness analyses. The literature describes four other approaches for measuring cost in education: (a) the evidence-based approach (Odden and Picus 2015), which determines the cost of ELL programs based on best-practices derived from research literature (rather than empirical analyses); (b) Professional Judgement Panels which gather groups of educators to estimate resources required in various types of schools; (c) the successful schools approach, which examines resource allocation patterns in high-performing schools; and (d) cost function analyses, which use large datasets that include information on district expenditures and outcomes (Augenblick, Palaich, and Associates 2011; Baker, Taylor and Vedlitz 2005; Chambers and Levin 2006; Gándara and Rumberger 2007; Rebell 2007).

[iii] The finance system contains a second layer called the Target Revenue System. The Target Revenue System is a "hold harmless" clause that prevents districts from losing funding as a result of reforms implemented through House Bill 1. To ensure that no district lost funding as a result of the 2006 tax relief, House Bill 1 guarantees that districts receive at least the amount they would have received using the old formula system.

[iv] According to NCES data, in 2012-13, 4.2 million students were classified as ELL, out of a total of 47.5 million enrolled in U.S. public schools (8.9%). Because the percent of ELLs is higher, on average, in larger districts, the average percent of ELL students across all U.S. districts, 4.4%, understates the actual percent of students classified as ELL nationally.

[v] We control for the cost of labor in the local labor market (Taylor and Fowler 2006), whether the district has fewer than 500 students, between 500 and 2,000, or more than 2,000, urbanicity using NCES district locale codes (i.e., urban-large city, urban-small city, suburban, rural-fringe, and rural-remote), the proportion of students in poverty and its square, and the proportion of students in special education.

[vi] This number is calculated using the margins command in STATA, which provides predicted values for districts with 0% ELL students and for districts with 20% ELL students, holding other variables in the model constant. The

gap could also be calculated simply by adding the main effect of % ELL and the interaction term between % ELL and school year 2012-13 and then multiplying this number of 0.2. For example, based on the coefficients in the first column of Table 3, the funding gap for all U.S. districts in 2012-13 is (5000.59-5043.53) * 0.2 = -8.59, implying that in 2012-13, otherwise similar districts receive $8.59 less per student for each 20 percentage point increase in the percent of ELLs in the district (as shown in Panel B of Table 3). We use the same methods to determine the ELL funding gap for each state.

[vii] The dissimilarity index is a measure of the proportion of students in the state that would need to switch districts to create perfect integration of ELLs across states. The index is given by $0.5 \Sigma \mid (ELL_i / ELL_{state\_total}) - (non\text{-}ELL_i / non\text{-}ELL_{state\_total}) \mid$.

[viii] For example, states might use a different cost of wage index than the one we use, or they might not use one at all.

[ix] Specific results are available from the author upon request.

[x] Recall that M&O taxes, which are used to pay for salaries and other ongoing expenses, are subsidized for lower-wealth districts through state's Foundation School Program. In contrast, I&S taxes, which are used to repay bonds, are not subsidized to the same extent. Lower-property wealth districts therefore generate less funding from I&S taxes than otherwise similar high-property wealth districts, and thus may rely more on M&O taxes to raise local revenues.

[xi] Results are available from the author upon request.