STATE FUNDING AND THE EQUAL EDUCATIONAL OPPORTUNITY OF LANGUAGE MINORITY STUDENTS: THE TEXAS PUBLIC SCHOOL FINANCE MECHANISM AND THE EXTENT TO WHICH ENGLISH LANGUAGE LEARNERS ARE EQUITABLY SERVED

A Dissertation

by

NOELLE ROGERS EASON

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

December 2010

Major Subject: Educational Psychology

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ABSTRACT

State Funding and the Equal Educational Opportunity of Language Minority Students: The Texas Public School Finance Mechanism and the Extent to Which English Language Learners Are Equitably Served.

(December 2010)

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This quantitative study examined state and local funding and district spending patterns for English language learning (ELL) students in Texas. The purpose of this study was to examine the vertical equity of the state public school funding system from 1997-2007 for purchasing educational resources for ELL students. Vertical equity was operationalized through a research-based framework that places ELL students at risk of academic failure. Regression analysis examined vertical equity through (a) the extent to which the quantity of ELL students within districts predicted the TPSFM funding output for ELL students in districts over 10 years and (b) the extent to which, when districts are grouped by like-sized populations of ELL students within each of the 10 years, the quantity of ELL students within districts with like-sized populations of ELL students predicted the TPSFM funding output for ELL students. The findings revealed that from 1997-2007, the ELL student funding component was not found to be a statistically

significant predictor for district spending on ELL students in any given Texas district. The present study therefore concludes with a discussion of policy implications and recommendations for further study. Within the current punitive culture for student assessment results and annual yearly progress measures, these findings indicate that programs serving ELL students may be constrained to produce results in areas where they are not equitably funded to be able to do so. In the daily life of school operations, teachers and administrators may be well aware that the state's mechanism does not supply adequate funding for the education of ELL students, therefore the results of this study may serve policy makers to clearly see the elephant of inequitable funding standing in the classroom.

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CHAPTER I

INTRODUCTION: THE IMPORTANCE OF RESEARCH

In 2007, the United States government sued the state of Texas (*United States v. Texas*, 2007) alleging that the Texas Education Agency (TEA) had failed to achieve results for its secondary English language learner (ELL) students in overcoming language barriers. State educational agencies are required under The No Child Left Behind Act of 2001 (NCLB) to provide programs for ELL students to promote the overcoming of language barriers toward academic achievement (*Castañeda v. Pickard*, 1981; EEOA, 1974; Garcia & Morgan, 1997; Hansen et al., 2007). After examining factors such as the dropout rate and the academic achievement of ELL students in core content areas, the lawsuit alleged that TEA had failed to equitably implement Bilingual Education (BE) and English as a Second Language (ESL) programs. The United States District Court of Appeals found that under the Equal Education Opportunity Act (EEOA, 1974); a civil rights based statue, TEA had failed their responsibilities to ensure that no child would be denied equal educational opportunities (*United States v. Texas*, 2007).

The educational structure of TEA is one in which responsibilities for serving ELL students toward overcoming language barriers are delegated to the local districts. Under the EEOA (1974), however, state agencies may not completely delegate their obligations in practice. The state agency is responsible to set guidelines for establishing language-serving programs and to ensure that the guidelines are implemented.

This dissertation follows the style of *Journal of Educational Psychology*.

Texas school districts' programmatic approaches to serving ELL students, including BE and ESL and their various sub-programs, which will be further discussed, exist as a resource for ELL students to ensure their academic achievement while mastering the English language. These programs represent additional and varying costs to each district, however "the state's school funding contribution is driven, in part by efforts to maintain certain standards of equity within the school finance system" (Legislative Budget Board, 2001, p. 1).

The Ninth Circuit Court of Appeals ruled in *Flores v. Arizona* (2008) that failure to adequately fund programs of instruction for ELL students was to deny equal educational opportunities for these students. The Court found that it is the responsibility of states and their agencies to ensure adequate funding of language support programs.

What exactly constitutes *adequate funding* continues to be a source of debate and significant education finance litigation. Adequacy calculations generally consider poverty status, English language proficiency, and other factors when determining the amount of resources needed by a school (Glenn, 2006), however, ongoing litigation suggests that school funding continues to be challenged, while the extent of disparities and the definitions of adequacy and equity are decided in the courts (NCES, 2003).

Definition of Terms

English Language Learner (ELL)

According to TEA (2008), ELLs are those students whose home language is other than English and who therefore have been identified as English language learners by the Language Proficiency Assessment Committee (LPAC), or English proficient (19

TAC §89.1220, 2006), according to criteria established in 19 TAC §89.1225. ELL students in Texas are served in specialized language programs including Bilingual Education (BE) or English as a Second Language (ESL) or within sub-categories of these programs (Clark, 1998; Legislative Budget Board, 2001; Texas House of Representatives Research Organization, 2004).

At-Risk Students

At-risk students are students who are at risk of dropping out of school according to state criteria (TEA, 2004; Texas Education Code Section 29.081; Texas Education Code Section 29.052). The term is further refined in school finance research literature (Stringfield & Land, 2002, p. vii) as those students, "who, through no fault of their own, are at risk of low academic achievement and dropping out before completing high school." Land and Legters (2002) formed a seminal, at-risk framework, based on a comprehensive review of the research literature, in which they conclude that the five most frequently cited individual or family-level risk factors are poverty, race or ethnicity, ELL student status, low educational attainment of parents, and single-parent status.

Revenue

Revenue refers to the dollars received by the school district and eventually the child (Berne & Stiefel, 1984). Revenue can be examined by the source, such as state, local, and federal, and further divided by program type such as Title I funding.

Expenditures

Expenditures refer to the dollar value of the resources that are purchase for the

student within a district (Berne & Stiefel, 1984). In Texas, districts' expenditures are identified by a code system that contains a mandated sequence of alphanumerical codes that indicate purpose such as current operating (further divided into instruction, utilities, maintenance, transportation, food service or) or debt-service (TEA, 2004). A district's total expenditures include state and local funding and exclude federal funding (Hansen, Marsh, Ikemoto, & Barney, 2007; Sable & Hill, 2006; TEA, 2004). Classifying expenditures by function permits researchers to examine how much money actually reaches students in the classrooms (Stiefel, Ruberstein, & Berne, 1998).

Vertical Equity

Berne and Stiefel (1984) defined vertical equity as the financially unequal treatment of unequals—distributing more of the object to the more needy. *Unequal treatment* refers to the differences in the services provided by a district's expenditure per ELL student—the services purchased in that local environment, taking resource limitations into account. *Unequal students* refers to the difference in district expenditure for ELL students, as compared to district expenditures for students not served in specialized language programs including Bilingual Education (BE) or English as a Second Language (ESL) or any sub-category of these programs (Clark, 1998; Legislative Budget Board, 2001; Texas House of Representatives Research Organization, 2004).

The Texas Public School Finance Mechanism

Texas' public school funding mechanism (TPSFM), also known as the Foundation School Program (FSP) is a complex system of adjustments, weights, and

formulas comprised of the following three tiers (Imazeki & Reschovsky, 2005, p. 100): (a) Tier I: Foundation formula, which guarantees all school districts a certain amount of money if they agree to levy a minimum property tax rate; (b) Tier II: Guaranteed tax base formula, which guarantees all districts a fixed amount of money for each cent of additional property tax rate above the minimum and below a statutory maximum; and (c) Tier III: Recapture provision, which caps the revenue-raising capacity of all property-wealthy districts by requiring them to contribute all property tax revenues on property values above the caps to help finance the FSP.

Texas school districts are therefore allocated a base level, per-pupil distribution of state revenue according to Texas Education Code Section 42.302. Distributions are based on the number of students in a district's average daily attendance (TEA, 2004, 2008; Texas Education Code Section 42.302(a)). Tiers I and II include 12 variables from districts: property tax revenue (X_1), beginning teacher salary (X_2), student enrolment based on average daily attendance (ADA) (X_3), transportation allotment, (X_4); and student population groups receiving additional weighting within the formula: % economically disadvantaged students (X_5), % special education students ($X_{6,}$), % ELL students in specialized language programs (X_7), % compensatory education students ($X_{8,}$), % students enrolled in career and technology classes ($X_{9,}$) and % gifted and talented students (X_{10}); a district's tax rate (X_{11}) and facilities funding allotment (X_{12}) (Imazeki & Reschovsky, 2005; Legislative Budget Board, 2009; TEA, 2004, 2008; Texas Education Code Section 42). The following state mechanism variables are further defined:

Actual total operating expenditures.

TEA (2006) defined actual total operating expenditures as being grouped by program of expense. Actual operating expenditures for groups of program categories are expressed as a percent of actual total operating expenditures. The values in the per-student column show actual total operating expenditures divided by the total number of academic school year students in membership. Per-student operating expenditures are shown for total operating expenditures by program for various groupings of operating categories. Note that the number shown is not the amount actually spent on each and every student; it is a per-student average of the total. Program codes appear in parentheses. The sum of operating expenditures by program area is less than total operating expenditures by function because a significant portion of expenditures have no program area designated and are reported as "99" meaning *undistributed*. These are not included in any of the program categories shown or in the total operating expenditure amount by program. Also, functions included differ between the two breakdowns, by program versus by function.

Certain base cost.

Certain base cost refers to the costs to provide the basic services for education/instruction to students not in special education, according to TEA (2006).

Beginning teacher salary.

A beginning teacher is the salary reported for a teacher with zero years of experience, according to TEA (2006).

Percent economically disadvantaged population.

The percent of economically disadvantaged students per district is calculated as the sum of the students coded as eligible for free or reduced-price lunch or eligible for other public assistance, divided by the total number of students, according to TEA (2006).

Percent special education population.

The percentage of special education population refers to a district's population of students served by programs for students with disabilities. These include the costs incurred to evaluate, place and provide educational and/or other services to students who have Individual Educational Plans (IEP) approved by Admission, Review and Dismissal (ARD) committees. These plans are based students' abilities and/or learning needs, according to TEA (2006).

Percent compensatory education population.

The percentage of compensatory education population refers to a district's population of students identified as at-risk of dropping out of school. The cost to evaluate, place and provide educational programs and/or other services designed to supplement the regular education program for students identified as at risk of dropping out of school. The purpose is to increase academic achievement and reduce the drop out rate of these students. (TEA, 2004; Texas Education Code Section 29.081)

Percent career and technology population.

The percent of career and technology refers to a district's population of students identified as career and technology. This includes the cost to evaluate, place and provide

educational and/or other services to prepare students within the career and technology program for gainful employment, advanced technical training or homemaking. This may include apprenticeship and job training activities, according to TEA (2006).

Percent English language learner (ELL) population.

The percentage of students within a district being served by a specialized language program under Section 29 of the Texas Education Code, according to Texas Education Code Section 42.153. This includes the cost to evaluate, place and provide educational and/or other services, for students within the district identified as ELL students, that are intended to make the students proficient in the English language, primary language literacy, composition and academic language related to required courses, according to TEA (2006). Programmatic approaches to serving ELL students may vary by district to include BE, ESL, or any sub-category of these programs (Clark, 1998; Legislative Budget Board, 2001; Texas House of Representatives Research Organization, 2004), however, the percentage of ELL students measured by the TPSFM refers to the percentage of ELL students served in a district, regardless of the type of programmatic intervention received (TEA, 2006).

Percent gifted and talented population.

The percentage of gifted and talented refers to a district's population of students identified as gifted and talented. This includes the cost to assess students for program placement and provide instructional services beyond the basic educational program, designed to meet the needs of students in gifted and talented programs, according to TEA (2006).

Average daily attendance (ADA).

The average daily attendance (ADA) is the actual calculation for a district's average daily attendance used in calculating Tier I allotments for students in districts' special programs, according to TEA (2010). TEA (2010) further explained that the sum of the number of days attended by all students in a six-week period (sum of all students' days of attendance) is divided by the number of days taught in the six-week period. The results for all six-week periods in a school year are then summed, divided by six, and rounded to three decimal places.

Property wealth.

The Texas Comptroller's Office (2010) explained that within school finance, a district's property wealth is measured in taxable property value per student. The Texas Comptroller's Property Tax Division conducts an annual property value study that determines the taxable wealth of each Texas school district to be used to allocate state aid. The state sends more money to those districts that are less able to raise money locally because of insufficient taxable property. A district's property wealth is factored into the Tier I formula to adjust the allotment for each district's property tax base. State revenue for each district is based upon the district's property values, according to TEA (2006) and Texas Comptroller's Office (2010).

M&O tax rate.

This is the locally adopted tax rate set for the 2006 calendar year. The total adopted rate is composed of a maintenance and operation rate (M&O) and a debt service rate which is sometimes referred to as the Interest and Sinking fund rate. Rates are

expressed per $100 of taxable value. Taxes based on this rate were to be paid by taxpayers in early 2007. The state value shown for the adopted tax rates is the simple average of all the district rates, according to the Texas Comptroller's Office (2010).

Transportation allotment.

The transportation allotment is the cost for a district to transport students to and from school, according to TEA (2006).

Facilities funding.

Facilities funding is a measure of cost that includes both plant maintenance and operations: keeping the physical plant and grounds in effective working condition and security and monitoring services: keeping student and staff surroundings safe, according to TEA (2006).

Weighted Variables

The TPSFM applies an adjustment or *weight* (Texas Education Code Section 29.081) to the quantity students served in specialized programs per district, in order to ensure appropriate distribution to the districts that serve them (Clark, 1998; Legislative Budget Board, 2001).

Statistical Significance Measures

Statistical significance will be determined by regression analysis to examine the statistical power of predictability of the X_7 variable, a district's ELL student population size, on districts' total expenditures on these students.

Archive Data

Centralized government data bureaus gather data highly relevant to social science

researchers, be it for academic interests, government policy making, or to inform the public (De Vries, 1997). In the context of the present study, TEA collects and provides public access to financial and demographic data through Public Education Information Management System (PEIMS).

TEA provides an annual resource guide and reporting system in order for all districts to uniformly report data including yearly expenditures (TEA, 2004). Districts report their data to PEIMS as a sequence of alphanumeric codes, which identifies the school district, various expenditure functions, and program intent (TEA, 2004). In accordance with the state's financial codes (Texas Education Code Sections 29.081, 42.152), an independent auditor ensures that expenditures for districts are calculated and reported properly (TEA, 2004). These archive data offer a variety of potential research purposes including the analysis of financial equity issues.

Research Problem

The Equal Educational Opportunity Act (EEOA) (1974) requires all state and local educational agencies take *appropriate action* to ensure that the needs of ELL students are met. The United States Supreme Court ruled in *Lau v. Nichols* (1974) that all students must have appropriate access to a district's educational program and that all students be instructed, therefore, in a language of *comprehensible input* (EEOA, 1974; *Lau v. Nichols*, 1974). The Court did not specify, however, what type of specialized language program should be implemented to serve ELL students, but rather left this decision to local districts (Garcia & Morgan, 1997; *Lau v. Nichols*, 1974; Sugarman, 1999).

In *Castañeda v. Pickard* (1981), the Court further refined the concept of *appropriate action* for meeting ELL student needs in a 3-prong test for specialized language programs serving these students. According to the ruling, (*Castañeda v. Pickard*, 1981):

1. A program must be based on sound educational theory, recognized by experts within the field or deemed a legitimate experimental strategy.
2. The program's implementation must be in accordance with the educational theory and resources such as instructional materials, and facilities and personnel.
3. After a legitimate period, program results must be able to measure whether language barriers are being overcome.

Various types of specialized language programs exist within the public school system to address ELL students' language needs. Texas school districts' programmatic approaches to serving ELL students include Bilingual Education (BE) for the primary grade levels, which uses native language instruction and English as a Second Language (ESL) for the secondary grade levels, which focuses on content instruction in English (Garcia & Morgan, 1997; TEA, 2004). Texas districts additionally offer various sub-divisions of BE and ESL programs including: Transitional Bilingual/Early Exit, Transitional Bilingual/Late Exit, Dual Language Immersion/Two-Way, Dual Language Immersion/One-Way, Content-based ESL and Pull out-based ESL (Garcia & Morgan, 1997; TEA, 2004).

I did not examine the quality of the program being evaluated nor any measure of cost-effectiveness. As Lara-Alecio et al. (2005) cautioned, the most cost effective program may not be the most educationally effective program. Theobald (2003) examined Texas programmatic approaches to serving ELL students and found that the important policy decision was not which type of BE or ESL program to use, but instead to ensure that all ELL students are served by some form of English acquisition assistance program. Furthermore, I do not intend to make a case for BE and ESL programs, a case effectively presented in previous research (Blasingame, 2008; Krashen, 1996, 1997; Rolstad, 2005; Swain, 1979; Willig, 1985). Instead, I examined public school funding to establish to what extent ELL students in Texas are served from the financial perspective.

Public School Funding in Texas

To fund public education, Texas school districts are allocated a base level, per-pupil distribution of state revenue according to the Texas Education Code (Texas Education Code Section 29.081). The TPSFM determines funding distributions for each district based on the number of students in a district's average daily attendance (TEA, 2004, 2008; Texas Education Code Section 42.302(a)). The formula for the TPSFM takes into account additional expenses to districts for programs including: Special Education, Gifted and Talented, Career and Technology and specialized language programs. Hodgkinson (1999) explained:

> Taxpayers and policy makers must understand that while bilingual education can be seen as a polarizing issue, children who do not speak English at home will be more expensive to educate regardless of the system used…All the

> research shows that if children are taught in a language they understand, and are gradually shifted to English after 4 years, bilingual education is a real success, compared with other techniques. . . While immigrants may be more expensive to educate, they are the nation's new workers, family members, and taxpayers. A nation that can absorb large numbers of immigrants and release their talent and energy will be at a major economic advantage. (p. 35)

To promote equity for all students, the mechanism takes into account adjustments for district size, geographical sparseness, cost of living, concentration of low-income students as well as adjusting for additional expenses to districts for programs such specialized language programs serving ELL students (Imazeki & Reschovsky, 2005). The state formula weights certain variables within the equation to ensure funding equity for all students in all districts across the state (Texas House of Representatives Research Organization, 2004). One such weight is applied (Texas Education Code Section 29.081) to the variable which represents a district's ELL students served in specialized language programs in order to ensure that districts can purchase appropriate educational resources for students (Clark, 1998; Legislative Budget Board, 2001). Baker and Markam (2002) noted that, assuming a rational allocation of aid, districts with more ELL students should be receiving more aid per enrolled pupil. Examining this relationship allowed researchers to answer critical questions about funding equity, a concept that will be further explained.

A history of litigation has challenged the equity of the TPSFM based on disparities in per-pupil spending by different Texas districts (*Carrollton-Farmers Branch School District v. Edgewood ISD*, 1992; *Edgewood ISD v Kirby*, 1989; *Edgewood ISD v Kirby*, 1991; *Edgewood ISD v. Meno*, 1995; *San Antonio ISD v. Rodriguez*, 1973; *West Orange Cove v. Alanis*, 2003; *West Orange-Cove v. Neeley et al.,* 2004). Additionally, researchers (i.e., Cardenas, 1997; Peevely & Ray, 2001; Rolle, 2008 Working Paper). have suggested that the TPSFM may not equally distribute funds to districts, taking all of the mechanism's variables into account. If funds are not distributed equally, there is a need to further examine the TPSFM for equity of access to educational opportunities for all students.

Differing Educational Costs

"Evidence from a large literature on the costs of education...indicates that the costs of meeting educational accountability standards are substantially higher when a high proportion of students come from economically disadvantaged families and enter schools with limited English proficiency" (Imazeki & Reschovsky, 2005, p. 103). As such, districts with larger ELL student populations are intended to receive greater funding distributions (Baker & Markam, 2002), so that the appropriate educational resources may be purchased.

While districts have finite funds from which to purchase a variety of educational resources, "teacher salaries account for the largest share of school expenditures and are arguably the most important input in the educational process" (Imazeki & Reschovsky, 2005, p. 110). Teacher salaries have been shown to improve educational outcomes by

allowing districts to select from a larger pool of applicants (Grubb, 2009). Appropriately greater funding for districts serving ELL students necessarily signifies providing an equal opportunity of instruction to ELL students. Analysis of teacher salaries, qualifications, and mobility, however, has found that ELL students have a lack of access to qualified teachers (Education Trust, 2008; NCES, 2004).

Comprehensive, national studies have found significant evidence that teachers with stronger credentials tend to teach in schools with more advantaged and higher performing students (Clotfelter, Ladd, Vigdor, & Wheeler, 2006; Darling-Hammond, 2001) than in schools serving large numbers of academically disadvantaged, minority-status students (Hanushek, Kain, & Rivkin 2004; Maiden & Evans, 2009). Schools with the highest percentage of ELL students have the greatest likelihood of employing novice teachers and to assign teachers without the required credentials to teach specialized language programs including BE and ESL classes (NCES, 2004).

In Texas's 50 largest school districts, low-income, Hispanic, and African-American students were found to not be getting their fair share of the best teachers, or the money it takes to pay for them (Education Trust, 2008). The Education Trust found:

> In 42 out of 50 Texas districts, the highest-minority schools have more novice teachers than do the lowest-minority schools. In 43 out of 50 Texas districts, the highest-poverty schools have more novice teachers than do the lowest-poverty schools. . . In 47 of the 50 largest districts in Texas (94 percent), the five-year average teacher turnover was greater in the highest-poverty schools than in the lowest-poverty schools. In 44 of the 50 Texas

> districts (88 percent), schools with the highest concentration of Hispanic and African-American students had a higher five-year average teacher turnover. (p.15)

When ELL students, who are already identified as *at risk* of dropping out of school according to state criteria (TEA, 2004; Texas Education Code Sections 29.081, 29.052), do not receive equitable access to quality instruction, these students are not being appropriately supported towards academic achievement. It is imperative, therefore to further examine the state funding mechanism for purchasing educational resources for ELL students.

Delimitations of the Study

Central to this study was the relationship between districts' expenditures on ELL students served in specialized language programs and districts' population size of ELL students. I therefore confined to an examination of the research testing questions in the context of all independent public school districts in existence in Texas over the 10-year study period, from 1997-2007.

As will be further explained, although differing weights have been applied to certain variables within the TPSFM, beginning with Texas' own GOERP report (1974), (Hansen et al., 2007; Legislative Budget Board, 2009; Texas Education Code Section 42.001; Texas House of Representatives Research Organization, 2004), I examined funding from 1997-2007 when a funding weight of 0.1 was consistently assigned to ELL students served in specialized language programs within TPSFM funding distributions.

I specifically examined districts' total state expenditures and total local

expenditures, not districts' total revenues. Therefore federal funding, which is excluded when districts report their total expenditures (Berne & Stiefel, 1984; Hansen et al., 2007; Sable & Hill, 2006; TEA, 2004), was not included in this study.

I purposefully excluded charter schools and private schools because non-independent school districts are funded through distinct practices (Alexander et al., 2002; Clark & Toenjes, 1996; Sabel & Hill, 2006; Smith, 2005; Vergari, 2007). This study did not conduct specialized language program evaluation nor did it examine the relationship between districts' expenditures and students' academic achievement, because these analyses have been extensively explored (Hancock, 2005; Hanushek, 1997; Hartman, 1994; Malone, 2000; Mosborg, 1996; Sonnen, 2000) and were outside of the scope of the research testing questions.

Purpose of the Study

State education finance systems are designed to promote equity among the funds available to all districts for purchasing educational resources for their students (Guthrie & Rothstein, 1999; Ladd & Hansen, 1999; Rechovsky & Imazeki, 2001; Texas House of Representatives Research Organization, 2004). TEA reviews the distribution of state resources to campuses with a larger percentage of students in at-risk situations to verify that a higher percentage of state compensatory education allotment is flowing to campuses that have a higher number of students in at-risk situations (TEA, 2004). Therefore differences in districts' expenditures per pupil indicate district-level spending allocation decisions about state and local revenue distributions in light of the local

resource constraints of cost and availability of educational goods (Baker & Markham, 2002; Berne & Stiefel, 1984; NCES, 2003).

The number of ELL students Texas schools has increased dramatically from 1998 to 2008 (Cortez & Johnson, 2008). According to TEA (2009), between 1998-1999 and 2008-2009, the number of ELL students receiving BE or ESL instructional services has increased by 58.2%, representing an increases of more than a quarter of a million students. It is therefore crucial to examine the extent to which the TPSFM provides equitable funding for all Texas districts to purchase educational resources for their ELL students, regardless of districts' population size of ELL students. The purpose of my study was to examine the vertical equity of the state public school funding system from 1997-2007 for purchasing educational resources for ELL students. Vertical equity was operationalized through a research-based framework that places ELL students at risk of academic failure. Regression analysis examined vertical equity through (a) the extent to which the quantity of ELL students within districts predicted the TPSFM funding output for ELL students in districts over 10 years and (b) the extent to which, when districts are grouped by like-sized populations of ELL students within each of the 10 years, the quantity of ELL students within districts with like-sized populations of ELL students predicted the TPSFM funding output for ELL students.

Research Questions

Two research questions guided the study:

Question 1

Is X_7, the variable within the TPSFM which represents the quantity of ELL

students served in specialized language programs within a district, a statistically significant predictor for a districts' total expenditure for these students for each of the 10 academic school years examined, from 1997-2007?

Question 2

When districts are grouped into quartiles by like population sizes of ELL students, is X_7, the variable within the TPSFM which represents the quantity of ELL students served in specialized language programs within a district, a statistically significant predictor for a districts' total expenditure for these students within each quartile for each of the 10 academic school years, from 1997-2007?

Organization of the Study

My study is presented in five chapters and follows the format delineated by the American Psychological Association (APA), 6th Edition. Chapter I of the study included definition of terms, a presentation of the research problem, the purpose of study and research questions, and delimitations.

In Chapter II of the study, I include a review of the literature focusing on educational finance systems and the principles of funding equity with specific emphasis on vertical equity. In Chapter II, I further examine the Texas Public School Finance Mechanism (TPSFM), ELL students served in specialized language programs, the structure of weighting variables within the Texas formula, previous research studies on the TPSFM and a summary.

The methodology of the study is presented in Chapter III. This chapter includes the study population, research design, research questions, and the context of the study,

data collection, data analysis, and a summary.

In Chapter IV, I report the data analysis and a summary.

In Chapter V, I discuss findings from the data analysis and research questions, present the limitations of the study, recommendations for future study, and finally implications and conclusions.

CHAPTER II

REVIEW OF THE LITERATURE

This chapter includes a review of the related literature in the area of public school finance with specific emphasis on funding equity for ELL students served in specialized language programs in Texas independent school districts. Previous literature and studies were examined in light of the current study's research questions to examine to what extent ELL students are receiving equal access to resources that determine the quality of educational instruction the student receives. The focus of this critical overview was to demonstrate potential connections within the current body of scientific research and to refine the concept of equity within educational finance systems for ELL students.

Financing Public Education

The Tenth Amendment of the United States Constitution delineates the responsibility of public education to the states (U.S. Constitution; Wood & Honeyman, 1990). State legislatures delegate authority to state departments of education and other state agencies, which in turn have created school districts, in charge of the daily operations of the state's educational program (Wood & Honeyman, 1990). Sources of revenue for funding the public school education program may vary from state to state, however, "the three major sources of revenue, income, sales, and property taxes, account for nearly all the revenues used to fund public education" (Wood & Honeyman, 1990, p. 5).

According to Wood and Honeyman (1990):

> States define a minimum educational program that must be extended to all residents by the local district. However, the wealth of any given state is not distributed in any uniform pattern. The ability of local districts to offer the state mandated educational program will vary greatly from community to community. (p. 4)

Regardless of wealth distribution patterns, states are held responsible to provide an equal educational opportunity for its residents (*Flores v. Arizona,* 2008; Guthrie & Rothstein, 1999; Ladd & Hansen, 1999; Rechovsky & Imazeki, 2001; Texas House of Representatives Research Organization, 2004; Wood & Honeyman, 1990). "Because a child's educational offering cannot be a function of the wealth, or lack thereof, within a local community, the state taxes the wealth of all its residents and provides assistance to the poorer school districts" (Wood & Honeyman, 1990, p. 4). Although early versions of state funding formulas since the 1920s proved to be inequitable (Wood & Honeyman, 1990), they have attempted to equalize educational funding by requiring local taxpayers to contribute their fair share to local public schools for schools' operational expenses.

In Texas, the state Constitution guarantees “suitable provisions for the support and maintenance” of the public school system (Texas Constitution), however, extensive litigation (*Carrollton-Farmers Branch School District v. Edgewood ISD*, 1992; *Edgewood ISD v Kirby*, 1989; *Edgewood ISD v Kirby*, 1991; *Edgewood ISD v. Meno*, 1995; *San Antonio ISD v. Rodriguez*, 1973; *West Orange-Cove v. Alanis*, 2003; *West Orange-Cove v. Neeley et al.,* 2004) has challenged the equity of public school financing for districts throughout the state. Researchers have noted that districts may pay different

prices for the same resources, such as teacher salary, or may be constrained by resource availability because of geographical location, such as within urban or rural settings (NCES, 2003; Baker & Markham, 2002; Berne & Stiefel, 1984). One of the aims of state education finance systems, therefore, has been to foster greater equity among the funds available to school districts (Guthrie & Rothstein, 1999; Ladd & Hansen, 1999; Rechovsky & Imazeki, 2001; Texas House of Representatives Research Organization, 2004).

Education Finance Systems

"Education finance systems provide the framework for generating revenue, allocating funds between different levels of government, and purchasing the inputs used in education" (NCES, 2003, p. 33). According to the National Center for Education Statistics (2003), revenue is the financial support that may be allocated to a general fund or as categorical funds to support particular programs or activities such as special education, transportation, compensatory education, and capital outlay. Expenditures refer to the dollar value of the educational resources that are purchased for the student (Berne & Stiefel, 1984). According to Berne and Stiefel (1984): (a) Revenue is the dollars received by the school district and eventually the child. This can be examined by source (state, local, federal) and further divided by program type such as Title I funding; (b) Expenditures are the dollar value of the resources that are purchase for the child. This money is identified by purpose such as current operating (further divided into instruction, utilities, maintenance, transportation, food service or) or debt-service.

Across Texas, district revenues and expenditures are compiled in PEIMS for the purpose of reporting (TEA, 2004). TEA provided an annual resource guide and reporting system in order for all districts to report their yearly expenditures, defined as decreases in net financial resources (TEA, 2004), purchased from state revenue (TEA, 2004).

Districts' expenditures are uniformly reported to TEA using a detailed coding system, which identifies the nature and object of an account or a transaction in a school district's accounting record (TEA, 2004). The expenditure code structure contains a mandated sequence of alphanumerical codes that specifically explain the financial transaction, indicating the source of the funds and where the funds were spent (TEA, 2004). In accordance with the state's financial codes, Sections 29.081 and 42,152 of the Texas Education Code, an independent auditor ensures that expenditures for districts are calculated and reported properly (TEA, 2004).

Purchasing Educational Resources

School districts purchase a variety of educational resources to support the educational program for their students. Imazeki and Reschovsky (2005) noted, "spending decisions have a direct impact on student performance goals, and decisions about what goals to meet have direct implications for the level of per-pupil spending a district must undertake" (p. 106).

One important educational resource is teachers, purchased through teacher salary. Spending on teachers often constitutes the largest share of a district's educational budget (Clotfelter, Ladd & Vigdor, 2007). Researchers (Ferguson, 1991; Hanushek, 1989; Hedges, 1994) have reported that teacher salary may vary by a teacher's credentials and

experience and this in turn has been found to affect educational output. Clotfelter, Ladd and Vigdor (2007) noted, "education researchers and policymakers agree that teachers differ in terms of quality and that quality matters for student achievement" (p. 3). Although the present study did not examine ELL student achievement outcomes, the extent of funding equity may affect a district's ability to purchase appropriate educational resources including qualified classroom teachers for ELL students.

Maiden and Evans (2009) noted

> Money for educational funding was allocated to the school district, and each school spent money in ways that brings about the best results specific to the individual district's needs. One serious consideration for spending money equitably is teacher compensation because this expenditure represented the largest component of the educational budget in districts throughout the United States, and because the scholarly literature is increasingly recognizing the importance of the teacher to meeting the goals of NCLB or any systematic reform. (p. 232)

According to NCLB, in order to be considered highly-qualified, teachers of ELL students must (a) have obtained the full teacher certification licensure according to the state, including the appropriate specialized certification (b) have obtained a minimum of a bachelor’s degree; and (c) have demonstrated competency in the core academic subjects in which the teacher teaches. NCLB requires that ELL students receive direct instruction from highly qualified teachers.

Researchers (Hanushek, Kain, & Rivkin, 2004; Waddell, Underwood, & Edwards, 2008) have found, however, that urban schools serving economically disadvantaged and minority students have particular difficulty attracting and retaining appropriately qualified teachers. Howey (2008) noted that across the United States, a high number of teachers are leaving urban, high-needs, highly diverse schools and that those teachers who remain are frequently less qualified than their suburban school counterparts.

Darling-Hammond's (2001) study investigated student characteristics such as poverty, ELL student status and minority status and found that these student characteristics were significantly negatively correlated with student outcomes and significantly negatively correlated with qualifications of teachers. Districts must therefore strive for "equity for all students and for highly-qualified teachers choosing education as a profession. This necessitates the most efficient and equitable funding to lay the foundation for the desired results of increased student learning" (Maiden & Evans, 2009, p. 232).

Principles of Funding Equity

Equity versus Equality

Within school funding, there may often be a difference in practice between equitable funding and equal funding. Hirth and Eiler (2005) noted:

> The difference between equity and equality leads to profound differences in the definition of the problems to be addressed and the remedies available for their solution. In school finance the term equitable has come to refer to funding based on the needs of children. Spending the same number of dollars on each student is a form of equality, but it may not be equitable; some students necessitate greater expenditures. (p. 383)

Analyzing equity values for the distribution of financial resources are traditionally based on Berne and Stiefel's (1984) school finance equity analysis framework which structures three equity concepts: (a) horizontal equity, defined as the equal treatment of equals, (b) vertical equity, defined as the unequal treatment of unequals, and (c) wealth neutrality, defined as the absence of a relationship between school district wealth and the equal opportunity of students, where the absence of a relationship signifies equal opportunity.

Central to the current research study is the reality that students may have differing abilities and therefore represent differing expenses to the district. "The care, staff, and time needed to work with a profoundly mentally disabled child are very different from the resources needed to work with a child who has a speech articulation disorder" (Hirth & Eiler, 2005, p. 383). In these cases where students are unalike, the

principle of vertical equity requires that unequal students receive appropriately unequal financial treatment (Berne & Stiefel, 1984; Hirth & Eiler, 2005). School districts with higher costs to educate more expensive student populations should receive higher funding (Toutkoushian & Michael, 2007). State funding systems must therefore make allowances "for dissimilar expenditures for special, often disadvantaged, populations, operating in difference situations. Such expenditures would be vertically equitable" (Wood & Honeyman, 1990, p. 9).

Vertical Equity

A state's educational funding system ensures that appropriate resources are equitably distributed; in doing so, it is necessary to draw on the theoretical concept of vertical equity (Vesely & Crampton, 2004).

> In economics, vertical equity is defined as the unequal treatment of unequals. In education, children defined as being at risk of low academic achievement or dropping out represent the operationalization of this concept. They include children in urban schools, those with disabilities, children from low-income families, students with limited English proficiency, ethnic minority students, and children from families with low parental education attainment. (Vesely & Crampton 2004, p. 121)

Vertical equity measures, therefore assess the degree to which districts with higher concentrations of students with special needs might require more resources to achieve desired outcomes, as compared to schools with lower concentrations (Stiefel, Ruberstein, & Berne, 1998).

The concept of vertical equity within school finance therefore signifies that for students with differing educational needs, districts should be allocated differing levels of funding and should spend differing levels of funding in order to meet those needs. For operationalizing a definition and method of measuring for vertical equity, Berne and Stiefel (1984) noted that one must determine: (a) which vertical equity characteristics of students or school districts require different levels of revenues and (b) identify the appropriate magnitudes of these differences.

Vertical equity ensures that undisputed higher costs for these certain students are appropriately taken into account. A critical measure of the appropriateness of a state's funding mechanism is the extent of vertical equity for funding the educational resources to be purchased for ELL students.

ELL Students Served in Specialized Language Programs

The population central to my study was that of ELL students served in specialized language programs in Texas districts, represented as X_7 within the TPSFM. TEA (2008) has defined the variable X_7 as those students who have been identified as English language learners by the Language Proficiency Assessment Committee (LPAC), or English proficient (19 TAC §89.1220), according to criteria established in 19 TAC §89.1225.

The Texas Education Code further identifies ELL students as *at-risk* because they are at risk of dropping out of school according to state criteria (TEA, 2004; Texas Education Code Section 29.081; Texas Education Code Section 29.052). In school finance literature, Stringfield and Land (2002) have noted that *at-risk* refers to those

students, "who, through no fault of their own, are at risk of low academic achievement and dropping out before completing high school" (p. vii). The seminal framework by Land and Legters (2002) concluded that the five most frequently cited individual or family-level risk factors are poverty, race or ethnicity, ELL student status, low educational attainment of parents, and single-parent status. Variables defined as risk factors are necessarily "beyond the school's control" (Vesely & Crampton, 2004, p. 112) and must therefore be addressed within the state funding formula.

The Texas Public School Finance Mechanism

The TPSFM is a linear system for funding state and local aid to districts, comprised of the following three tiers (Texas Education Code Section 42; TEA, 2004, 2008; Legislative Budget Board, 2009):

1. Tier I: Basic allotment (α) + Property tax + School district adjustments + Transportation allotment, + Student-level adjustments
2. Tier II: Wealth equalizations
3. Tier III: Facilities funding and other aid.

Although Texas school districts receive differing or unequal total funds, the TPSFM theoretically ensures equitable distribution of funds to each district by weighting certain variables to adjust for additional costs of education. (Hansen et al., 2007; Legislative Budget Board, 2009; Rechovsky & Imazeki, 2001; Texas Education Code Section 42.001; Texas House of Representatives Research Organization, 2004).

Program Weights

In Texas, student-level variables, which are the various student programs in Tier

I, receive a weight within the state funding formula (Clark, 2001; Clark & Toenjes, 1996; Murray, Rosenberg, & Rosenberg, 2007; NCES, 2003; Reschovsky & Imazek, 1997; Vesely, Crampton, Obiakor, & Sapp, 2008). According to the Texas House of Representatives Research Organization (2004), student-level weights for variables within the Texas mechanism focus:

> on achieving vertical equity, thus ensuring that differently situated children receive similar funding for their educational needs. For example, the special education weight supports the premise that children with disabilities should be given extra resources because educating a child with special needs requires a greater investment of time and money than educating a child in the regular education program. The same theory holds true for children in bilingual education, gifted and talented, or career and technology programs. (p. 9)

Districts are therefore entitled to receive an additional annual allotment equal to the basic allotment per student multiplied by a weight for each student who participates in special programs (Hansen et al., 2007; Legislative Budget Board, 2009; Texas Education Code Section 42.001; Texas House of Representatives Research Organization, 2004). Districts receive a weighted dispersion per their population size of ELL students (Hansen et al., 2007; Legislative Budget Board, 2009; Reschovsky & Imazeki, 1997; Texas Education Code Section 42.001; Texas House of Representatives Research Organization, 2004; Vesely, Crampton, Obiakor, & Sapp, 2008).

Toutkoushian and Michael (2007) noted that vertical equity is evaluated relative

to the weights for each factor that the state has set. In some instances, these weights are not based on rigorous analysis of the additional funding needed to equalize educational outcomes. Measures of vertical equity, then, represent how well the state is meeting its established goals. This information is therefore valuable for helping policymakers know whether the state's funding system is working as intended and whether the state is making progress toward these goals over time.

History of weights within the TPSFM.

The concept of weighting TPSFM variables in order to improve educational resource equity for Texas students was first introduced in 1974 by the Texas Governor's Office of Educational Research and Planning (GOERP) report on restructuring school funding (Texas House of Representatives Research Organization, 2004). According to the Texas House of Representatives Research Organization (2004), the goal of the GOERP report (1974) was to improve vertical equity in the state funding system—creating greater equity for students with differing needs and abilities. The GOERP report (1974) examined 42 high-achieving school districts of varying sizes for expenditure variation between identical programs. The GOERP recommended:

> a range of program weights for regular education (from kindergarten at 1.2 to high school at 1.15); vocational-technical programs (from agriculture at 2.63 to industrial arts at 2.25); and special education (from visually handicapped at 4.45 to emotionally disturbed at 3.77). The GOERP recommended a beginning weight of 0.15 for programs such as compensatory, bilingual, and migrant education, with an increase to 0.40 in

> two years. (Texas House of Representatives Research Organization, 2004, p. 3)

In 1975, Texas HB 1715, based on a series of school finance conferences by the Texas State Advisory Committee to the U.S. Commission on Civil Rights, applied the following weights for students in special programs: 2.20 for educationally disadvantaged; 2.20 for bilingual education; 2.15 migrant education (Cardenas, 1997). Texas HB 1715 (1975) did not pass.

The following year, Intercultural Development Research Association (IDRA) published the Texas Bilingual Cost Analysis (1976) (as cited in Cardenas, 1997) to determine the per-pupil weights needed for a minimally adequate program. According to this cost analysis, bilingual program weights ranged from 1.25 to 1.42. Further cost analyses conducted by Texas districts and in other states including Houston ISD, Utah, and Colorado (Cardenas, 1997) determined similar per-pupil weights needed to fund their bilingual program for ELL students. IDRA further determined that for the 1978-1979 school year, Texas was the second lowest funder of bilingual education compared to all other states who also funded categorically (Cardenas, 1997).

Implementing per-pupil program weights did not begin until Texas HB 72 (1984). Although a number of studies including IRDA's Texas Bilingual Cost Analysis (1976) and further studies in Houston ISD, Utah, and Colorado recommended an ELL weight ranging from 1.25 to 1.42 and Texas' own GOERP report (1974) recommended a weight beginning at 0.15, to be increased to 0.40 within two years (Texas House of Representatives Research Organization, 2004), the weight ultimately applied was 0.1

(Clark, 1998; Legislative Budget Board, 2001; Texas House of Representatives Research Organization, 2004;).

This funding weight of 0.1 remains the current weight for ELL students (Hansen et al., 2007; Legislative Budget Board, 2009; Texas Education Code Section 42.001; Texas House of Representatives Research Organization, 2004) even while the number of ELL students in Texas continues to increase, from 533, 741 (13.5% of the state's total student population) in 1999 to 774, 719 (16.7%) in 2007 (TEA, 2009). Districts must therefore purchase appropriate educational resources to provide an equitable educational opportunity for a growing ELL population with distributions from a funding weight that should be reexamined for appropriateness. If inequities between districts' funding of programs for ELL students are found to exist in practice, the theory behind the TPSFM—equitable access to educational resources exists for all students, regardless of program participation—cannot be guaranteed.

Previous Studies

School finance literature has often focused on the relationship of per-pupil spending and student educational outcomes, both from national and state perspectives (Hanushek, 1997; Hartman, 1994; Hancock, 2005; Malone, 2000; Mosborg, 1996; Sonnen, 2000). Researchers who have examined the relationship between per-pupil spending and its effect on students' academic achievement have reported mixed results, depending on the level of analysis. The more broad and inclusive a study, the less statistical significance is found between connecting school spending and student academic achievement. A meta-analysis by Hanushek (1997) examined 400 previous

studies of student achievement and found no strong or consistent relationship between student performance and the amount of school resources spent. Further studies also found no significant correlation between per-pupil spending and academic achievement (Chaney, 2002; Stringfellow, 2007). Other researchers, however, have found certain correlations by further disaggregating the construct of district spending and student-level variables. For example, Malone (2000) disaggregated district expenditures and examined districts' varying levels of operating expenditures on instruction and found that students with the highest achievement scores were not from districts with the highest total number of dollars spent on instruction, but rather from school districts that spent the greatest percentage of their operating expenditures on instruction. Mosborg (1996) additionally reported that although the majority of a school district's budget is spent on instruction, student differences in wealth and need do significantly impact academic achievement.

Per-pupil spending can impact student achievement indirectly because greater spending can result in reduced class sizes, which raises achievement (Wenglinsky, 1997). Hartman (1994) examined high middle and low-expenditure school districts in Pennsylvania and found that school districts that spent more money on instructional resources had smaller class sizes, more teachers, and more teachers who were more experienced. Within school finance literature, there is a clear need to examine the extent of equitable access to educational resources for all students, regardless of program participation and the district in which they are located.

Only a limited number of studies have previously examined, in some capacity,

the equity of the Texas mechanism at the district-level:

- Facilities funding in districts across Texas (Luke, 2007)
- Per-pupil spending for gifted and talented students in districts (Baker, 2001)
- Per-pupil spending across elementary schools within single districts (Ajwad, 2006)
- Distribution of Title I grant monies between large districts and smaller districts (Rural and School Community Trust, 2007)
- Comparing Texas and Kansas in the area of cost adjustments that balance districts' needs with students' needs (Baker & Duncombe, 2004).

Researchers have previously examined the system of weights within the TPSFM to:

- Explore other alternative components to receive weights within the Texas formula (Clark & Toenjes, 1996) and, as previously discussed,
- Recommend alternative weight magnitudes (GOERP report (1974), as cited in Texas House of Representitives Research Organization, 2004; Texas HB 1715, 1975; IRDA's Texas Bilingual Cost Analysis (1976), as cited in Cardenas, 1997).

According to the Texas House of Representatives Research Organization, (2004), the TPSFM and its imbedded weights exist to promote funding equity for ELL students and for all other students in all districts across the state. Toutkoushian and Michael (2007), however, noted that determining the weights for certain variable and even which

variables are weighted could be the result of "cost studies, a review of weights used in other states, or political negotiations between policymakers" (p. 405). Additionally, from state to state these weights vary considerably. "The wide variations across states in their vertical equity weights show that a consensus does not yet exist on what these weights should be" (Toutkoushian & Michael, 2007, pp. 404-405). There is clearly a need to examine the appropriateness of Texas' current funding weight for ELL students in light of the equity of TPSFM distributions.

Researchers further noted the lack of vertical equity studies within school finance literature. Vesely and Crampton (2004) noted that there are only a limited number of studies that truly examine vertical equity of the funding of state education systems. Although a number of studies may mention vertical equity, they did not include its statistical analysis. Instead, "the measurement of vertical student equity remains largely undeveloped in the literature" (p. 113).

The few number of previous studies within school finance literature that do examine vertical equity have: (a) analyzed the vertical equity of all 50 state funding systems for public schools in 1998-1999 and found that as the at-risk student factors of poverty, ELL status, racial minority status, and attendance at an urban school compounded, states reduced rather than increased funding (Vesely, Crampton, Obiakor & Sapp, 2008); and (b) measured the vertical equity of funding for 292 public school districts in Indiana and found that vertical inequity could be improved through substantial changes in the student funding weight for ELL students (Toutkoushian & Michael, 2007).

As Vesely and Crampton (2004) noted:

> In an educational environment in which many schools and districts struggle to meet federal and state mandates with limited funds, it is imperative to build a better understanding of the ability of funding for at-risk children to increase the vertical equity of state school finance systems. (p. 122)

In light of the reviewed literature, there is a clear need within the research literature for a study to examine the vertical equity of the TPSFM for ELL students served across Texas. An extensive review of the literature did not find any study that has examined the vertical equity of the TPSFM for X_7, the quantity of ELL students served within specialized language programs, for all districts across Texas.

In the current study therefore, I adopted a narrowed focus and only sought to answer the research questions examining the vertical equity of the Texas funding mechanism through district-level expenditures for ELL students rather than for ELL student educational outcomes. I also closely followed the research by Hansen et al., (2007) of the School Finance Redesign Project (SFRP) at the University of Washington's Center on Reinventing Public Education, which conducted an extensive case study of the Texas school finance system in order to examine how K-12 finance in Texas might be redesigned to better support student performance. A self-identified limitation to the SFRP study, however, was the use of only four districts, making generalizability of the findings to other districts in Texas improper (Hansen et al., 2007). Therefore, I sought to address this limitation by advancing the study population to

including all ELL students in all districts in Texas during a 10-year study period from 1997-2007. Via a thorough review of the literature, I found that previous studies within school finance research have rarely focused on ELL students and previous studies within the ELL literature have rarely focused on school finance.

Summary

This chapter presented a focused review of pertinent research studies in the area of public school finance with specific emphasis on funding equity for ELL students. This chapter reviewed the legal authority for public education financing and states' responsibilities to purchase appropriate educational resources for all students. Principles of funding equity were discussed including the clarification between equality and equity, with specific emphasis on vertical equity. It was noted vertical equity remains a concept in need of further study.

In this chapter, I specifically defined the ELL student population as an area of interest for equity studies in Texas. The TPSFM was thoroughly explained along with its system of weights and the history of legislation and studies, which brought about the current ELL weight in place in the state formula today.

A review of previous studies noted the importance of examining specific components of the state funding mechanism. In this chapter, I concluded with a discussion of the narrowed focus of the current study, the concept of vertical equity for funding ELL students as measured through districts' programmatic expenditures on these students.

CHAPTER III

METHODOLOGY

The purpose of my study was to examine the vertical equity of the Texas Public School Finance Mechanism (TPSFM) from 1997-2007 for purchasing educational resources for ELL students. Vertical equity was operationalized through a research-based framework that places ELL students at risk of academic failure. Regression analysis examined vertical equity through (a) the extent to which the quantity of ELL students within districts predicted the TPSFM funding output for ELL students in districts over 10 years and (b) the extent to which, when districts are grouped by like-sized populations of ELL students within each of the 10 years, the quantity of ELL students within districts with like-sized populations of ELL students predicted the TPSFM funding output for ELL students. In this chapter, I outlined the methodological design of the study including an explanation of the Texas Public School Finance Mechanism (TPSFM) from the mathematical perspective, the study population, research design and context of the study, data collection and data analysis.

The TPSFM Equation

The TPSFM, illustrated in Equation 1, funds state and local aid to districts.

$$\text{TPSFM } (Y_i) = \alpha + b1X_1 + b2X_2 + b3X_3 + b4X_4 + b5X_5 + b6X_6 + b7X_7 + b8X_8 + b9X_9 + b10X_{10} + b11X_{11} + b12X_{12} + e \quad (1)$$

This equation for the TPSFM can be used to predict districts' expenditures, where

for each district *i*, Y_i represents the educational resources purchased for their students (Berne & Stiefel, 1984; Hansen et al., 2007; Sable & Hill, 2006; Vesely, Crampton, Obiakor, & Sapp, 2008). The variables which comprise the TPSFM, according to Clark and Toenjes (1996); Hancock (2005); Hansen et al., (2007); Legislative Budget Board (2009); TEA, (2004), (2008), (2010); Texas Education Code Section 42; Vesely, Crampton, Obiakor, and Sapp, (2008), are further identified in Table 1.

Table 1

The Texas Public School Finance Mechanism

Variable	Description
Y_i	Total state and local aid for district *i*
α	Basic per-pupil allotment
b1 - b12	Regression coefficients for X values
X_1	Property wealth in district *i*
X_2	Beginning teacher salary in district *i*
X_3	Average daily attendance (ADA) enrollment in district *i*
X_4	Transportation allotment in district *i*
X_5	Percent of students in district *i* classified as economically disadvantaged
X_6	Percent of students in district *i* served in special education programs
X_7	Percent of students in district *i* classified as ELLs, served in specialized language programs, including BE or ESL or any sub-divisions of these programs

Table 1 (continued)

Variable	Description
X_8	Variable
X_9	Percent of students in district *i* classified as vocational or career and technology
X_{10}	Percent of students in district *i* classified as gifted and talented
X_{11}	Maintenance and Operations (M&O) tax rate in district *i*
X_{12}	Facilities funding in district *i*
e	Error term

Study Population

In this study, I focused on all Texas school districts from 1997-2007 that purchased educational resources for ELL students served in specialized language programs. In accordance with previous research (Luke, 2007; Zhou, 2008), no private schools, home schools, or charter schools were included. Only independent school districts were examined because non-independent school districts such as charter schools operate under distinct funding practices (Alexander et al., 2000; Clark & Toenjes, 1996; Sabel & Hill, 2006; Smith, 2005; Vergari, 2007).

Research Design

The research design for this study was modeled from the research studies by Hansen et al., (2007) of the School Finance Redesign Project (SFRP) who examined the

vertical equity for funding from the TPSFM for four school districts and by Vesely et al., (2008) who examining the vertical funding equity for students at-risk within the 50 United States for the 1998-1999 school year.

As Toutkoushian and Michael (2007) noted, "progress toward horizontal and vertical equity in each state remains an empirical question to be answered through data analysis" (p. 408). My study therefore includes an empirical analysis of the state's demographic and financial data from 1997-2007 examined for the vertical equity for districts educating ELL students.

Vertical equity, defined in the literature as the unequal treatment of unequals (Berne & Stiefel, 1984), was operationalized in accordance with previous research studies explained in Chapter II (Berne & Stiefel, 1984; Hirth & Eiler, 2005; Stiefel, Ruberstein, & Berne, 1998; Toutkoushian & Michael, 2007; Vesely & Crampton, 2004) that identify ELL students as at risk for academic failure and therefore in need of additional financial resources.

Independent Variable

The independent variable, Y_i, represents districts' total state and local expenditures for their students, defined as the educational resources purchased from state and local revenue (Berne & Stiefel, 1984; Hansen et al., 2007; Sable & Hill, 2006; Vesely, Crampton, Obiakor, & Sapp, 2008). Although a significant amount of federal money through Title I funding is provided to districts to purchase educational resources for their ELL students, Title I funding was excluded from this analysis because the TPSFM does not considered it within the formula. Previous national research (Gordon,

2003) summarized that any initial increase in districts' instructional spending attributed to an increase in Title I funding did not produce a statistically significant positive effect after 2 years time.

Total state and local expenditure as opposed to total revenue was used as the independent variable to predict funding because districts' total state and local expenditures indicate district-level spending allocation decisions about state and local revenue distributions in light of local resource constraints. Additionally, districts' total state and local expenditures exclude federal funding whereas a districts' total revenue includes state, local, and federal funding (Hansen et al., 2007; Sable & Hill, 2006; TEA, 2004).

Dependent Variable

The dependent variable for this study was ELL students within any type of specialized language program, defined as X_7 within the TPSFM. TEA (2006) has defined expenditures on ELL students as the cost to evaluate, to place and to provide ELL students with educational and/or other services that are intended to make the students proficient in the English language, primary language literacy, composition and academic language related to required courses. Examining district expenditures from the TPSFM addresses the vertical equity of funding for ELL students in practice—the extent to which X_7 is found to be a significant predictor of the money being spent on ELL students.

Research Questions

Two research questions guided this study:

Question 1: Is X_7, the quantity of ELL students served in specialized language programs within a district, a statistically significant predictor for a districts' total expenditure for these students for each of the 10 academic school years examined, from 1997-2007?

Question 2: When districts are grouped into quartiles by like population sizes of ELL students, is X_7, the quantity of ELL students served in specialized language programs within a district, a statistically significant predictor for a districts' total expenditure for these students within each quartile for each of the 10 academic school years, from 1997-2007?

Context of the Study

I examined independent school district in Texas that served ELL students in specialized language programs during the 10-year study period from 1997-2007. Financing decisions about expenditures for ELL students are made at the district level therefore the unit of analysis selected for the present study was the district.

The state of Texas was chosen because of its history of litigation challenging the equity of the state funding mechanism based on disparities in per-pupil spending (*Carrollton-Farmers Branch School District v. Edgewood ISD*, 1992; *Edgewood ISD v Kirby*, 1989; *Edgewood ISD v Kirby*, 1991; *Edgewood ISD v. Meno*, 1995; *San Antonio ISD v. Rodriguez*, 1973; *West Orange-Cove v. Alanis*, 2003; *West Orange-Cove v. Neeley et al.,* 2004) and because of the availability of the comprehensive, state-level,

district-level, and student-level data that allowed this study to examine the research questions in greater detail and with far more confidence than had been possible in previous studies.

Data Collection

TEA records information from each district available for public access through PEIMS. These data are coded to indicate specific information such as the school district code, various expenditure functions, and program intent (TEA, 2001). TEA provides an annual resource guide and reporting system in order for all districts to uniformly report data including yearly expenditures (TEA, 2008).

The data gathered for this study included students' and districts' demographics and financial indicators as reported to TEA by each district over the 10-year study period from 1997-2007. District-level data were gathered from PEIMS on the 12 variables of the TPSFM: property tax revenue (X_1), beginning teacher salary (X_2), student enrolment based on average daily attendance (ADA) (X_3), transportation allotment, (X_4); the student population groups receiving additional weighting within the formula: % economically disadvantaged students (X_5), % special education students ($X_{6,}$), % ELL students who participate in any specialized language programs (X_7), % compensatory education students (X_8), % students enrolled in career and technology classes ($X_{9,}$) and % gifted and talented students (X_{10}); a district's tax rate (X_{11}) and facilities funding allotment (X_{12}).

Data Analysis

Quantitative methods were used to examine the vertical equity of TPSFM funding for X_7, the quantity of ELL students served specialized language programs, in each Texas district during the 10-year study period from 1997-2007. In accordance with the research literature and previous studies measuring the vertical equity of state finance systems (Iatarola & Stiefel, 2003; Stiefel, Ruberstein, & Berne, 1998; Toutkoushian & Michael, 2007; Vesely, Crampton, Obiakor, & Sapp, 2008), linear regression and correlation analyses were conducted in order to answer the study's research questions.

These analyses were used to describe the strength of funding predictability and statistical significance for the relationship between, X_7 and districts' expenditures for ELL students in all Texas districts over each of the 10 years of funding distributed by the TPSFM.

Researchers further suggests that additional information about a variable's predictive power on a mechanism's output may be captured by stratifying the mechanism's components (Imazeki & Reschovsky, 2005; Rolle, Houck, & McColl, 2008). SPSS statistical software was therefore used to group districts into quartiles based on districts' population sizes of X_7. Quartile I included districts within the lowest 0-25% of X_7 when compared to all other districts that year. Quartile II included districts within the lower 25-50% of X_7 when compared to all other districts that year. Quartile III included districts within the 50-75% of X_7 when compared to all other districts that year. Quartile IV included districts with the highest 75-100% of X_7 when compared to all other districts that year. For each of the 10 years, each quartile of districts with similar

X_7 population sizes was examined for the strength of relationship between X_7 and districts' expenditures on these ELL students.

Analyzing district-level data over districts of varying sizes, as is the case in Texas, "may lead to a common econometric problem, known as heteroskedasticity. A quite standard way to account for this problem is by weighting each observation by group (district) size" (Imazeki & Reschovsky, 2005, p. 110). Grouping districts by similar ELL student population sizes therefore allows for the comparison of like districts to further examine the effect of varying population sizes of X_7 on district expenditures for these ELL students. "Positive correlations and regression coefficients between vertical equity factors and per-pupil revenues show whether districts with higher need receive more money" (Toutkoushian & Michael, 2007, p. 398). Analyzing districts' expenditures on ELL students can examine the extent of vertical equity of the money actually being spent on these students.

The working hypothesis for this study was that, when the data from all Texas districts over the 10-year study period are examined, districts with a higher X_7, quantity of ELL students in specialized language programs, have higher expenditures for these ELL students from their funding distributions by the TPSFM and that this relationship holds true for all districts across the state.

H_0: For the relationship between the quantity of ELL students served in specialized language programs within a district and that district's expenditures for these ELL students, there is no difference among Texas school districts.

H_A: For the relationship between the quantity of ELL students served in specialized language programs within a district and that district's expenditures for these ELL students there is a difference among Texas school districts.

According to state policy underlying the TPSFM, X_7 should be found to be a statistically significant variable for predicting district expenditure in all districts for each of the 10 years and, necessarily, for all quartiles of all districts for all years. Baker and Markam (2002) noted that *rational* allocation of aid would indicate that correlations are all expected to be positive, significant, and strong. Data analysis that results the failure to reject the null hypothesis would indicate that the TPSFM is in accordance with the state policy that underlies it—districts with more ELL students should be spending more on these students.

Summary

In this chapter the methodological design of the present study was outlined. This included a mathematical explanation of the TPSFM, denoting the mechanism's components. In this chapter, I also explained the population, research design and context, data collection and data analysis for my current study.

CHAPTER IV

DATA ANALYSIS

This chapter includes the results from the statistical analysis of the investigated data from the TPSFM. Descriptive statistics of the data as well as considerations within the analysis including maintaining the uniformity of the unit of the data and the treatment of outliers will be presented. Analyses are reported on the extent to which districts' ELL student population sizes were a statistically significant predictor for districts' expenditures on these ELL students from 1997-2007. Further the statistical significance within quartiles of districts with similar population sizes of ELL students for each of the 10 years.

Considerations within Data Analysis

Maintaining the Uniformity of the Unit of Data

Each district records expenditures, completes an independent audit, and submits these verified financial data to TEA annually. The format, coding structure, and unit for the data were not always uniform from year to year. Considerations were made when analyzing the data from 1997-2007.

- For 1997 data, the response variable (Y_1) was constructed from Y_1 per-student multiplied by the total student enrollment for that year.
- For data from 2002 and 2003, student-level variables denoting subgroups of programmatic participation X_5, X_6, X_7, X_8, X_9, and X_{10} were reported in raw numerical counts. In the analyses, the raw counts were converted to percentages

within districts by dividing the number of students in each program by the total student count for that year for each district.

- For data from 2005, 2006, and 2007, both the response variable was constructed and the student-level variables X_5, X_6, X_7, X_8, X_9, and X_{10} were adjusted from raw counts to percentages.

These adjustments all served to maintain the uniformity of the unit of data with other years included in the analysis.

Treatment of Outliers

Tukey (1977) defined data values as suspected outliers when values exist beyond the outer fences. With respect to financial management data, TEA (2004) defined an outlier as an extreme numerical value. Although, according to Hogan and Evalenko (2006), the operational definition of outliers within behavioral sciences and statistical programs may widely vary. Outlier districts were therefore defined for this study in accordance with previous research by Peng and So (2002) as those districts whose total student population size placed them outside of two standard deviations from the mean for districts' total population size for that year. According to the raw data for this study, outlier districts included those districts with total student populations greater than 10,000. Table 2 presents the extent to which districts' ELL student population sizes were a statistically significant predictor for districts' expenditures on these ELL students from 1997-2007. Table 2 compares the differences in outcomes between statistical analyses including all districts and statistical analysis excluding outlier districts.

Table 2

The Effect of Outlier District Inclusion and Exclusion

	Outliers Included				Outliers Excluded			
Year	N	Sig	Partial η^2	Adjusted R^2	N	Sig	Partial η^2	Adjusted R^2
1997	1043	0.055	0.004	0.997	1041	0.077	0.003	0.994
1998	1037	0.233	0.001	0.996	1035	0.204	0.002	0.993
1999	1041	0.325	0.001	0.995	1039	0.803	0	0.99
2000	905	0.97	0	0.996	903	0.969	0	0.992
2001	1005	0.657	0	0.997	1003	0.778	0	0.994
2002	1014	0.993	0	0.997	1012	0.976	0	0.994
2003	910	0.238	0.002	0.997	908	0.47	0.001	0.994
2004	902	0.618	0	0.997	900	0.522	0	0.995
2005	939	0.996	0.001	0.988	937	0.811	0.001	0.981
2006	933	0.476	0.001	0.979	931	0.582	0	0.984
2007	933	0.359	0	0.984	931	0.826	0	0.983

Note. N represents the total number of Texas districts for that year that purchased educational resources for their ELL students served in specialized language programs. A partial η^2 score indicates the strength of relationship between the dependent variable and the independent variable in the presence of the other variables. A partial η^2 score of 0 means that X_7 is not highly related to the outcome variable. Adjusted R^2 is a measure of the strength of the model with a score of 1 indicating perfect prediction power.

Table 2 shows that three or fewer outlier districts ever existed within one single

year as shown by the difference in N within a single year.. Adjusted R^2 values reveal strong, positive correlations for all years, regardless of outlier inclusion or exclusion. Additionally, the statistical significance was only slightly affected by outlier inclusion or exclusion. Two years of notable exception were 1999 and 2007. In 1999, data analysis from all 1041 districts indicated a statistical significance of 0.325. When data from the outlier districts for that year are excluded in the analysis, however, the statistical significance increased to 0.803. In 2007, analysis of data from all 933 districts indicated a statistical significance of 0.359, whereas when data from the outlier districts for that year are excluded in the analysis, the statistical significance increased to 0.826. The regression analysis presented in Table 2 shows that with or without the outliers, there was not a statistically significant impact on regression values for the equations. Given these findings using the present study's data and the fact that the TPSFM funds all districts, regardless of total student population size, according to its unique, linear formula, data analyses for this study were conducted including all districts.

Further analysis presented in Table 3 examined the extent to which a district's ELL student population was a statistically significant predictor of a district's expenditures on these students, according to the TPSFM funding distributions. According to Toutkoushian and Michael (2007), positive correlations and positive regression coefficients for X_7, or districts' total population sizes of ELL students, on districts' per-ELL pupil spending would indicate that districts with higher needs to fund ELL programs are able to spend the appropriately additional ELL funding to purchase educational resources. In Table 3, the Adjusted R^2 values from 1997-2007 reveal a strong power of prediction for the TPSFM to predict district expenditures. Partial η^2 values, indicating to what extent district expenditures can be explained by X_7 in the presence of the other variables within the TPSFM, for all 10 years indicate that X_7 is not a very strong predictor and is not highly related to the outcome variable, district expenditures, in the presence of other variables. For all 10 years, the Partial η^2 scores for X_7 are extremely weak, ranging from 0 to 0.0004.

Table 3

Analysis of TPSFM Components for All Texas Public School Districts in Predicting Total Expenditures, 1997-2007

Year	N	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	Partial η^2	Adj R^2
1997	1043	0.008***	0.001	.330***	.112***	0	.026***	0	.008***	.03***	.01***	.354***	0.004	0.997
1998	1037	0	0	.658***	.05***	0	.005**	0.001	0.001	0.001	0	.091***	0.001	0.996
1999	1041	0	0.001	.615***	.014***	0	0.002	0.001	0	0	0	.025***	0.001	0.995
2000	905	0.001	.006**	.608***	0.153***	0	.005**	0	0.002	.007**	0	.063***	0	0.996
2001	1005	.006**	0.002	.658***	.156***	0.001	.003*	0	0	0.001	.006**	.332***	0	0.997
2002	1014	.01***	0.002	.672***	.232***	0.001	.004*	0	0	0.001	.011***	.295***	0	0.997
2003	910	.005**	0	.593***	0.001	0	.005*	0.002	0	0.001	.007**	.272***	0.002	0.997
2004	902	0.001	.014***	.538***	.022***	.010***	.007**	0	0	0.002	0	0.353***	0	0.997
2005	939	.036***	0.002	.984***	0.002	0	0.002	0	0	0.001	.028***	.006**	0.001	0.988
2006	933	.015***	0	.973***	0	0	0.001	0.001	0	0	.014***	.008***	0.001	0.979
2007	933	.025***	0.004*	.980***	.003*	0	0	0.001	0	0	.025***	.006**	0	0.984

Note. *P-value <.1, **<.05 , ***<.01 The total number of Texas districts for that year that purchased educational resources for their ELL students served in specialized language programs is represented by N. A partial η^2 score indicates the strength of relationship between the dependent variable and the independent variable in the presence of the other variables. A partial η^2 score of 0 means that X_7 is not highly related to the outcome variable. Adjusted R^2 is a measure of the strength of the model with a score of 1 indicating perfect prediction power.

Districts with Like-Sized ELL Student Populations

Districts from each year were grouped into quartiles by similar population sizes of ELL students. Quartile I included districts within the lowest 0-25% of ELL students when compared to all other districts that year. Quartile II included districts within the lower 25-50% of ELL students when compared to all other districts that year. Quartile III included districts within the 50-75% of ELL students when compared to all other districts that year. Quartile IV included districts with the highest 75-100% of ELL students when compared to all other districts that year.

Table 4 includes regression analysis of Quartile I districts' ELL populations and expenditures.

Analysis presented in Table 4 examined the extent to which, among districts with the lowest 0-25% of ELL student populations for that year, ELL population size was a statistically significant predictor of a district's expenditures on these students, according to the TPSFM funding distributions. For all 10 years, the Adjusted R^2 values reveal a strong power of prediction for the TPSFM to predict district expenditures, ranging from 0.936 to 0.982. Partial η^2 values, however, indicate that X_7 is not a very strong predictor and is not highly related to the outcome variable, district expenditures, in the presence of other variables. For all 10 years, Partial η^2 scores for X_7 are extremely weak, ranging from 0 to 0.023.

Table 4

Analysis of TPSFM Components for All Texas Public School Districts in Predicting Total Expenditures in QI

Year	N	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	Partial η^2	Adj R^2
1997	1043	.081***	0.003	0.12***	.02**	0.001	0.006	0.005	.022**	.026**	.072***	.364***	0.006	0.982
1998	1037	0	0.002	.350***	0.004	0.002	0.011	0	0	0.007	0.006	.394***	0	0.981
1999	1041	0	0.001	.353***	0.003	0	0.001	0.001	0.003	0	0.008	.492***	0.001	0.982
2000	905	0.002	.037***	.301***	.017*	0.003	0.002	0.002	0.001	0.006	0.011	.359***	0.002	0.977
2001	1005	.084***	.014*	.589**	0.001	0.008	0.005	.017*	0.001	0.005	.075**	0.193	0.017	0.969
2002	1014	.072***	0.002	.203***	0.002	0	0.01	.018*	0	.038***	.076***	.482***	0.018	0.979
2003	910	.034***	.040***	.369***	0	0.001	0.001	.023**	0.004	0.01	.068***	.546***	0.023	0.982
2004	902	.014*	0.003	.499**	0.006	.048***	0	0.012	0.001	.033**	.044***	.461***	0.012	0.983
2005	939	.100***	0.002	.913***	0.009	0.004	0	0	0.002	.038***	.098***	.014*	0	0.944
2006	933	.080**	.026**	.925***	0.009	0.005	0.001	0.003	.026**	0.012	.057***	.014*	0.003	0.952
2007	933	.108***	0.002	0.904***	0.007	0.012	0.001	0.002	0.007	.032**	.107***	.015*	0.002	0.939

Note. *P-value <.1, **<.05 , ***<.01 The total number of Texas districts for that year that purchased educational resources for their ELL students served in specialized language programs is represented by N. A partial η^2 score indicates the strength of relationship between the dependent variable and the independent variable in the presence of the other variables. A partial η^2 score of 0 means that X_7 is not highly related to the outcome variable. Adjusted R^2 is a measure of the strength of the model with a score of 1 indicating perfect prediction power.

Table 5 includes regression analysis of Quartile II districts' ELL populations and expenditures.

Analysis presented in Table 5 examined the extent to which, among districts with the lower 25-50% of ELL student populations for that year, ELL population size was a statistically significant predictor of a district's expenditures on these students, according to the TPSFM funding distributions. For all 10 years, the Adjusted R^2 values reveal a strong power of prediction for the TPSFM to predict district expenditures, ranging from 0.963 to 0.997. Partial η^2 values, however, indicate that X_7 is not a very strong predictor and is not highly related to the outcome variable, district expenditures, in the presence of other variables. For all 10 years, Partial η^2 scores for X_7 are extremely weak, ranging from 0 to 0.035.

Table 5

Analysis of TPSFM Components for All Texas Public School Districts in Predicting Total Expenditures in QII

Year	N	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	Partial η^2	Adj R^2
1997	1043	.012*	0.011	.384***	.148***	.075***	.105***	0	.012*	.048***	.012*	.237***	0	0.996
1998	1037	0.002	0.003	.646***	0.032	0.001	0.011	0.002	0.004	0.002	0	.126***	0.002	0.993
1999	1041	0.001	0.001	.568***	0	.013*	0.007	0.002	0.001	0.004	0.006	.120***	0.002	0.992
2000	905	.043**	0.006	.763***	0.003	0.008	.018**	0.001	0.004	.041***	0.012	.096***	0.001	0.992
2001	1005	.012*	0.001	.546***	.056***	0.002	0.001	0.007	0.001	.015*	.023**	.262***	0.007	0.992
2002	1014	.025**	0.009	.555***	.137***	0.003	0.004	0.002	0	0.007	.022**	.337***	0.002	0.994
2003	910	.032***	0.001	.334***	.028**	0.001	0.005	.035***	0	0.011	.031***	.280***	0.035	0.993
2004	902	0.001	0.002	.677***	.194***	.022**	.033***	0.001	0.01	.013*	0	.100***	0.001	0.997
2005	939	.044***	0.007	.960***	.031***	0	0.003	.032***	0	0.001	.046***	.016*	0.032	0.97
2006	933	.026**	.065***	.035***	.951***	.034***	0.003	.030***	0.001	0.001	.060***	0.004	0.03	0.963
2007	933	.039***	0	.964***	.039***	0.005	0.002	0.009	0	0.007	.046***	0.007	0.009	0.97

Note. *P-value <.1, **<.05 , ***<.01 The total number of Texas districts for that year that purchased educational resources for their ELL students served in specialized language programs is represented by N. A partial η^2 score indicates the strength of relationship between the dependent variable and the independent variable in the presence of the other variables. A partial η^2 score of 0 means that X_7 is not highly related to the outcome variable. Adjusted R^2 is a measure of the strength of the model with a score of 1 indicating perfect prediction power.

Table 6 includes regression analysis of Quartile III districts' ELL populations and expenditures.

Analysis presented in Table 6 examined the extent to which, among districts with the upper 50-75% of ELL student populations for that year, ELL population size was a statistically significant predictor of a district's expenditures on these students, according to the TPSFM funding distributions. For all 10 years, the Adjusted R^2 values reveal a strong power of prediction for the TPSFM to predict district expenditures, ranging from 0.974 to 0.997. Partial η^2 values, however, indicate that X_7 is not a very strong predictor and is not highly related to the outcome variable, district expenditures, in the presence of other variables. For all 10 years, Partial η^2 scores for X_7 are extremely weak, ranging from 0 to 0.013.

Table 6

Analysis of TPSFM Components for All Texas Public School Districts in Predicting Total Expenditures in QIII

Year	N	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	Partial η^2	Adj R^2
1997	1043	0.003	0.0003	.355***	.201***	.395***	.155***	0	.034***	.034***	0.001	.151***	0	0.997
1998	1037	0.003	0.001	.492***	0.001	0.003	0.005	0	0.005	0.002	0.005	.019**	0	0.988
1999	1041	0.005	0	.406***	0.005	0.001	0.003	0.001	0.004	0	0.004	.059***	0.001	0.986
2000	905	0	0.009	.435***	.022**	0.001	0.004	0.012	0.01	0.001	0	.08***	0.012	0.992
2001	1005	0.002	0.007	.481***	.035***	.016**	.013*	0	0.003	0.007	0	.073***	0	0.995
2002	1014	0.001	0	.513***	.024**	0.004	0.008	.013*	0.002	0.008	0.005	.086***	0.013	0.994
2003	910	.014*	0.001	.580***	0	0.009	0.011	0.004	0.008	0	.027**	.049**	0.004	0.992
2004	902	0.002	0.005	.703***	.165***	0.011	.016*	0	0.001	.034***	0	.145***	0	0.997
2005	939	.055**	0.002	.976***	0.004	0.003	0.004	0.009	0.001	0	.067***	0.005	0.009	0.982
2006	933	.039***	0	.972***	0.001	0.006	0.002	0.003	0.001	0.005	.047***	0.01	0.003	0.98
2007	933	.050***	0.004	0.966***	0.003	0.002	0	0.001	0	0	.042***	0.001	0.001	0.976

Note. *P-value <.1, **<.05 , ***<.01 The total number of Texas districts for that year that purchased educational resources for their ELL students served in specialized language programs is represented by N. A partial η^2 score indicates the strength of relationship between the dependent variable and the independent variable in the presence of the other variables. A partial η^2 score of 0 means that X_7 is not highly related to the outcome variable. Adjusted R^2 is a measure of the strength of the model with a score of 1 indicating perfect prediction power.
of the model with a score of 1 indicating perfect prediction power.

Table 7 includes regression analysis of Quartile IV districts' ELL populations and expenditures.

Analysis presented in Table 7 examined the extent to which, among districts with the largest 75-100% of ELL student populations for that year, ELL population size was a statistically significant predictor of a district's expenditures on these students, according to the TPSFM funding distributions. For all 10 years, the Adjusted R^2 values reveal a strong power of prediction for the TPSFM to predict district expenditures, ranging from 0.977 to 0.998. Partial η^2 values, however, indicate that X_7 is not a very strong predictor and is not highly related to the outcome variable, district expenditures, in the presence of other variables. For all 10 years, Partial η^2 scores for X_7 are extremely weak, ranging from 0 to 0.002.

Table 7

Analysis of TPSFM Components for All Texas Public School Districts in Predicting Total Expenditures in QIV

Year	N	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	Partial η^2	Adj R^2
1997	1043	.016**	0.004	.333***	.110***	.099***	0.004	0	.016**	.116***	.018**	.470***	0	0.998
1998	1037	0.01	0	.761***	.075***	.013*	.022**	0.002	0.001	0	0	.196** *	0.002	0.998
1999	1041	.011*	0	.695***	.022**	.018**	0.008	0.001	0	0	0	.025**	0.001	0.996
2000	905	0.001	0.009	.623***	.225***	0.003	0.007	0	0.001	0.01	0	.053**	0	0.996
2001	1005	.014*	.013*	.657***	.175***	0.009	0.01	0.002	0	0.001	0.01	,485** *	0.002	0.998
2002	1014	0.01	0.009	.671***	.293***	0.009	.011*	0	0.001	0.002	.011*	.414** *	0	0.997
2003	910	0.004	0.007	.621***	0.001	0.005	0.004	0.001	0.003	0.002	0.002	.415** *	0.001	0.998
2004	902	0.001	0.012	.546***	0.011	.025**	0.006	0.001	0	0	0.001	.363**	0.001	0.997
2005	939	0.032***	0	.984***	0	0.001	0.001	0.001	0.001	0	.014*	.012*	0.001	0.988
2006	933	.020**	0.004	.971***	0.001	0.003	0	0	0	0.003	.012*	.022**	0	0.977
2007	933	.032***	0.01	.982***	0	0.006	0	0	0.001	0	.030***	.038** *	0	0.986

Note. *P-value <.1, **<.05 , ***<.01 The total number of Texas districts for that year that purchased educational resources for their ELL students served in specialized language programs is represented by N. A partial η^2 score indicates the strength of relationship between the dependent variable and the independent variable in the presence of the other variables. A partial η^2 score of 0 means that X_7 is not highly related to the outcome variable. Adjusted R^2 is a measure of the strength of the model with a score of 1 indicating perfect prediction power.

Individual Academic Years

The following analyses examined each of the 10 years of data individually for the extent to which district's ELL student population was a statistically significant predictor of a district's expenditures on these students, according to the TPSFM funding distributions. Each individual year's overall correlation analysis was compared to correlation analysis within quartiles of districts with like-sized ELL student populations.

Table 8 presents regression analysis for the school year 1997-1998. Table 8 presents the Adjusted R^2 value of 0.997, revealing that X_7 is a strong predictor of district expenditures for all districts in 1997. Within quartiles of districts with like-sized ELL student populations, the Adjusted R^2 values remain strong with Quartile I being the relative lowest at 0.981. The Partial η^2 value for 1997 as a whole is 0.004, indicating that X_7, in the presence of the other variables within the TPSFM, is not a very strong predictor and is not highly related to the outcome variable, district expenditures. Within quartiles of like-sized ELL student populations, the Partial η^2 scores for X_7 are extremely weak. Quartiles II, III, IV have Partial η^2 scores of 0. Quartile I has the relatively strongest Partial η^2 score at 0.006.

Table 8

Regression Analysis for School Year 1997-1998

Quartile	N	Sig	Partial η^2	Adjusted R^2
Q I	261	0.285	0.006	0.981

Table 8 (continued)

Quartile	N	Sig	Partial η^2	Adjusted R^2
Q II	261	0.934	0	0.995
Q III	261	0.913	0	0.997
Q IV	260	0.85	0	0.998
All	1043	0.055	0.004	0.997

Note. N represents the total number of Texas districts that purchased educational resources for their ELL students served in specialized language programs. A partial η^2 score indicates the strength of relationship between the dependent variable and the independent variable in the presence of the other variables. A partial η^2 score of 0 means that X_7 is not highly related to the outcome variable. Adjusted R^2 is a measure of the strength of the model with a score of 1 indicating perfect prediction power.

Table 9 presents the Adjusted R^2 value of 0.996, revealing that X_7 is a strong predictor of district expenditures for all districts in 1998. Within quartiles of districts with like-sized ELL student populations, the Adjusted R^2 values remain strong. Quartile I has the relatively lowest Adjusted R^2 value of 0.98. The Partial η^2 value for 1998 as a whole is 0.001, indicating that X_7, in the presence of the other variables within the TPSFM, is not a very strong predictor and is not highly related to the outcome variable, district expenditures. Within quartiles of like-sized ELL student populations, the Partial η^2 scores for X_7 are extremely weak. Quartiles I and III have Partial η^2 scores of 0. Quartiles II and IV have the relatively strongest Partial η^2 scores at 0.002 each.

Table 9

Regression Analysis for School Year 1998-1999

Quartile	N	Sig	Partial η^2	Adjusted R^2
Q I	260	0.969	0	0.98
Q II	259	0.562	0.002	0.993
Q III	259	0.891	0	0.988
Q IV	259	0.466	0.002	0.998
All	1037	0.233	0.001	0.996

Note. N represents the total number of Texas districts that purchased educational resources for their ELL students served in specialized language programs. A partial η^2 score indicates the strength of relationship between the dependent variable and the independent variable in the presence of the other variables. A partial η^2 score of 0 means that X_7 is not highly related to the outcome variable. Adjusted R^2 is a measure of the strength of the model with a score of 1 indicating perfect prediction power.

Table 10 presents the Adjusted R^2 value of 0.995, revealing that X_7 is a strong predictor of district expenditures for all districts in 1999. Within quartiles of districts with like-sized ELL student populations, the Adjusted R^2 values remain strong with Quartile I being the relative lowest at 0.982. The Partial η^2 value for 1999 as a whole is 0.001, indicating that X_7, in the presence of the other variables within the TPSFM, is not a strong predictor and is not highly related to the outcome variable, district expenditures. Within quartiles of like-sized ELL student populations, the Partial η^2 scores for X_7 are extremely weak. Quartiles II, III, and IV have Partial η^2 scores of 0.001. Quartile II has the relatively strongest Partial η^2 score at only 0.002.

Table 10

Regression Analysis for School Year 1999-2000

Quartile	N	Sig	Partial η^2	Adjusted R^2
Q I	261	0.681	0.001	0.982
Q II	260	0.478	0.002	0.992
Q III	260	0.675	0.001	0.986
Q IV	260	0.72	0.001	0.996
All	1041	0.325	0.001	0.995

Note. N represents the total number of Texas districts that purchased educational resources for their ELL students served in specialized language programs. A partial η^2 score indicates the strength of relationship between the dependent variable and the independent variable in the presence of the other variables. A partial η^2 score of 0 means that X_7 is not highly related to the outcome variable. Adjusted R^2 is a measure of the strength of the model with a score of 1 indicating perfect prediction power.

Table 11 presents the Adjusted R^2 value of 0.996, revealing that X_7 is a strong predictor of district expenditures for all districts in 2000. Within quartiles of districts with like-sized ELL student populations, the Adjusted R^2 values remain strong with Quartile I being the relative lowest at 0.976. The Partial η^2 value for 2000 as a whole is 0, indicating that X_7, in the presence of the other variables within the TPSFM, is not a very strong predictor and is not highly related to the outcome variable, district expenditures. Within quartiles of like-sized ELL student populations, the Partial η^2 scores for X_7 are extremely weak. Quartile IV has a Partial η^2 score of 0, followed by Quartile II at 0.001, and Quartile I at 0.002. Quartile III has the relatively strongest

Partial η^2 score at only 0.012.

Table 11

Regression Analysis for School Year 2000-2001

Quartile	N	Sig	Partial η^2	Adjusted R^2
Q I	227	0.559	0.002	0.976
Q II	226	0.618	0.001	0.991
Q III	226	0.109	0.012	0.992
Q IV	226	0.927	0	0.996
All	905	0.97	0	0.996

Note. N represents the total number of Texas districts for that year that purchased educational resources for their ELL students served in specialized language programs. A partial η^2 score indicates the strength of relationship between the dependent variable and the independent variable in the presence of the other variables. A partial η^2 score of 0 means that X_7 is not highly related to the outcome variable. Adjusted R^2 is a measure of the strength of the model with a score of 1 indicating perfect prediction power.

Table 12 presents the Adjusted R^2 value of 0.997, revealing that X_7 is a strong predictor of district expenditures for all districts in 2001. Within quartiles of districts with like-sized ELL student populations, the Adjusted R^2 values remain strong with Quartile I being the relative lowest at 0.969. The Partial η^2 value for 2001 as a whole is 0, indicating that X_7, in the presence of the other variables within the TPSFM, is not a very strong predictor and is not highly related to the outcome variable, district expenditures. Within quartiles of like-sized ELL student populations, the Partial η^2scores

for X_7 are extremely weak. Quartile III has a Partial η^2 score of 0, followed by Quartile IV at 0.002, and Quartile II at 0.007. Quartile I has the relatively strongest Partial η^2 score at only 0.017.

Table 12

Regression Analysis for School Year 2001-2002

Quartile	N	Sig	Partial η^2	Adjusted R^2
Q I	252	0.061	0.017	0.969
Q II	251	0.208	0.007	0.992
Q III	251	0.937	0	0.995
Q IV	251	0.447	0.002	0.998
All	1005	0.657	0	0.997

Note. N represents the total number of Texas districts for that year that purchased educational resources for their ELL students served in specialized language programs. A partial η^2 score indicates the strength of relationship between the dependent variable and the independent variable in the presence of the other variables. A partial η^2 score of 0 means that X_7 is not highly related to the outcome variable. Adjusted R^2 is a measure of the strength of the model with a score of 1 indicating perfect prediction power.

Table 13 presents the Adjusted R^2 value of 0.997, revealing that X_7 is a strong predictor of district expenditures for all districts in 2002. Within quartiles of districts with like-sized ELL student populations, the Adjusted R^2 values remain strong with Quartile I being the relative lowest at 0.978. The Partial η^2 value for 2002 as a whole is 0, indicating that X_7, in the presence of the other variables within the TPSFM, is not a

predictor and is not related to the outcome variable, district expenditures. Within quartiles of like-sized ELL student populations, the Partial η^2 scores for X_7 are extremely weak. Quartile IV has a Partial η^2 score of 0, followed by Quartile II at 0.002, and Quartile III at 0.013. Quartile I has the relatively strongest Partial η^2 score at only 0.018.

Table 13

Regression Analysis for School Year 2002-2003

Quartile	N	Sig	Partial η^2	Adjusted R^2
Q I	338	0.06	0.018	0.978
Q II	338	0.503	0.002	0.994
Q III	338	0.067	0.013	0.994
Q IV	338	0.775	0	0.997
All	1014	0.993	0	0.997

Note. N represents the total number of Texas districts for that year that purchased educational resources for their ELL students served in specialized language programs. A partial η^2 score indicates the strength of relationship between the dependent variable and the independent variable in the presence of the other variables. A partial η^2 score of 0 means that X_7 is not highly related to the outcome variable. Adjusted R^2 is a measure of the strength of the model with a score of 1 indicating perfect prediction power.

Table 14 presents the Adjusted R^2 value of 0.997, revealing that X_7 is a strong predicor of district expenditures for all districts in 2003. Within quartiles of districts with like-sized ELL student populations, the Adjusted R^2 values remain strong with Quartile I being the relative lowest at 0.982. The Partial η^2 value for 2003 as a whole is 0.002,

indicating that X_7, in the presence of the other variables within the TPSFM, is not a strong predictor and is not highly related to the outcome variable, district expenditures. Within quartiles of like-sized ELL student populations, the Partial η^2 scores for X_7 are extremely weak. Quartile IV has a Partial η^2 score of 0.001, followed by Quartile III at 0.004, and Quartile I at 0.023. Quartile II has the relatively strongest Partial η^2 score at only 0.035.

Table 14

Regression Analysis for school year 2003-2004

Quartile	N	Sig	Partial η^2	Adjusted R^2
Q I	228	0.032	0.023	0.982
Q II	228	0.006	0.035	0.993
Q III	227	0.355	0.004	0.992
Q IV	227	0.666	0.001	0.998
All	910	0.238	0.002	0.997

Note. N represents the total number of Texas districts for that year that purchased educational resources for their ELL students served in specialized language programs. A partial η^2 score indicates the strength of relationship between the dependent variable and the independent variable in the presence of the other variables. A partial η^2 score of 0 means that X_7 is not highly related to the outcome variable. Adjusted R^2 is a measure of the strength of the model with a score of 1 indicating perfect prediction power.

Table 15 presents the Adjusted R^2 value of 0.997, revealing that X_7 is a strong predictor of district expenditures for all districts in 2004. Within quartiles of districts

with like-sized ELL student populations, the Adjusted R^2 values remain strong with Quartile I being the relative lowest at 0.982. The Partial η^2 value for 2004 as a whole is 0, indicating that X_7, in the presence of the other variables within the TPSFM, is not a predictor and is not related to the outcome variable, district expenditures. Within quartiles of like-sized ELL student populations, the Partial η^2 scores for X7 are extremely weak. Quartile III has a Partial η^2 score of 0, followed by Quartiles II and IV at 0.001. Quartile I has the relatively strongest Partial η^2 score at only 0.012.

Table 15

Regression Analysis for School Year 2004-2005

Quartile	N	Sig	Partial η^2	Adjusted R^2
Q I	226	0.128	0.012	0.982
Q II	226	0.685	0.001	0.997
Q III	225	0.791	0	0.997
Q IV	225	0.702	0.001	0.997
All	902	0.618	0	0.997

Note. N represents the total number of Texas districts for that year that purchased educational resources for their ELL students served in specialized language programs. A partial η^2 score indicates the strength of relationship between the dependent variable and the independent variable in the presence of the other variables. A partial η^2 score of 0 means that X_7 is not highly related to the outcome variable. Adjusted R^2 is a measure of the strength of the model with a score of 1 indicating perfect prediction power.

Table 16 presents the Adjusted R^2 value of 0.988, revealing that X_7 is a strong

predictor of district expenditures for all districts in 2005. Within quartiles of districts with like-sized ELL student populations, the Adjusted R^2 values remain strong with Quartile I being the relative lowest at 0.944. The Partial η^2 value for 2005 as a whole is 0.001, indicating that X_7, in the presence of the other variables within the TPSFM, is not a strong predictor and is not related to the outcome variable, district expenditures. Within quartiles of like-sized ELL student populations, the Partial η^2 scores for X_7 are extremely weak. Quartile I has a Partial η^2 score of 0, followed by Quartile IV at 0.001, and Quartile III at 0.009. Quartile II has the relatively strongest Partial η^2 score at only 0.032.

Table 16

Regression Analysis for School Year 2005-2006

Quartiles	N	Sig	Partial η^2	Adjusted R^2
Q I	235	0.908	0	0.944
Q II	235	0.007	0.032	0.968
Q III	235	0.138	0.009	0.982
Q IV	234	0.601	0.001	0.988
All	939	0.996	0.001	0.988

Note. N represents the total number of Texas districts for that year that purchased educational resources for their ELL students served in specialized language programs. A partial η^2 score indicates the strength of relationship between the dependent variable and the independent variable in the presence of the other variables. A partial η^2 score of 0 means that X_7 is not highly related to the outcome variable. Adjusted R^2 is a measure of the strength of the model with a score of 1 indicating perfect prediction power.

Table 17 presents the Adjusted R^2 value of 0.979, revealing that X_7 is a strong predictor of district expenditures for all districts in 2006. Within quartiles of districts with like-sized ELL student populations, the Adjusted R^2 values remain strong with Quartile I being the relative lowest at 0.952. The Partial η^2 value for 2006 as a whole is 0.001, indicating that X_7, in the presence of the other variables within the TPSFM, is not a strong predictor and is not related to the outcome variable, district expenditures. Within quartiles of like-sized ELL student populations, the Partial η^2 scores for X_7 are extremely weak. Quartile IV has a Partial η^2 score of 0, followed by Quartiles I and III at 0.003. Quartile II has the relatively strongest Partial η^2 score at 0.03.

Table 17

Regression Analysis for School Year 2006-2007

Quartiles	N	Sig	Partial η^2	Adjusted R^2
Q I	234	0.448	0.003	0.952
Q II	233	0.009	0.03	0.963
Q III	233	0.429	0.003	0.979
Q IV	233	0.921	0	0.977
All	933	0.476	0.001	0.979

Note. N represents the total number of Texas districts for that year that purchased educational resources for their ELL students served in specialized language programs. A partial η^2 score indicates the strength of relationship between the dependent variable and the independent variable in the presence of the other variables. A partial η^2 score of 0 means that X_7 is not highly related to the outcome variable. Adjusted R^2 is a measure of the strength of the model with a score of 1 indicating perfect prediction power.

Table 18 presents the Adjusted R^2 value of 0.984, revealing that X_7 is a strong predictor of district expenditures for all districts in 2007. Within quartiles of districts with like-sized ELL student populations, the Adjusted R^2 values remain strong with Quartile I being the relative lowest at 0.936. The Partial η^2 value for 2007 as a whole is 0, indicating that X_7, in the presence of the other variables within the TPSFM, is not a predictor and is not related to the outcome variable, district expenditures. Within quartiles of like-sized ELL student populations, the Partial η^2 scores for X_7 are extremely weak. Quartile IV has a Partial η^2 score of 0, followed by Quartile III at 0.001, and Quartile I at 0.002. Quartile II has the relatively strongest Partial η^2 score at only 0.009.

Table 18

Regression Analysis for School Year 2007-2008

Quartiles	N	Sig	Partial η^2	Adjusted R^2
Q I	234	0.509	0.002	0.936
Q II	233	0.162	0.009	0.97
Q III	233	0.689	0.001	0.974
Q IV	233	0.848	0	0.985
All	933	0.359	0	0.984

Note. N represents the total number of Texas districts for that year that purchased educational resources for their ELL students served in specialized language programs. A partial η^2 score indicates the strength of relationship between the dependent variable and the independent variable in the presence of the other variables. A partial η^2 score of 0 means that X_7 is not highly related to the outcome variable. Adjusted R^2 is a measure of the strength of the model with a score of 1 indicating perfect prediction power.

Summary

The purpose of my study was to examine the vertical equity of the state public school funding system from 1997-2007 for purchasing educational resources for ELL students. Vertical equity was operationalized through a research-based framework that places ELL students at risk of academic failure. Regression analysis examined vertical equity through (a) the extent to which the quantity of ELL students within districts predicted the TPSFM funding output for ELL students in districts over 10 years and (b) the extent to which, when districts are grouped by like-sized populations of ELL students within each of the 10 years, the quantity of ELL students within districts with like-sized populations of ELL students predicted the TPSFM funding output for ELL students.

Herein, I presented considerations in the treatment of the data followed by data analysis including: (a) descriptive statistics on Texas independent school districts from 1997-2007, (b) the effect of outlier exclusion and inclusion on data analysis, (c) regression analysis of districts' ELL student population size and districts' expenditures on these students from 1997-2007, (d) regression analysis of quartiles of districts with like-sized ELL student populations and districts' expenditures on these students, and (e) regression analysis examining each year's overall analysis with respect to quartiles of districts with like-sized ELL student populations. In the following chapter, I discuss the research questions, limitations of the study, recommendations and conclusions.

CHAPTER V

SUMMARY

This chapter includes a discussion of the implications of the findings from this study and recommendations for future research. The two research questions that guided this research are answered in light of the data analyzed from the TPSFM. The present study's limitations will be discussed as well as the measures taken to address these limitations. This chapter concludes with a discussion about vertical equity measures in practice in Texas and recommendations for the TPSFM.

Research Question 1

Is X_7, the quantity of ELL students served in specialized language programs within a district, a statistically significant predictor for a districts' total expenditure for these students for each of the 10 academic school years examined, from 1997-2007?

For this research question, I examined to what extent the TPSFM fit the financial and demographic data for each of the 10 academic years analyzed, as indicated by the Adjusted R^2 value, and to what extent X_7 of the TPSFM predicted funding for all ELL students in all districts over each year, as indicated by the Partial η^2 value.

Analyses of the data, as reported in Table 3, revealed the strong statistical power of the TPSFM to predict district expenditures from 1997-2007. Further analyses, however, found that X_7 was not a strong predictor and was not related to district expenditures from 1997-2007.

Research Question 2

When districts are grouped into quartiles by like population sizes of ELL students, is X_7, the quantity of ELL students served in specialized language programs within a district, a statistically significant predictor for a districts' total expenditure for these students within each quartile for each of the 10 academic school years, from 1997-2007?

For this research question, I examined to what extent the TPSFM fit the financial and demographic data for each quartile for each of the 10 academic years and to what extent X_7 predicted funding for all ELL students in all districts over each year, considering districts with varying population sizes of X_7.

Analyses of the data to answer the second research question are reported in Tables 4-7 and Tables 8-18. Tables 4-7 presented analyses results by each quartile of districts grouped by like population size of ELL students. Tables 8-18 presented analyses by each year, highlighting the differences between analysis of an academic year overall and analysis within the differing quartiles for that same year. Findings revealed the strong statistical power of the TPSFM to predict district expenditures from 1997-2007 for all quartiles of districts. Further analyses, however, found that X_7 was not a strong predictor and was not related to district expenditures within any quartile of districts from 1997-2007.

Limitations

Best and Kahn (2003) described limitations as "those conditions beyond the control of the researcher that may place restrictions on the conclusions of the study and

their application to other situations" (p. 37). Limitations which may have affected the current study include the following aspects, which will be further discussed(a) the funding implications of differing resource availabilities to districts; (b) the differing costs of implementation for whichever type of program districts implement to serve ELL students; (c) the occurrence of overlay provisions; the use of archival data; (d) the use of district-level as the unit of analysis; and (e) the results of this study may not be generalizeable beyond Texas.

Addressing Limitations

The research design for the present study strongly protected against internal and external validity threats by controlling for validity threats to the main effects in the areas of history, maturation, testing, instrumentation, regression, selection, and mortality.

The data set used in this study represented a population, not a sample, and therefore served to eliminate the threat to external validity. Additionally, this study has a high level of construct validity because the state and local funding practices as well as district expenditures are a matter of public record, annually reviewed by an independent auditor and meticulously defined by the state to maintain the uniformity of reporting and records. I, therefore, had a high level of confidence that the variables that were studied were valid measures of the corresponding constructs in the research questions being examined.

History was addressed in the research design by the fact that the adjustment weight of 0.1 for ELL students remained unchanged during the 10-year study period. Mortality was addressed by not including districts that folded or that did not report ELL

student expenditure in the data set for that year. Mortality, however, would not be expected to significantly affect study findings because the total number of Texas school districts had only slight variation, a ranging from a low of 902 districts in 2004 to a high of 1043 districts in 1997.

I, as the researcher, had no control over the funding implications of differing resource availabilities or of the cost of implementation of whichever type of BE or ESL program or program sub-division that districts employ. As previous studies have shown (Baker & Markham, 2002; Berne & Stiefel, 1984; NCES, 2003), school districts may be constrained by resource availability because of geographical location, such as within urban or rural settings, and therefore may pay different prices for the same resources, such as teacher salary. Although these factors do not influence the reporting of districts' financial data to PEIMS, the researcher concedes that these factors may have influenced district-level funding decisions for allocating resources to ELL students. Regardless, the theory of the TPSFM is designed to take into account district-level differences across Texas by weighting student-level variables within the equation to receive additional funding (Clark, 1998; Legislative Budget Board, 2001; Texas Education Code Section 29.081).

One limitation of this study is the use of archival data to answer the research questions. Lewis, Spurlock, Cox and Lueck (2008) explained that archival data is data that was originally collected for purposes not directly connected to the current study. In using archival data, the researcher is necessarily not familiar with the phases of data collection for the respective data set (Lewis, Spurlock, Cox & Lueck, 2008). Archival

data may present problems including inaccuracy, inconsistency, and within certain details of the reported data (Stiefel, Ruberstein, & Berne, 1998). The researcher for this study therefore operated under the assumption that the archival data available through PEIMS were collected, audited, reported, and published accurately and consistently.

According to Elder, Pavalko, and Clipp (1993), the determination to use archival data should be based on the strengths of the data. Data for Texas school districts were therefore selected because they have been found to be of high quality, according to Clark and Toenjes (1996), and have been used repeatedly for studies of school finance including previous studies by: Ajwad (2006); Baker (2001); Clark and Toenjes (1996); Legislative Education Board (1992); Luke (2007); Picus (1993); Picus and Hertert (1993); Public Education Team (1997); and School Finance Working Group (1997).

An additional limitation is the existence of funding modifications to the state formula intended to restrict the increase or decrease in districts' revenue from year to year, known as overlay provisions:

> Such provisions are usually made for political reasons by representatives who seek to protect the level of funding for their districts…Because overlay provisions usually increase per-pupil funding for districts with falling enrollments, and districts with falling enrollments tend to be located in lower socioeconomic areas with more at-risk students, the overlay provisions may affect the state's intended relationships between per-pupil revenues and vertical equity factors. Likewise, if the funding in a state's foundation aid program is set at the level needed to provide students with an

> adequate education, then modifications to the foundation aid program could cause some districts to receive more than adequate funding whereas others would have inadequate funding for education. (Toutkoushian & Michael, 2008, p. 353).

A further limitation to the current study is the use of district-level as the unit of analysis. As Stiefel, Ruberstein, and Berne (1998) noted, analysis at the district-level assumes that each school receives the average level of available resources within the district and this may not be the case in large urban school districts. Finally, although I acknowledge the strength of analysis using a data population, because of state-specific funding practices, findings from this empirical study may not be generalizeable beyond Texas.

Conclusions

"Nationally, the funding of at-risk student and ELL populations varies widely, and each state has its own funding challenges for these populations" (Hirth & Eiler, 2005, p. 396). Funding equity, however, is both the aim and obligation of state education finance systems (Guthrie & Rothstein, 1999; Ladd & Hansen, 1999; Rechovsky & Imazeki, 2001; Texas House of Representatives Research Organization, 2004). Results from my study showed that Texas districts did not equitably purchase educational resources for ELL students from 1997-2007 and the TPSFM did not improve the at-risk situation of ELL students from 1997-2007. Although a thorough review of the literature produced no previous study that examined the equity of the Texas mechanism from an ELL student funding perspective, my findings for this study are consistent with previous

studies within school finance literature criticizing the equity of the TPSFM (Hansen et al., 2007; Imazeki & Reschovsky, 2005; Rolle, 2008; Vesely, Crampton, Obiakor & Sapp, 2008).

The findings from my study challenge the assumptions by policy makers that (a) the state is meeting its own vertical equity goals for funding, (b) the funding weight for ELL students of 0.1 is sufficient to affect funding, (c) state and local funds for Texas public schools are distributed equitably to ELL students and (d) all Texas students, regardless of program participation or language status, have an equal opportunity to academic achievement.

These findings have serious and immediate implications for the overall educational opportunity of ELL students in Texas schools. As previously discussed, ELL students may not have equitable access to educational resources including highly qualified teachers (Education Trust, 2008; Hanushek, Kain, & Rivkin, 2004; Howey, 2008; NCES, 2004) and are classified as at-risk for dropping out of school (Land & Legters, 2002; TEA, 2004; Texas Education Code Section 29.081; Texas Education Code Section 29.052). The practical consequences of these inequities are both personal and systemic.

Compared to high school graduates, students who fail to complete high school have lower incomes, higher rates of unemployment, higher rates of government assistance and are 8 times as likely to be incarcerated, in addition to representing significant financial loss to the state education system (Deviney & Cavazoz, 2006). The United Ways (2009) commissioned a study, which calculated the various impacts for

Texas from dropouts of the senior class of 2012:

- Potential loss in the state's GSP, between $5.0 billion and $9.0 billion
- Increased welfare payments, between $404 million and $736 million
- Potential increase in crime related costs, between $595 million and $1.0 billion.
- The total predicted cost of dropouts, between $6.0 billion and $10.7 billion.

It is significantly more beneficial for Texas to appropriately educate its students than to have them drop out. "Every reputable economic study confirms that expenditures for public education are in fact investments, rather than merely expenses, which yield sound, cost-effective economic and social returns for society as a whole" (Wood & Honeyman, 1990, p. 3).

Vertical Equity Practices in Texas

Current funding practices in Texas raise serious concern about the state's commitment to providing equity for ELL students, as measured by vertical equity, within its education program.

Toutkoushian and Michael (2007) noted that vertical equity is evaluated relative to the weights for each factor that the state has set. In some instances, these weights are not based on rigorous analysis of the additional funding needed to equalize educational outcomes. Measures of vertical equity, then, represent how well the state is meeting its established goals. This information is therefore valuable for helping policymakers know whether the state's funding system is working as intended and whether the state is making progress toward these goals over time.

Measures of vertical equity define equity relative to a state's goals and objectives and evaluate equity relative to the weights a state has set for each factor (Toutkoushian & Michael, 2007). Current funding weights may be the result of cost studies, a review of weights used in other states, conjecture, or political negotiations between policymakers (Alexander & Wall, 2006; Baker & Duncombe, 2004; Toutkoushian & Michael, 2007). As previously discussed in the literature review, Texas' current funding weight of 0.1 for ELL students came about as the result of political compromise and was not implemented until Texas HB 72 (1984) despite research at that time, which determined the following weights to be appropriate:

(a) To begin at 0.15 and increase to 0.40 in the following two years, according to the GOERP report (1974), (Texas House of Representatives Research Organization, 2004).

(b) To be 2.20, as written in Texas HB 1715 (1975) which did not pass (Cardenas, 1997).

(c) To range from 1.25 to 1.42, based on IRDA's Texas Bilingual Cost Analysis (1976) and further studies in Houston ISD, Utah, and Colorado (Cardenas, 1997).

The "determination of formula parameters such as the basic allotment, weights, and other elements is a critical prerequisite to establishing a system that provides high-quality education for all children" (Clark & Toenjes, 1996, p. 129). Researchers (Clark & Toenjes, 1996; Duncombe & Lukemeyer, 2002; Reschovsky & Imazeki, 2001; Toutkoushian & Michael, 2007), have observed that there remains a significant

underestimation and lack of consensus on the magnitude of the weights needed for at-risk students relative to non at-risk students. Baker and Duncombe (2004) examined Texas districts and noted the limited evidence on the effect ELL student status on costs and suggested that weights higher than 50% are likely closer to the additional costs.

Discussion

As Vesely and Crampton (2004) noted, it is imperative to build a better understanding of the ability of funding for at-risk children to increase the vertical equity of state school finance systems. Current vertical equity measures are not able to inform policymakers (a) whether the dollars distributed agree with state objectives (Toutkoushian & Michael, 2007), (b) whether the state's vertical equity adjustments work as intended (Toutkoushian & Michael, 2007), (c) the effect of the weights on actual distribution of aid (Baker & Duncombe, 2004), or (d) whether the current weights are based on reasonable or actual program goals (Alexander & Wall, 2006). Additionally, in my study I examined the funds available that were spent on ELL students, not the funds necessary for certain outcomes for ELL students, a topic of significant debate within school finance literature (Gordon, 2003). As I delineated in the research design, my study did not examine program effectiveness nor consider any measure of students' educational outcomes. I concede therefore that even with equitable funding for ELL students in all Texas districts, ELL students' educational outcomes might not be equal or even improved.

Vesely and Crampton (2004) noted that a key question for policymakers is to establish how many additional resources are actually needed to ensure that at-risk

students succeed. As Imazeki & Reschovsky (2005, Working Paper) explained, "some school districts may have higher per pupil expenditures, not because of higher costs, but because they are not using their resources efficiently." (p.11)

According to Toutkoushian and Michael (2007), when districts are able to raise enough money to meet their intended education costs, the ideal weights may then be estimated through a cost analysis. The advantage of cost analysis for guiding a state formula design, Baker and Duncombe (2004) noted, is that both district needs and student needs may be simultaneously taken into account. It is therefore hoped that this study will encourage future research to examine the vertical equity measures within the TPSFM through cost analyses of the current ELL funding weight of 10%.

Researchers (Imazeki & Reschovsky, 2005; NCES, 2003) have offered explanations for current defects present in the Texas funding mechanism:

(a) The state's portion of education funding has been decreasing, from 47% in 2000 to 38% in 2004; the basic allotment rate that has not been raised in 5 years; and the guaranteed tax base was last increased in 2002-2003. "Therefore, as per-pupil property values grow from one year to the next, both Tier I and Tier II state aid allocations are reduced" (Imazeki & Reschovsky, 2005, p. 101).

(b) The number of students in the public education system is steadily increasing. The rising cost of meeting accountability standards at both the state and federal level for a greater number of students cannot be met without the annual expenditure of additional funds.

(c) Changing demographics among school-aged children represent higher unmet funding needs. In particular, greater numbers of ELL students would indicate an appropriately greater cost to meet educational accountability standards.

Therefore as opposed to waiting for legal reform to force its hand, Texas should take a proactive posture and frequently reevaluate its funding mechanism for vertical equity. According to Toutkoushian and Michael (2008) the state of Indiana reexamines its funding weight for ELL students every two years. Further researchers may want to examine school-level analyses throughout Texas in order to describe potential intra-district patterns of equity or inequity.

The analyses for vertical equity in my study indicated that districts with greater need did not receive higher funding for their ELL students. The Texas system may therefore benefit from further cost analysis studies and targeted optimization studies to determine the appropriate weight within the TPSFM that ensures the statistical significance of ELL students for purchasing educational resources. Imazeki and Reschovsky (2005) noted, "there is widespread agreement in Texas that the school funding system is in crisis and will need to be reformed" (p. 99). Perhaps the findings from my study will inform policy makers that, despite a state funding mechanism that theoretically claims to take additional programmatic costs into account, inequities in funding for Texas' ELL students existed from 1997-2007 and are likely still existing in classrooms today.

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