

BEYOND MONEY:
RELATING LOCAL SCHOOL TAXATION TO
FAMILY AND COMMUNITY RISK

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by
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TO FAMILY AND COMMUNITY RISK

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CHAPTER 1

Introduction

Kindergarten through twelfth grade public schools in the United States developed from tuition-based academies, open only to those who could afford education, to free institutions for all families regardless of income or race. The change occurred over 200 years through many means, particularly in state constitutions and statutes, but also through federal and state court interpretations of equal opportunity clauses leading to racial desegregation of schools, federal law establishing free education for disabled students, and a variety of financing options through local and state taxation.

State governments, including the executive, legislative and judicial branches, have historically held the constitutional responsibility for K-12 education, delegating governance authority to local school districts, including the limited ability to establish tax rates, to authorize ballot issues for community approval of taxation, to make operational decisions including personnel, instructional curriculum and geographical boundaries, and in general to exercise local control of schooling.

Although states authorized districts, the collection of local institutions that eventually formed these political subdivisions developed loosely as community schools, paid for by local residents. This historical foundation, with state and local jurisdiction for education, set up long-standing friction between the entities regarding governance, establishment of curriculum and especially school funding. Who pays for schools, with

the state responsible for educating all children, but the local communities charged with the actual delivery of education?

States historically hold the constitutional responsibility for K-12 education funding as one way of fulfilling their legal obligation to equal opportunity. As a result, traditional policy actors develop these policies at the state level -- often via statutory formulas -- in the courts or the legislature, and use a combination of local and state funds for education. Local districts have always relied heavily on property taxes for education, leading to widely varying available resources for education since locales have widely varying property wealth. So state policy via constitution and statute has attempted to equalize differences in both local financial and social need to provide adequate and equitable resources across districts that have widely varying local wealth and taxation for education.

For example, the State of Missouri disburses over \$2 billion annually for K-12 education, yet per pupil expenditures among districts range from \$13,739 to \$4,771, a difference of \$8,968 (Missouri Department of Elementary and Secondary Education, 2004). These financial differences are at play while certain family and school risk factors predict a student's likelihood of educational success, with high risk students scattered throughout Missouri's 524 school districts.

Missouri's school finance laws must account for differences in local wealth, local taxation, and student needs, based on the constitutional standards of equity and adequacy¹ that exist within many states' constitutions, and various court decisions since the 1970's that upheld this responsibility (Guthrie, 2004). In state-level school finance

¹ Efficiency is another common standard (Guthrie, 2005; Heck, 2004), although Missouri court decisions and policies have focused on equity and adequacy.

policy, equity means equal education opportunity and resources. Horizontal equity refers to the concept that all students are equal and should have equivalent resources. Equity also allows for additional funding for additional student needs (i.e.) students with learning disabilities, English Language Learners, called vertical equity. Equity policy and research have included concepts such as fiscal capacity and wealth neutrality. These types of studies helped develop policy to equalize wealth across districts, and measured revenue distribution per pupil, state and local wealth and taxation policy using statistical methods. (Guthrie, 2004). School finance and public finance equity have distinctly different definitions “school finance taxpayer equity compares tax rates to spending per child, public finance taxpayer equity compares tax burdens to ability to pay” (Berne and Stiefel, 1999, p. 10). These two conflicting concepts must be rectified in state-level school finance policy.

Eventually, scholars and policymakers noted that equity policy and research generally ignored students, and they now consider adequacy as the key goal of distribution policy based on the particular needs of students. Adequacy is an appropriate level of funding to reach particular achievement and/or educational goals set by policymakers; these outcomes are now measured by both national learning standards (via No Child Left Behind) and state standards (Missouri School Improvement Program and the Missouri Assessment Program). In state law, this includes providing additional resources for at-risk students, such as those in poverty or with special needs. Adequacy studies measure progress towards adequacy standards, that is, student outcomes (Guthrie, 2004; Baker, 2005). They vary greatly in method, and as a result, recommend many different amounts regarding adequate resources; for example, Augenblick and Myers’

(2003) study suggested a \$900 million estimate for meeting educational needs in Missouri – a very high figure. As a result, such studies, as well as with plaintiffs' demands, are subject to criticism on the basis of political and economic feasibility, particularly since some research argues that increased per pupil expenditures have little clear effect on school and student outcomes (Hanushek, 1989).

This study purposefully focused on local taxation relative to state school finance philosophies of equity and adequacy. School finance studies and policy used to look at fiscal capacity and local wealth, but these studies became outdated since they lacked consideration of the high needs students who cost more to educate. Now student needs policy and research ignores local taxation and wealth, deeming it unimportant and unrelated to student need-based funding. This is a serious shortcoming. Prior to this study, there had been little understanding of how the various family, community and economic situations that hinder student learning also affect local taxation. This study shows that there are family and community risk factors that affect local taxation so that states need to more carefully consider how these relationships affect their ability to provide equitable and adequate education while using local taxation requirements to fund these goals.

One school finance study by Randall Vesely and Faith Crampton (2004) used an at-risk typology (Land & Legters, 2002) to study how well several states' policies achieved student equity and adequacy given specific at-risk factors, although it did not tie risk factors to local community choices. The typology includes locale, race/ethnicity, single parent households, educational attainment, free-reduced lunch percentages, English Language Learner percentages and special education percentages as student risk

factors. These variables were used in this study of Missouri's 1993 foundation formula's local taxation requirements and subsequent community choices regarding local taxation.

Missouri

Missouri's levy-based foundation formula developed in the 1993 state legislature via Senate Bill 380, after a court order indicated that the old system was both inequitable and inadequate. The judgment affirmed that the State must provide both equitable and adequate funds "to preserve the rights and liberties of the people" (Brown, 1998, p. 3) per the Missouri Constitution, which guarantees free public education for its 900,000 K-12 public school students.

The subsequent formula carried two underlying assumptions. First, some communities have more need for equalized funding to provide equal opportunity due to their low local property wealth. The policy mechanism used was a universal assessed valuation amount, called a guaranteed tax base, which assured all districts revenue as if they had as much wealth as a property-rich district² (Ogle, 1998). Before this, districts got a flat foundation amount, plus an amount minus 57% of a district's local wealth (Otto Fajen, personal communication). The second assumption is that communities need to share the cost of responsibility for public schools. The 1993 formula provided matching funding for a minimum operating levy of \$2.75 per \$100 of assessed valuation, where twenty percent remain today.

These two assumptions led to action by local school districts, who turned to their communities to raise taxes to the \$2.75 level, and were rewarded with additional state

² Specifically, the district in the 95th percentile's wealth, times 2.167.

funds as if the district were taxing on the guaranteed tax base. Figure 1 shows the school districts below \$2.75 in 1992, then in 2003.

Figure 1. Missouri school districts with operating levies below \$2.75

1992

2003

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are needed to see this picture.

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are needed to see this picture.

These figures show that despite significant differences in property wealth, school districts responded to the \$2.75 minimum levy within the 1993 formula. The changes at first improved equity of funding among districts, but eventually inequalities in spending increased. By 2003-04, districts with equal tax levies were generating vastly different amounts of state aid percentages and per pupil spending. Figure 2 shows the differences in state aid from districts with similar taxation, including those at the minimum levy of \$2.75, which received anywhere from under 20 to 60 percent of their revenue from state aid. This would not be problematic as long as spending were equal despite the revenue source, but Figure 3 shows that similar tax levies do not always lead to equal spending, for example, at \$2.75, where a district spent as little as \$4,000 to as much as \$11,000.

Figure 2. 2003-04 Tax levies relative to percent state aid

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are needed to see this picture.

Figure 3. 2003-04 Tax Levies relative to per pupil expenditure

QuickTime™ and a
TIFF (Uncompressed) decompressor
are needed to see this picture.

These figures display a common dynamic in school finance formulas: an attempt to level financial inequity either in taxation or spending, leading to short-term improvements in equity which stalls over time. Missouri's equity and adequacy diminished over time via the 1993 formula (Augenblick & Silverstein, 2003; Joint

Interim Committee, 2004). In response to the deteriorating situation, about 120 school districts filed a lawsuit against the State of Missouri in November 2003 claiming the 1993 funding method was both inequitable and inadequate.

Although Missouri's 2005 formula does account for high risk student needs, it also continues to consider local taxation and revenue to determine state aid, therefore this examination of the 1993 formula incentive levy can illuminate finance policy in Missouri and in other states with communities with divergent wealth and social conditions.

Purpose

The typical state-level school finance policy intends to correct for inequalities inherent to divergent community social conditions while relying on them to make financial choices that curb inequity. Typical school finance policy analyses describe equity and adequacy issues using traditional tax, economic and school finance underpinnings but have yet to connect local taxation with student needs. This is a serious shortcoming, because if the family and community issues that affect student learning also affect local taxation, either in choices made or in the ability to pay, then states need to more carefully consider how these relationships affect their ability to provide equitable and adequate education while using local effort to fund these goals. So, in the case of the 1993 formula, what were the relationships between family and community conditions and local tax choices?

The purpose of this study was to understand the nature of school finance policy beyond financial considerations--to identify the social conditions related to local school taxation. This study examined the relationship between family and community educational risk factors and local taxation choices. In particular, how did family and

community risk factors relate to the \$2.75 incentive levy as written into Missouri's 1993 school equalization formula?

Significance of Study

Risk factors do affect taxation, making the state's absolute minimum taxation requirements an oversimplified tool to handle the social complexities that restrict both education and local taxation. State policymakers may need a more sophisticated means to decipher the proper effort of local taxation relative to community and family needs in order to provide equal and adequate education. Further research in this area would include using local expenditure levels and total local wealth as they relate to risk factors.

Research Questions

Question 1: Are local school district taxation levy and revenue related to the district's economic, community and family factors?

Question 2: What changes in economic and community/family variables affected local taxation changes within districts?

Question 3: Which district attributes are correlated with district responses to the 1993 and 2001 state policy changes?

Methods

This study was a quantitative examination of how a community's social conditions relate to its local school taxation. This study examined Missouri's 1993 foundation formula, particularly related to its \$2.75 minimum incentive levy. Missouri's equalization formulas use districts to calculate and distribute aid; therefore, this study used them as the unit of analysis.

Family and community data included locale (city, suburb, town, rural) race/ethnicity, single parent households, educational attainment, free-reduced lunch percentages, English Language Learner percentages and special education percentages as student risk factors. The analysis used the equalized operating tax levy and percent state aid as dependent variables. The National Center for Educational Statistics (NCES) has locale codes for school districts from the mid-80's to the present, as well as English Language Learner (ELL) and special education data from 1986 to the present. Missouri's Office of Social and Economic Data Analysis (OSED) had the 1990-2003 U.S. Census figures broken down by district that includes data on a community's median income, race/ethnicity, single parents and educational attainment. Missouri's Department of Elementary and Secondary Education (DESE) had information on school districts' assessed valuation types per pupil, their enrollments, tax levies and percent state aid from 1990 to the present. DESE also had free-reduced lunch (FRL) percentages by district from 1995 to the present, and NCES had FRL percentages prior to that.

The analysis included regression techniques to study the relationship of family and community risk factors and local taxation. One regression analysis looked at two particular years, one before 1993 and another after, first using tax levy, then percent state aid as the dependent variable. The next set of analyses used a fixed effects regression to study relative changes in local taxation over time, in relation to community and family factors. The final analysis attempted to look at two years, before the 1993 formula and after, to see how those districts that had been below \$2.75 changed their tax levies, and how that related to family and community factors.

Assumptions

1) This proposed study assumed that available data are accurate.

2) It was assumed that the school population resembles the community demographically. Family data were not available for several student risk factors, but OSEDA has community data. Land and Legters use parent educational attainment, single parent status and race/ethnicity; OSEDA had these figures but for the community.

Limitations

OSEDA had broken out U.S. Census data by school district. However, the census data uses zip code as its unit of analysis, which do not directly translate into school districts. However, OSEDA uses a consistent method to create school district data.

Similarly, DESE had assessed valuation figures by school district. Assessed valuation is calculated by county, and school district and county lines do not match.

NCES and DESE may use different ways of calculating enrollment, which is often used as a divisor in percentage calculations, but the data effect would be minor.

The free-reduced lunch program percentage has over time become a proxy for socioeconomic status, but the numbers themselves simply represent the students who take advantage of this federal program.

Delimitations

Since 1993, the number of school districts decreased to 524 from 535 (Kirk, 1996). This analysis used only the latest iteration of school districts, as the Census data is available for the latest iteration of school districts.

Definition of Terms

Adequacy. A funding level allowing schools to reach educational goals set by

policymakers (Guthrie, 2004; Baker, 2005). According to a 1993 court decision, Missouri must provide adequate funding for “general diffusion of knowledge and intelligence” (Brown, 1998, p. 7).

Assessed Valuation. The Missouri Revised Statutes defines assessed valuation as “...the valuation of all real and personal property as determined and finally established by the state agency charged with the duty of equalizing assessments” (Chapter 48, RSMo., 1945). It includes commercial, industrial and residential property Local governments, including municipalities, counties and school districts, base property taxes on the county’s assessed valuation. For the purposes of school district levies, state law requires that school districts report this statistic as, “Assessed valuation minus tax increment financed assessed valuation as of December 31 of previous calendar year” (www.dese.state.mo.us/divadm/finance, 2004), because TIF financing is not counted in property taxes.³

Average Daily Attendance. “Average daily attendance”, the quotient or the sum of the quotients obtained by dividing the total number of hours attended in a term by resident pupils between the ages of five and twenty-one by the actual number of hours school was in session in that term. To the average daily attendance of the following school term shall be added the full-time equivalent average daily attendance of summer school students. "Full-time equivalent average daily attendance of summer school students" shall be computed by dividing the total number of hours attended by all summer school pupils by the number of hours required in section 160.011, RSMo, in the school term. For purposes of determining average daily attendance under this

³ TIF agreements are economic development incentives that allow businesses to circumvent local taxes on newly developed properties for a particular amount of time. The philosophy is that such agreements attract business and ultimately add to the long-term economic improvement of an area.

subdivision, the term "resident pupil" shall include all children between the ages of five and twenty-one who are residents of the school district and who are attending kindergarten through grade twelve in such district. If a child is attending school in a district other than the district of residence and the child's parent is teaching in the school district or is a regular employee of the school district which the child is attending, then such child shall be considered a resident pupil of the school district which the child is attending for such period of time when the district of residence is not otherwise liable for tuition. Average daily attendance for students below the age of five years for which a school district may receive state aid based on such attendance shall be computed as regular school term attendance unless otherwise provided by law;

<http://www.moga.mo.gov/statutes/C100-199/1630000011.HTM> Retrieved July 14, 2006)

Educational Attainment. "All percents are based on persons over 25. Most people have completed their education by that age"

(<http://www.oseda.missouri.edu/osedarpts/census.html> Retrieved July 13, 2006).

English Language Learner (ELL). NCES defines as, "A course designed for students with a language background other than English, and whose proficiency in English is such that the probability of the individual's academic success in an English-only environment is below that of a peer with an English language background"

(<http://www.nces.ed.gov>). ELL is one of the three risk factors written into the 2005 foundation formula.

Equity. The Missouri Constitution guarantees equal education opportunities for all public schoolchildren (Brown, 1998). In school finance, equity means providing and distributing equal resources for equal education (Guthrie, 2004; Berne & Stiefel, 1999).

Equalized Adjusted Operating Levy. Used to calculate who is operating under \$2.75, this number is the, "...levy after Proposition C rollback for School Purposes. Section 163.011(10), RSMo, defines School Purposes as the Incidental and Teachers Funds." (www.dese.state.mo.us/divadm/finance, 2004) Proposition C is a local sales tax.

Female Head of Household. In the 1990 Census, a female headed household (no husband) with her own children under the age of 18 (<http://www.oseda.missouri.edu/MOSTATS/xtabs3.notes.html> Retrieved July 13, 2006)

Foundation formula. A foundation formula is designed to distribute state monies to school districts in order to equalize local wealth differences and to provide a base ('foundation') of funding. Missouri's 1993 formula was Foundation Aid = (Eligible Pupils x Tax Levy x GTB) – local revenues (Podgursky & Springer, 2006).

Free-reduced lunch (FRL). Students may apply for aid to buy their lunch based on family income. The National Center for Education Statistics defines FRL as, "A federally-funded program that provides supplemental nutrition in the form of a free meal at noon time for income-eligible students who are unable to pay the full cost. Public and non-profit private schools participating in the program are reimbursed for the lunches served" (<http://www.nces.ed.gov>).

Guaranteed tax base (GTB). In 1993, GTB meant "the ninety-fifth percentile wealth per pupil for the preceding year,; then in 1996, GTB was changed to mean two and one hundred sixty-seven thousandths times the state average equalized assessed valuation per pupil for the third preceding school year (<http://www.moga.mo.gov/statutes/C100-199/1630000011.htm> Retrieved July 14, 2006). All districts were able to draw state aid based on GTB rather than their own local wealth.

Hancock. Missouri's state-level tax and expenditure limitation constitutional amendment was passed via a 1980 voter referendum, commonly referred to as the "Hancock amendment", but additional language was rejected in 1994. To understand a community's support of tax and expenditure limitations relative to the local taxation effort incentive in the 1993 school foundation formula, two Hancock variables were created using county-level vote information available from the Missouri Secretary of State's archives. A school district located within a Hancock-supporting county was coded as 1, a non-supporting county was coded 0.

Local Wealth. In Missouri, a local government's local wealth is defined by its total assessed valuation of commercial, industrial and residential property.

Local Effort. Tax levies are a school district's local effort. While research may include bonding in this definition, this study uses the term outlined in state school finance policy, meaning adjusted equalized tax levy per Missouri's Revised Statute Section 163.011(10).

Locale. NCES uses locale codes developed by the Census Bureau, which were updated in 2005 to include more specific descriptions of geographical areas, including city, suburb, town and rural, with three subcategories within each. (www.nces.ed.gov, Common Core of Data.

Median Household Income. "Household income statistics (table XP6) include households with 1 person or unrelated roommates, but family statistics do not. This causes household income means and medians to generally be less than those for family households" (<http://www.oseda.missouri.edu/osedarpts/census.html>, Retrieved July 13, 2006).

Non-residential property. The combination of commercial and industrial property, not including residential property.

Percent State Aid. The percentage of a school district's total revenue that comes from state aid; total school district revenue includes local and federal fund sources.

Race. "This classification generally adhere to the guidelines in Federal Statistics Directive No. 15, issued by the Office of Management and Budget, which provides stands on ethnic and racial categories for statistical reporting to be used by all Federal agencies" and includes White, Black, American Indian, Asian or Pacific Islander and Other Race. Hispanic is an ethnic origin, not a race per the 1990 Census. "

(<http://www.oseda.missouri.edu/osedarpts/census.html>, Retrieved July 14, 2006)

Special Education. "Specially designed programs, at no cost to the parent/guardian, that meet the needs of a child with disabilities including classroom instruction, instruction in physical education, home instruction, and instruction in hospitals and institutions" (<http://www.nces.ed.gov>). Special education is one of the three student risk factors listed in the 2005 formula.

Remaining Chapters Overview

Chapter 2 provides a literature review that explains the underlying concepts in school finance, particularly equity, adequacy and their relationship to taxpayer equity and the research on student risk factors along with the subsequent studies that have examined student risk factors relative to school finance. The chapter builds a case to study family and community factors that affect a student's educational opportunity relative to local taxation, which is a state policy mechanism meant to help achieve equity and adequacy. Chapter 3 outlines the quantitative analysis and methods to study family and community

risk factors relative to local taxation. Chapter 4 presents the results with some comparison to prior research. Chapter 5 discusses the policy and research implications of this study.

CHAPTER 2

Literature Review

State level school finance policy intends to temper the effects of disparities in both local wealth and student need by providing equal and adequate educational opportunity. However, research neglects to consider how policy mechanisms relate to the very social differences these policies are meant to correct. Understanding how social dynamics affect community choices in local school taxation can help develop state policy to better provide equal and adequate educational opportunity. Therefore, the purpose of this study was to examine the relationship between educational risk factors and local school taxation in Missouri. In particular, how did community and family risk factors relate to the \$2.75 incentive levy as written into Missouri's 1993 school equalization formula?

The following discussion examines the history of school finance and its underlying concepts of local control and educational opportunity, which also necessarily link to other public policy concerns, such as taxpayer equity. The discussion develops a framework to support inclusion of social considerations into school finance research, particularly community and family issues that affect a student's opportunity to learn. It also examines research on state and local voting decisions. Missouri's policy is woven throughout the discussion.

The History of K-12 School Finance

Missouri's history parallels the dynamics nationally in school finance history (Howren, 1993). Education in a republic is intended to sustain a free form of government, that is, to teach citizens about freedom (Alexander & Salmon, 1995). U.S. state constitutions have three universally accepted concepts: common, system, and equality of opportunity (Alexander & Salmon, 1995). Common refers to free education for all students, regardless of family situation. Educational systems established by states via constitutions and subsequent legislation differed from the private and parochial schools that operated outside of state establishment and control. The earliest schools were used for particular educational purposes, including religious, social, economic and racial integration (Alexander & Salmon, 1995, p. 3). Finally, equal educational opportunity means the ability for all to access this free system. All of these constitutional concepts hold the underlying assumption that all individuals are of equal worth to society, and therefore deserve equal chances for education, which behooves state government to accept the responsibility for the establishment of a free educational system, challenging though it may be given disparities of individual circumstances (Alexander & Salmon, 1995).

Missouri's first educational system, prior to its 1820 statehood, used fees and tuition, which meant that schools were not open to all students, and operated in homes or churches. Free education would only have been available occasionally for poor students or orphans (Howren, 1993). During this colonial time, colonies had various types of schools operated by churches, wealth parents, tuition or other private control (Alexander & Salmon, 1995).

The first federal acknowledgement of education came in the Ordinance of 1787, which applied to the new states of the Northwest Territory. The document mentioned education, but the wording suggested education as a state responsibility rather than a federal one. Tax-supported schools, then, developed sporadically across new states to various degrees through state constitutions, legislation and local taxation, and by 1850, a child's access to a free public education depended largely on his/her state of residence (Alexander & Salmon, 1995). Missouri's first constitution in 1820 encouraged, not required, education. Missouri's first legislation on school finance emerged in 1825, when the legislature provided an opportunity for local communities to tax themselves for education (Howren, 1993). Missouri's current constitution equal opportunity clause is in Article I, Bill of Rights, section 2, which states:

That all constitutional government is intended to promote the general welfare of the people; that all persons have a natural right to life, liberty, the pursuit of happiness and the enjoyment of the gains of their own industry; that all persons are created equal and are entitled to equal rights and opportunity under the law; that to give security to these things is the principal office of government, and that when government does not confer this security, it fails in its chief design.

As educational taxation emerged in the latter half of the nineteenth century, public education expanded for all students (particularly non-minority children), and with it, increased attention on the economic returns of an educated citizenry. Public education no longer focused simply on sustaining a free republic, but on individual opportunity to earn a living.

School finance became cemented as a state responsibility over a century after initial local taxation began establishing a free system of school. In 1973, the United States Supreme Court opined in *San Antonio Independent School District v. Rodriguez*

that although students faced large differences in resources across school districts and states, such disparity did not violate the federal constitution's equal protection clause (Alexander & Salmon, 1995). Nearly all litigation since that time has focused on state constitutions and subsequent legislation, and the equal opportunity clauses in those constitutions.

While local school taxation emerged in the mid-nineteenth century, states had no active role in funding until after World War I. Missouri's first state-funded foundation program was a transportation reimbursement (Howren, 1993) in the early 1930's. The first state taxation for schools appeared in 1955, with a cigarette tax, and a state-administered distribution plan for that revenue: Missouri's first foundation formula. The foundation formula changed ten times, from 1955 to 1977 (Howren, 1993), and again in 1993, 1997, 2002 and 2005. All formats were meant to equally distribute state funds across school districts.

Missouri's 1993 formula was intended to determine state aid to a school district based on local taxation (Moody, 2003). The previous formula set in the 1975-1977 legislative sessions calculated minimum state aid based on a district's student enrollment times a weighted spending factor. This formula also weighted a district's local tax rate times enrollment, attempting to account for a proportional local effort relative to student counts. A guaranteed tax base was also included for the first time, which considered a district's local wealth relative to student counts, to distribute state money to districts with lower wealth. Unlike the 1993 and 2005 formulas, this formula deducted only part of local wealth from total entitlement aid; the 1993 court opinion considered this partial consideration of local wealth illogical (Howren, 1993) and a significant problem of

spending inequity. Judge Byron Kinder also commented that these foundation entitlement calculations did not achieve Missouri's constitutional standard for equal opportunity clause since every student did not have equal access to even average school facilities, which he noted were "from golden to god-awful" (*Committee for Educational Equality v. State*, No. CV190-1371CC, slip op. (Cir. Ct. Cole County January 1993)). At that time, Missouri had the second lowest per pupil expenditures in the country, which he determined negatively affected the adequacy standard. Kinder applied several previous court standards to his 1993 decision, including education as a fundamental right (*Concerned Parents v. Caruthersville School District* from 1977). And he also applied an adequacy standard for the Article IX, Section 1(a), 1945 portion of Missouri's constitution, "A general diffusion of knowledge and intelligence being essential to the preservation of the rights and liberties of the people..."; that is, students have a constitutional right to an amount of funding that adequately provides them with this general diffusion of knowledge to preserve their own rights.

K-12 School Finance Policy

The states' constitutional responsibility has been interpreted to include providing equitable and adequate education, two important standards used in school funding policy (Guthrie, 2004). Equity is generally defined as providing equal resources per student, while adequacy means providing the resources necessary for any student to reach a particular set of standards.

While Missouri's constitution does not use the words "equity" or "adequacy," it requires equal opportunity (Article I, Section 2). In both school finance and policy, this equal protection translates to "equity" and has traditionally been interpreted judicially as

the right for all students to access equal education regardless of race, geography, wealth, poverty level, etc. The “adequacy” standard has emerged from Article IX, section 1 of the Missouri Constitution that calls for “A general diffusion of knowledge and intelligence being essential to the preservation of the rights and liberties of the people...”

State courts have played a significant role in approving the constitutional effectiveness of such policies (Thompson & Wood, 2001; Thompson & Crampton, 2002). States, then, must try to provide adequate and equitable resources across districts, and often use foundation formulas to distribute state funding in order to account for differences in local resources and/or student needs. In short, a foundation formula guarantees a certain amount of funding per student, regardless of local district revenue differences. State aid makes up for the differences in local revenue, as long as districts reach a minimum local tax effort (Alexander & Salmon, 1995).

K-12 education responsibility is delegated to local school districts as political subdivisions. Subsequent revenue is generated through a mix of local, state and federal funding; nearly all funding comes from local and state funds. Historically, local school district revenue came primarily from taxes on local property wealth, as most local government revenues do (Alexander & Salmon, 1995). States have relied on individual income, corporation and sales/gross receipts taxes and/or other types of fees and licenses (Alexander & Salmon, 1995) to generate state revenue.

The field of school finance’s particular student-focused lens is markedly different from the lenses of public finance and economics, which consider efficiency and a different definition of equity. Berne and Stiefel (1999) succinctly summarize the

philosophical differences between public finance taxpayer equity and school finance equity:

The school finance and public finance conceptions of taxpayer equity do not always conform to one another. From a school finance perspective, a system would be judged fair to taxpayers if every taxpayer was assured that a given tax rate would translate into the same amount of spending per pupil regardless of where the taxpayer lived. From a public finance perspective, on the other hand, a system would be judged fair to taxpayers on the basis of either the ability to pay or the benefit principal. . . Thus, while school finance taxpayer equity compares tax rates to spending per child, public finance taxpayer equity compares tax burdens to ability to pay. (p. 10)

Because school finance defines equal opportunity of educational opportunity through equal resources that rely on some type of taxation, school finance policy and research reflect an inherent strife between equity and efficiency (Heck, 2004). There are interesting paradoxes in the school finance dynamic that arise from the competing interests of taxpayer equity and student equity. The state sets educational standards for students with the help of educators, politicians and the business community in particular (Placier, Walker & Foster, 2002), and then creates a policy to identify and financially compensate for the student risk factors that affect their chances to reach standards. Yet a local tax effort with voter approval is required. The local requirement is actually a way to achieve taxpayer equity, so that every district has at least a minimum effort no matter their local property wealth. Student equity is in theory achieved through the total expenditures, local plus state revenue. Local communities must tax themselves to achieve standards they had little to do with setting, and these communities include the high-risk family factors that affect educational opportunity.

Like most states, Missouri's constitutional standards include both equity and adequacy of the state's school finance system, which have been upheld by court

decisions. Missouri uses a foundation formula that distributes state dollars to its 524 school districts with nearly 900,000 public school children. Local revenue is generated through a combination of property taxes and a statewide one-cent state-administered sales tax (Ogle, 1998). Missouri generates its state revenue from personal and corporate income tax and sales tax (Ogle, 1998).

The 1993 foundation formula required a minimum levy of \$2.75 per \$100 of assessed valuation (i.e., local property wealth) for districts to draw state aid, and guaranteed “each district the same amount of total revenue from local and state sources” (p. 1) as would be available to the most wealthy school districts. (Ogle, 1998). During the 2005 legislative session, Missouri lawmakers changed Missouri’s formula to calculate state aid based on student needs rather than local wealth, but it continues to account for local taxation by using a local revenue deduction from state aid. Current policy therefore still fundamentally relies on community investment in schools and also presumes the community’s willingness and capacity to do so; like the 1993 formula, it incorporates both school finance policy and taxpayer philosophies.

K-12 School Finance Research: Key Constructs

With the evolution of school finance policy in the last five decades, state legislatures and the courts, as well as school finance researchers, attempt to better measure and inform policy around the key state constitution concepts of equity and adequacy. However, this research has not studied the possible connections between the family risk factors that affect a student’s educational opportunity and lead to lower achievement, dropping out, etc., and the local tax choices their communities make. Given that states rely on local community revenue to provide equal and adequate educational

opportunity, it is important to understand how risk factors affect local educational investment.

Equity

Equity analyses consider horizontal equity (equal opportunities for all children) and vertical equity (special opportunities/resources for children with special needs (Berne & Stiefel, 1999)). Vertical equity allows for additional funding for additional student needs such as learning or behavioral disorders (Berne & Stiefel, 1999). Policy meant to achieve vertical equity reflects the commonly held understanding that students with particular circumstances, including poverty, language proficiency, disability, ethnicity and limited parental education, face greater obstacles to gaining an equal education and require additional resources to educate (Baker, 2005; Guthrie 2004; Land & Legters, 2002; Verstegen, 2004; Vesely & Crampton, 2004).

Equity studies tend to use range distributions and other statistical analyses to evaluate the equality of per pupil expenditures, student needs, and state and local taxes and wealth, etc. But these studies became passé as policy and subsequent research have focused increasingly on the adequacy of resources and varying student needs (Baker, 2005; Guthrie, 2004).

Adequacy

Adequacy is defined as the provision of enough resources to achieve some end, usually, to reach particular state standards (Guthrie, 2004) set by policymakers. Baker (2005) defines two different types of adequacy: absolute and relative. Absolute adequacy measures the overall resources available to reach education standards in a particular state, and relative adequacy handles the cost differences among student needs.

Over time, adequacy as a concept has become closely aligned with vertical equity, as both champion education for all children, regardless of need and expense. Studies to determine a state's requirements for adequate funding vary greatly in method, and therefore offer widely varying conclusions and dollar amounts. Adequacy studies use more qualitative methods than equity studies do, such as expert panels (Guthrie, 2004), although increasingly common cost efficiency models measure progress towards adequacy standards (Baker, 2005). Conventional equity studies tend to be more concrete in their conclusions than adequacy studies, which reflect subjective adequacy standards (Guthrie, 2004). Such studies examine revenue distribution per pupil, and adequacy builds on that concept, but extends to value considerations such as whether performance meets education standards (Guthrie, 2004).

Adequacy studies regularly use outcomes as dependent variables, asking what affects school or district expenditures, or student outcomes such as graduation or attendance rates (Augenblick & Silverstein, 2003; Baker, 2004; Reschovsky & Imazeki, 2000; Verstegen, 2004). Because adequacy studies vary greatly in method, they therefore offer widely varying conclusions and dollar amounts regarding adequate resources. And the results, which may be used to develop state policy or buoy plaintiffs' arguments, become vulnerable to criticism particularly in the standard state defense argument: that increased per pupil expenditures have little clear effect on school and student outcomes (Hanushek, 1989) and that resources ought to be used more efficiently⁴ (Rolle, 2004).

⁴ For a review of the money matters/money does not matter literature, refer to Anthony Rolle's 2004 article *Out With the Old -- In With the New: Thoughts on the Future of Educational Productivity Research* in the *Peabody Journal of Education*.

School Finance Research Shortcomings

Some of the earliest school finance studies evaluated state-level taxation policy and its resource distribution (Guthrie, 2004), because state policy must strive for “wealth neutrality” or equal opportunities for children in localities with varying resources. Those studies focus on local wealth and community capacity (Berne & Stiefel, 1999, p. 14). But as adequacy policy developed a focus on student needs, understanding differences in state-level taxation policy, distribution of state aid, and the statistical measurement of resources were, and still are, deemed as “arcane issues” (Guthrie, 2004, p. 1).

In fact, as court decisions have championed adequacy, state policies now commonly calculate student needs in order to distribute state aid (Education Commission of the States, 2006, para. 3), rather than gauging local wealth that conjures the more concrete but unsophisticated notion of equity. From the state’s view, as long as the adequacy amounts per student are sufficient, those funds can also provide equity. And several state courts support this, including a Minnesota Supreme Court decision (Specific case name, In King, Swanson & Sweetland, 2005):

The finance system, including voter approved tax supplements and debt service levies, satisfied this constitutional test. The disparities in overall funding were not objectionable, as long as the equalized base funding level provided an adequate education. The court noted that adequacy ‘... refers not to some minimal floor but to the measure of need that must be met.’ (p. 5)

But Alexander & Salmon (1995) remarked, “if local leeway becomes a major revenue source for local districts, the levels of both pupil equity and taxpayer equity will be eroded significantly” (p. 209). State school finance policy is meant to equalize resources and educational opportunity, and includes measures of taxpayer protection,

particularly in voter leeway. However, from a state perspective, communities and taxpayers may make choices that upend the intent of state policy:

Local taxing decisions could, in principle, completely neutralize state equalization efforts. If local districts simply use state aid to reduce local taxes or, in the case of dependent school districts, reallocate those funds to other municipal purposes, state policies would have no effect on pupil equity (Fastrup, 1997, p. 94).

Taxpayer revolt

Blankenau and Skidmore (2002) showed that when states have court-ordered education finance reform, the state's voters tend to pass state and local tax and expenditure limitations (TEL's); their 2004 study indicated that in the absence of court-ordered reform, local TEL's negatively affect education spending. Downes and Figlio (1999) published a review of TEL research, saying that generally, student performance growth becomes limited in states with TEL's. Noteworthy research show that low-poverty districts are less likely to override limitations, and if families with more resources relocate to districts with more resources, community and family disparities widen. Missouri voters approved a TEL provision placed into the state constitution in 1980, commonly referred to as the Hancock amendment.

TEL's, particularly coupled with supermajority⁵ requirements, negatively affect both local and state response to court-ordered reform (Jordan, Jordan & Crawford, 2005), although the same study showed that TEL states were able to increase state aid and as expected, decreased local expenditures (Jordan, Jordan & Crawford, 2005). The Hancock amendment ties state revenue caps to state per capita income (Podgursky & Springer,

⁵ Missouri has a two-thirds requirement for school bond issues, and a simple majority on operating levy increases up to \$6.00 (DESE, 2006).

2006), while the 1993 formula was developed after court-ordered reform. Some local education tax issues require a supermajority, depending on when the issue is presented (DESE, 2006).

School boards may set their tax rates at or below the ceilings approved by local voters. In some cases, boards may be required to roll back a tax rate. Within Missouri statute, the actual minimum operating levy is defined as a tax levy of \$1.25 per \$100 of assessed valuation (Section 48.010, RSMo.). The 1993 formula doled out money by accounting for differences in local wealth and local tax effort of school districts, and set a minimum “incentive” levy of \$2.75 per \$100 of assessed valuation. Many districts had to raise their levies to receive the incentive; twenty percent remain at \$2.75 today. In the new 2005 foundation formula, local revenue is deducted from the initial state aid amount calculated on the districts’ student needs⁶. And when Karen DeMoss (2004) described states’ political contexts, her cross-cluster analysis suggested that Missouri is in a region that values low tax effort. So studying local taxation still has merit, particularly in Missouri.

Research on student needs often identifies the expenditures per pupil needed to provide an adequate education (King, Swanson & Sweetland, 2005), which may conclude that some expenditure differences across districts are acceptable as long as the minimum amount provides an adequate education. On the other hand, local choices may negate the equalizing intent of state policy, and statewide, since voters tend to limit local and/or state revenues and expenditures just after school finance policy reform. Moreover, the

⁶ This deduction is calculated as if every district has a \$3.43 levy. In reality, if the levy is below \$3.43, then their local revenues are lower than the deduction, so the district receives less aid than if their levy was \$3.43. If the levy is above \$3.43, then their local revenues are higher than the deduction and the district retains those extra dollars.

risk factors that are being used to determine state aid adequacy amounts may affect local taxation choices; there is no evidence one way or the other, and because taxation issues are considered passé by the school finance research field, research in this area is limited.

The preceding discussion identified local taxation and student needs as important relationships to study in order to better understand school finance policy as it relates to equity and adequacy. Karen DeMoss (2004) argued for examination of social contexts in school finance research, citing political science studies showing that social, economic and political issues drive court decisions beyond finance (p. 48). DeMoss uses a variety of variables to capture the complex policy situations affecting court decisions. She concludes:

Education finance research could support a shift to align financial provisions with constitutional language – or to generally address finance issues through the political process – by investigating the different state-level policies involved in funding processes in addition to the field’s historical commitment to examining funding outcomes...Exploring these more interdisciplinary facets that move beyond strict econometric examinations of education finance could provide better understandings of how this diverse country might structure school funding in ways that can make the differences scholars already know money can make (Hedges, Laine, & Greenwald, 1994; Grissmer, 2000) (pp. 62-63).

Studying Local Choices Relative to State Policy: The Variables

The purpose of this study was to examine the relationship between educational risk factors and local school taxation in Missouri, specifically, how community and family risk factors relate to the \$2.75 incentive levy as written into Missouri’s 1993 school equalization formula.

Missouri’s 1993 foundation formula policy used a minimum incentive levy \$2.75 per \$100 of assessed valuation by local school districts. As mentioned earlier, twenty percent remain at \$2.75, while other districts were already above this level. Knowing how

they responded to the new policy can also illuminate how state policy affected local choices. Therefore, local taxation level was the dependent variable in this study.

This section of the chapter synthesizes the research supporting the choices of independent variables for the study. The first discussion outlines the student education risk factors identified by Land and Legters (2002) and used in a school finance policy evaluation by Vesely and Crampton (2004). These were key independent variables, as this analysis attempted to understand how student risk factors relate to communities' local taxation decisions.

While this study of Missouri's 1993 formula and its effect on local taxation is purposefully not an econometric or political science study on voting, the literature on school elections is important to build a model that will draw more informed conclusions about local choices and behavior to inform state policy. Locale, percent state aid and assessed valuation categories will also be included as independent variables to aid possible explanations that can affect local community decisions.

Defining Student Risk and Education Opportunity

In school finance policy and research, equity refers to equal education opportunity and resources for all students, regardless of income and need. Adequacy means that each student must have the enough resources to receive this opportunity. Adequacy policies increasingly included student need considerations and therefore became aligned with some equity measures (Guthrie, 2004).

Research has established the factors that negatively affect a student's academic performance. Deborah Land and Nettie Legters (2002) describe the factors and argue that research needs to consider "the compound nature of risk, specifically interactions

between individual/family-level and school-level risk factors” (p. 2). Recent school finance research used this typology for a cross-state policy examination of vertical equity (Vesely & Crampton, 2004). In Missouri, school finance policy has included some consideration of student need (poverty, special needs and English-speaking status) but with the underlying assumption that communities must share responsibility of the cost of education. Yet communities include students and families with varying need.

Land and Legters (2002) describe both family and school-level risk factors that affect student achievement. Family factors include poverty, race/ethnicity, limited English proficiency (LEP), parent’s educational attainment and single parent families. School factors are grouped into three categories: school socio-demographic characteristics, school climate and culture and school policies. The authors describe an urbanicity factor, which uses several risk areas, including school-level poverty, racial/ethnic minority composition and school size. They also mention the lack of national data collected on school-level risk factors, but explain their importance, “...not only because they reflect a deepening (and less stigmatizing) understanding of risk, but also because schools, and the communities in which they reside, are the most obvious sites of intervention for educational improvement” (Vesely & Crampton, 2004, p. 23).

Vesely and Crampton (2004) adapted the Legters and Land typology by honing in on the risk factors that are beyond the school’s control, including “disability, poverty, limited English proficiency, race, and urbanicity” (p. 115). Only one of the four states they examined, New York, accounted for parental educational attainment in its policies; this factor was not included in the overall vertical equity analysis of per pupil funding given risk factors. They also left out single parent status, saying it was highly correlated

with poverty. Moreover, although Vesely and Crampton make an argument for leaving out highly correlated risk factors, they dismiss race, which is also highly associated with poverty, but do include it in a variable created to capture compound risk of being a racial minority in an urban school district, urbanicity.

In his case study dissertation of a Missouri school district ballot issue, David Smith (1998) used prior research to determine the socioeconomic variables to include in his survey study of district voters. He attempted to predict who voted to support school issues. He used the variables from previous studies,⁷ including personal, sociological, economic, and attitudes toward education. He found that voters in that particular district supported ballot issues based on their perceptions of teachers and administrators and the school's efficiency, as well as gender, parental status, religion, income and occupation. Smith's study, along with his predecessors, was specifically designed to study how to successfully pass a ballot issue in school districts and offered recommendations in that regard. Although the research related to Missouri, it relied on survey responses, which likely were answered by those citizens with strong opinions on education one way or the other. The conclusions had no remarks regarding state policy or how such statute may affect voter choices or an administrator's willingness to offer ballot issues. However, his findings alluded to a relationship between risk factors and local tax choices.

James M. Poterba (1997) examined thirty years of data to discover how changing demographics affected total school spending. He concluded that "demographic heterogeneity" of a community affects its education expenditures; that is, the more

⁷ "...Croskey (1974) in his study of three Kansas school districts; by Ritter (1980) in his study of the Columbia School District...; by Allen (1985) in his study of the Jefferson City School District...; by Scott (1985) in his study of the Springfield School District...; and by Smith (1980) in his study of the Kirksville School District."

diverse the population in terms of age and race, the less it spends on education. He concluded that more research was needed with regard to community heterogeneity and its effect on school spending, and made a point of offering no conclusions on how to resolve tensions within the local school finance election processes, which use voter approval for local taxation.

A 2005 study analyzed Connecticut communities' responses to their 1989 state aid formula, which uses a variety of non-economic variables to study effects on per pupil expenditure. Mark Chandler noted the balance within state policy for both student and taxpayer equity (p. 66); non-discretionary lump sum categorical state aid for student needs and discretionary aid spurred in part by local tax effort i.e., state aid for particular programs that require no local funding (categoricals) plus state aid requiring matching state monies which local districts can spend as they chose. This is similar to Missouri's 1993 formula that included matching aid, with some consideration of categoricals, particularly special education and transportation.

Chandler's study used approaches that were useful in this study. First, he used non-economic factors to try to explain local behavior, including political and social factors (minority, poverty, college degree). Second, regarding taxation, he found that state aid reduced the differences in local taxation across districts; therefore Connecticut's state distribution policy improved taxpayer equity. Chandler included several community and family variables: college degrees, poverty rate, fraction of Democrats and fraction of minorities variables were included along with tax prices and cost, median income, state restricted aid, categorical aid (restricted funds for a particular purpose such as special education) and percentage of students in public schools, as well as local tax levies. His

article offered no explanation for those particular variables, other than to account for various interest groups' influence on local education expenditures.

Chandler found that college-educated communities had a small positive effect on pupil expenditures, with no political or minority effect on district spending (p. 70-71). Upon discovering that percent poverty positively affected spending, he offered two alternate explanations: that these communities rely less on local funding and property taxes and more on state aid, or that high-poverty populations reflect an urban effect, meaning greater costs (p. 72). This study of Missouri's local taxation decisions using the Land and Legters typology was intended to bring some clarity to Chandler's poverty finding, and, potentially to reiterate his finding that parental education positively affects taxation levels, assuming that expenditures and taxation levels are similar.

The purpose of Rolle's (2004) study was to understand budget behavior, and in particular to see how well high need districts were able to increase their budgets. His dependent variable was Indiana school districts' annual budgets from 1988 to 1997. He used several student outcome variables (per pupil expenditures, attendance, graduation and remediation rates and school quality) as well as community and family attributes as independent variables. Like Chandler, Rolle offered scant explanation for why these factors were used to study district expenditures. Indiana's foundation formula did not equalize student opportunity, as Rolle concluded that "...school districts with large percentages of low income families, individuals without high school diplomas living in the community, minority students, single parent households, and high student-teacher ratios tended to receive less money per student—on average—than school districts without these characteristics" (p. 296).

Vesely and Crampton (2004) used their own iteration of the Land and Legters (2002) risk typology to study school finance policy across states. This proposed study will instead use all of the elements of the Land and Legters typology related to local taxation choices, as other research has noted the effect of several of these variables on local education expenditures. The variables will include race/ethnicity, poverty, single parent households, educational attainment, English Language Learner and special education.

Locale

In Baker's (2005) discussion of adequacy cost studies, he cites Duncombe and Johnston's finding in Kansas that high poverty concentrations in large districts lead to increased costs. Similarly, he notes the research that shows wages in poor urban districts with large numbers of poor students affect teacher recruitment and retention and perhaps wages, and therefore districts costs to educate these students (p. 267). His acknowledgement of compound risk and its educational effects parallels Land and Legters (2002) and Vesely and Crampton's (2004) arguments that high risk factors greatly affect a student's opportunity to learn. Baker ultimately concludes that locale effects on costs are unknown. Chandler (2005) also stopped short of concluding that certain tax and expenditure decisions were a result of both the minority and urban community characteristics of a school district. And rural interests greatly protest any contention that locale affects educators' ability to overcome poverty (Rural Policy Matters, 2006).

To offer some clarity to this debate, as well as to inform policy in Missouri, a state split by rural, suburban and urban interests, this study used locale as a descriptive variable, to study local education taxation choices.

Economic Considerations: Percent State Aid, Income and Assessed Valuation

This study is a policy analysis of Missouri's 1993 foundation formula, particularly, the minimum incentive levy, and how student risk factors that affect student learning may relate to the levels of taxation that a community approves. Although the study's focus was on those factors, research based on median voter or budget maximization theory offered some guidance in order to develop well-grounded recommendations, as the 1993 policy appears to include elements of these theories. As a result, additional factors were included in the analysis: percent state aid (as a dependent variable), median income and types of assessed valuation.

Percent State Aid and Median Income

Chandler (2005) was testing two theories of why local districts behave the way they do toward state aid policy. Median voter theory assumes that state aid would lead to lower local taxation when household median income is static, because the public goods would stay the same but at less cost to the individual household. Meanwhile, the budget-maximizing bureaucracy model would view lump sum state aid as an addition to current spending. Therefore taxation and spending would not change or even increase since the educators as bureaucrats maximize all available revenue to spend (p. 67). Thus he used several variables to account for local interest groups' influence on education spending. Both the median voter and budget maximizing theories assume that voters can come to a

relatively clear understanding of what they are voting on, the consequences, and how to vote.

Chandler discusses how state aid may supplement (budget maximization) or supplant (median voter) existing revenue, and his interpretation reflects key theoretical differences. Even when he accounted for towns with low fiscal capacity that received more state aid per local dollar, he still found that non-discretionary spending of state dollars actually led to a decrease in expenditures. Chandler could have regarded this finding as evidence against educator-bureaucrat budget-maximization, but instead characterized his results as “theoretically ambiguous” (p. 70) relative to economic theory. Similarly, Chandler showed that increased state aid increased spending. But he also observed that restricted state aid substituted rather than supplemented discretionary spending, so it appears that personnel costs were negatively related to monies specifically spent for high needs students.

He concluded that both models showed a reduction in disparities in per pupil spending across districts, and reduced differences across districts in property tax rates. Taxation decreased relative to state aid as median voter theory posits. He found that both theories’ models showed that median income was positively related to education spending. However, he ended the article by stating, “the inconsistency of the regression results with each model’s theoretical predictions signals that economists still have work to do to develop a satisfactory explanation of localities’ response to intergovernmental grants” (p. 81). His research suggested including median income and percent state aid as variables in this study.

Rolle (2004) offers a broader explanation of budget maximization than Chandler, citing research and theory that says bureaucrats seek more than just increased salaries or power, including the drive to achieve the “mission” of public services (p. 281). Like Chandler, Rolle chooses not to draw conclusions that unilaterally support budget-maximizing theory. He only used total district budget rather than a state aid variable to understand how Indiana districts responded to their 1993 formula. Not surprisingly, he discusses the challenge of empirical analysis that accurately captures the complexity of why and how school districts get additional state funding. Had he used percent state aid as a variable, he may have had clearer results about how Indiana districts reacted to their new formula.

To show that state aid reduces either local tax pricing or public school services, Fischel (2001) used concepts of median voter theory, saying local voters will not purposefully raise taxes when funds regularly come from elsewhere. For this reason, Fischel rebukes the “fiscal harness” of school finance, which links state school finance spending to the choices of local districts, because it induces those voters to accept both state taxation for lower wealth districts and their own relatively high local school taxation (p. 151).

Citing much of the same median voter and budget-maximizing research in their discussion of why TEL’s matter to school equity and adequacy, Downes and Figlio (1999) note research that showed that local municipalities act in order to prompt voter response; as budget-maximizers, they cut services so voters will feel the need for taxation. They offer the median voter view as well. A TEL would be considered a large-scale median voter reaction. An Illinois study that showed that TEL’s had no

achievement affect, so that although voters reduced their own costs, schools did not reduce their services, or at least reacted to operate more efficiently. This finding negates the budget-maximizing view.

With sufficient research showing both theories at work, it justified using percent state aid as a dependent variable, to understand community taxation in the presence of the state aid incentive. The analysis also included two dummy political variables for each school district, based on their support of Missouri's TEL ballot initiatives in 1980 and 1994, commonly referred to as Hancock, to determine how community taxation philosophy related to local school taxation choices.

Missouri

Fischel would likely not approve of Missouri's 1993 formula, because it was a foundation formula, meaning that a minimum local effort is required to draw state aid. Median voter theory would assume that once less wealthy districts were given additional state aid, either local taxation effort or education delivery would stagnate or fall. Perhaps anticipating this, the 1993 formula required a minimum \$2.75 effort for matching state aid (although a less generous formula was available for those who could afford to tax themselves below this level) and had a \$3.85 cap (Podgursky & Springer, 2006). 1996 research concluded that local taxes in Missouri were steadily rising even before the full phase-in of the new policy (Kirk, 1996).

The Missouri formula's other policy mechanism to equalize state aid was a guaranteed tax base (GTB). Essentially, the Missouri districts that had half the wealth of the most affluent districts received dollar-for-dollar aid, while the poorest districts got a 400% return on their local effort (Podgursky & Spring, 2006). Many states have used

GTB, as it equalizes resources by assuming all districts had equal wealth (Thompson & Wood, 2001). Alexander & Solomon (1995) describe the structure as retaining local control that provides some taxpayer equity, but the policy ultimately fails because it does not account for differences in how well education is provided across districts.

A guaranteed tax base, in the view of median voter theory, would be an inducement for lower wealth districts to increase the tax rate in order to maximize state aid to minimize one's own personal liability and to increase the value to their schools and homes. Therefore it would be logical for the lowest wealth districts to have the lowest levies. If they do, then that would be reflected in how much state aid a district receives relative to its local effort.

Assessed Valuation

Fischel (2001) argues that districts with more non-residential assessed valuation will vote in higher taxes for their district, because the shared cost with business and agriculture lowers their costs at the same time school improves along with home prices. He firmly believes that local taxation is worthwhile, because of the immediate individual benefit of good schools through subsequent increased home values (i.e., capitalization). Other school finance researchers share his view on capitalization (Downes & Pogue, 1992; Ladd & Harris, 1995; Loubert, 2005), although each has a unique set of arguments and recommendations for school finance equalization policy⁸. The 1993 formula used a GTB based on collective assessed valuations. As Podgursky and Springer (2006) observed, the GTB arrangement in Missouri “encouraged school districts with below-

⁸ Downes and Pogue (1992) debate between equalizing tax effort and tax rates; Ladd and Harris (1995) recommend moving commercial assessment and subsequent revenue to the state level; Loubert (2005) examines home values relative to state equalization.

average levels of district wealth to raise their local tax rates” (p. 36). The assumption is that voters in the lowest wealth districts would logically maximize the GTB. However, Fischel’s argument also means that voters would choose higher taxes based on the amount of non-residential property in order to reduce their own tax prices. Were districts with higher ratios of non-residential property levying more than others?

With the 1993 formula dependent on local wealth and tax effort, as well as the collective property wealth of Missouri as calculated in the guaranteed tax base, it was worthwhile to include these economic factors in this study in a limited way, to more fully understand local voter choices.

An interesting hybrid of median voter and budget maximizing theory may be seen here. Assuming voters understand the consequences of their actions, they would tax themselves more to gain state aid even if it meant higher year-end household property tax bills (although not as high if they share tax liability with non-residential property owners). But given the complexity of the formula, it is more likely that educators knew how to maximize state aid and therefore recommended options to voters based on their own knowledge of the formula.

Missouri has three types of assessed valuation: commercial, agricultural and residential. The study included assessed valuation per pupil variables to keep the focus on student needs within school finance.

Other factors

Two other factors were included: elderly percentages and district enrollment. Some research uses community age, particularly elderly, as a factor determining the success of school elections (Berkman & Plutzer, 2004; Tedin, 1994; Tedin, Matland &

Weiher, 2001). Moreover, Missouri school leaders tend to believe the elderly adversely affect tax levy passage in school district elections. Therefore, the percent of the community over the age of 65 was included. Because district enrollment has been associated with costs; that is, small schools and very large schools have large per pupil expenditures (Alexander & Salmon, 1995), enrollment was included as well.

Because this study primarily focused on school risk factor effects on school district taxation, some variables used in prior research on local levies were not included: school leadership and tenure, gender, religion, number of non-school families, private school enrollment, marital status and other factors relative to the success of school finance elections (Smith, 1998). Much of this prior research used zero-sum dependent variables, in particular, the actual passage or non-passage of tax issues, rather than the relative outcome of those choices.

Regarding economic studies, Loubert (2005) investigates home values relative to state school finance policy reform, and cites several similar studies. However, home values are not included in this proposed study for two reasons. First, presuming that the community median income variable is a similar measure of household wealth, which the Land and Legters typology includes, it is not necessary to have home values in the analysis. Second, including home values would tend to make the study more about economic theory than about how much local support the state can rely on from high need communities and families.

Finally, many studies use per pupil expenditures to gauge the effectiveness of state equalization policy (Chandler, 2005; Rolle, 2004). Although this is a useful outcome measure of equalization efforts, this study was meant to examine the relationship of

community and family factors that affect education and how those factors may translate into a community's choices regarding local taxation and how that affects state policy to equalize educational opportunity regardless of student need.

Summary

Equity and adequacy are state constitutional concepts upheld by court decisions and studied by school finance researchers. Equity is a relatively concrete concept meaning equal opportunity for all students, and is measured by disparities in per pupil expenditures, resources and local taxation and tax effort. Adequacy has been defined as sufficient resources to enable all children to reach particular standards set by the state. Its research uses a wide variety of measurement techniques, leading to different conclusions.

States are responsible for delivering equitable and adequate education, and many use foundation formulas to calculate the appropriate amount of state aid for each school district. Local communities are expected to share responsibility for funding education although the state sets educational standards. Past policy in Missouri and elsewhere focused on local wealth and taxation differences, and state aid attempted to eliminate them. This policy used a minimum incentive levy of \$2.75 per \$100 of assessed valuation. The new formula now calculates aid by student needs, but deducts local revenue from this amount, which assumes that all districts levy at \$3.43.

Adequacy finance policy recognizes that some students cost more to educate. Risk factors often include special education, English speaking status and poverty. Land and Legters (2002) outlined several risk factors that affect a student's opportunity to learn, and Vesely and Crampton (2004) used this typology in a cross-state policy analysis of school finance policy. Other researchers (Chandler, 2005; Poterba, 1997; Rolle, 2004;

Smith, 1998) studied these community and family characteristics relative to per pupil expenditure or the passage of school ballot issues. Economists argue that economic self-interest primarily drives taxation choices (Fischel, 2001), so these variables will be included will offer better policy recommendations should findings suggest that community and family risk factors relate to local taxation choices. But interestingly, research by Tedin (1994) found that symbolic values, that is, religion, party identification and their view of other races, affected citizen's support of a particular state foundation formula policy as much as economic self-interest. Tedin, et. al. (2001) found that one's own race and age affected both the action of voting and the support of the ballot issue.

Studying taxation issues in school finance research has been marginalized since researchers began to focus on student needs. However, state policy still relies on local revenue. Communities make a variety of choices regarding how much to tax themselves. No studies have connected the student risk factors that drive adequacy policy to the local taxation choices until now. With a relationship between the two, state policymakers may need to include more sophisticated measures to determine each community's education revenue contribution based on their student's needs, or revisit any or all reliance on local wealth to generate equitable and adequate school funding.

CHAPTER 3

Research Design and Methods

Introduction

This quantitative study examined how a community's social conditions relate to its local school taxation. This research explored the choices and social make-up of Missouri communities in response to the state's 1993 foundation formula, which used a minimum incentive levy. This topic remains relevant because historically, local communities provide some funding for their local schools. States also distribute revenue to equalize educational opportunity across districts per their own constitutions. State distribution policies such as foundation formulas may require local taxation. Missouri's 1993 foundation formula attempted to equalize wealth disparities between districts by using a matching grant based on minimum local incentive levy along with revenue equalization based on property wealth.

The implications of these risk and tax relationships are somewhat complicated. Economists tend to argue that tax pricing is related to the community make-up of property types (commercial, agricultural, residential) and a personal stake in home values (Fischel, 2001). But generally, state-level school finance policy is no longer driven by local fiscal issues alone as in years past, and has always had a particular philosophy: to

equalize educational opportunity. Therefore a simple taxation study would exclude the more complex concerns of school finance policy, particularly that of equalizing educational opportunity across disparate student needs and local wealth, and the states' own constitutional standards of equity and adequacy.

Current school finance studies examine how revenue or expenditures affect students' educational opportunity, especially for high need and therefore high cost students. Meanwhile historical studies of community fiscal capacity, tax base or other fiscal analyses became outdated because of their focus outside of student needs (Guthrie, 2004). Since the adequacy movement began in the 1990's, states recognize that individual student needs affect educational opportunity; put simply, high needs students cost more to educate (Baker, 2005; Vesely & Crampton, 2004). Therefore, school finance distribution policy often uses weighted student needs to assign a minimum adequacy amount per student that includes a local funding requirement.

But research currently holds little to no understanding of whether the family and community risk factors that hurt student achievement and currently shape school finance policy are related to tax choices made by communities. With risk factors affecting local taxation, then the state's absolute minimum taxation requirements oversimplifies the social complexities that restrict both education and local taxation. State policy may need a more sophisticated means to decipher the proper effort of local taxation relative to community and family needs in order to provide equal and adequate education.

The following chapter provides a brief background of the problem, Missouri's current policy, the research design including questions, the data including variables and data collection, and the analyses and formulas used to answer the research questions.

Research Design

Missouri uses a foundation formula to determine how state revenue will be distributed to school districts, and includes a local taxation component. Missouri's 1993 foundation formula⁹ established a \$2.75 minimum incentive levy, and about twenty percent of Missouri school districts remain at this operating levy in 2004, with the other eighty percent of districts levying a wide range from \$2.76 up to nearly \$6.00¹⁰. The new 2005 foundation formula also includes a local effort deduction from state aid that assumes each district should levy at \$3.43, so this analysis remains relevant. Both policies, particularly the 2005 policy, do account for differences in student need and calculate state aid to districts accordingly, but also do not account for community or family risk factors that may affect local taxation choices. Previous research on taxation in school finance studied student and taxpayer equity rather than the adequacy notion of equalizing opportunity for students with varying needs. Since local revenue is still used within state policy to equalize opportunity, studying local taxation still has relevance, but now in relationship to student needs. Community and family factors affect a student's opportunity to learn. In what ways do those same factors affect taxation, even in the presence of a minimum incentive levy? Why do some communities tax themselves at higher levels than others? Is the difference related to the same community and family factors the state policy means to correct? To understand this, this study examined the

⁹ This formula intended to equalize total revenue across districts, despite their wealth. State Aid = (Students x Tax Effort x Guaranteed Tax Base). \$2.75 was the minimum incentive levy to draw state aid on this formula. GTB was set at the level of the 95th percentile district (Podgursky & Springer, 2006).

¹⁰ Only a handful of districts can afford to levy below \$2.75.

community/family and economic risk factors in relation to the \$2.75 incentive levy as written into Missouri's 1993 school equalization formula.

Based upon prior theoretical and empirical research as reviewed in Chapter 2, it is hypothesized that the tax levy a district sets should be a function its family, community, and economic factors:

$$\text{Tax Levy} = f(\text{Family Factors}, \text{Community Factors}, \text{Economic Factors})$$

Data

Population. Missouri's equalization formulas use districts as the unit of analysis, therefore district-level data are examined here. Missouri currently has 524 school districts; however, that has changed since 1993. The analysis only considered the latest configuration of school districts, down 14 since 1993. This restriction was warranted because the current configuration of districts absorbed the former districts, and therefore the current data reflect enrollment and financial changes. Further, U.S. Census data on median income and educational attainment were not readily available for these former districts.

Finally, two districts were eliminated from analysis; the two special school districts, one in Pemiscot County and the other in St. Louis. These districts serve only special education students. This elimination is common practice in Missouri school finance research (Brown, 1998; Wood, 2003).

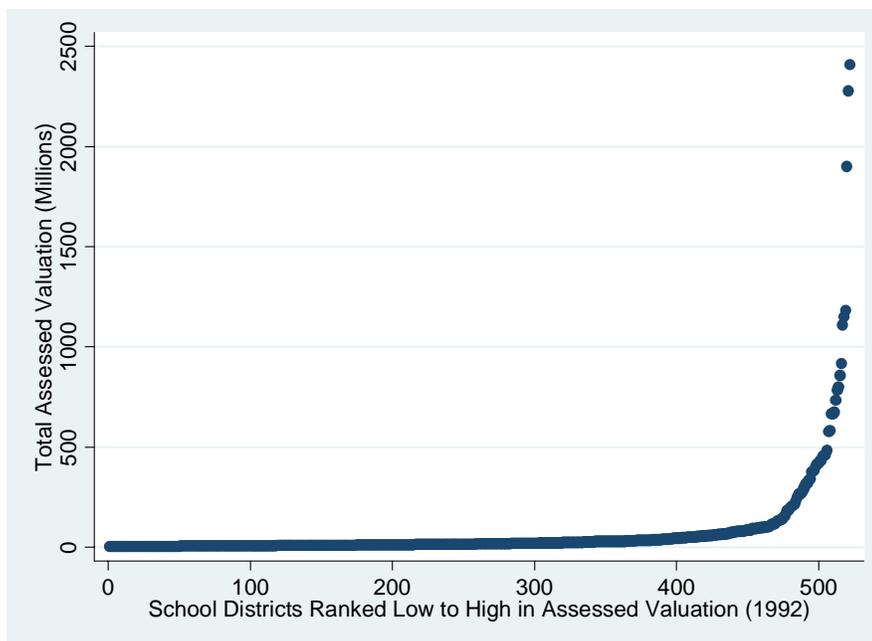
Data Transformation

Three important situations affected data transformation. First, ELL numbers were available only after 1998, thus the research questions were investigated using both a shorter timetable (1998-2003 including ELL) and a longer timetable (1992-2003 without

English Language Learner numbers). ELL is a critical factor in explaining the presence of high-need children, thus it was important to use a time-period that included this measure. However, given the large changes in 1993 with the adoption of the minimum incentive levy, it was important to investigate these research questions using a longer time-period, even at the cost of losing an important risk factor.

Second, the data were converted to logarithms to even out the reported numbers and to aid in analysis and commentary for several reasons. Missouri law requires reassessment of land values by counties every other year, in addition to the consistently rising prices in the real estate market. This leads to exponential increases in assessed valuation. In addition, huge differences in assessed valuations exist among Missouri's 524 school districts. Figure 4 shows one year of district assessed valuations, ranked from 1 to 522, in hundreds million dollar iterations. The pattern is not linear, showing the need for using logarithms in this study.

Figure 4. School Districts Ranked Low to High Assessed Valuation, 2002



Third, all variables represented in dollars have been converted to 2004-dollars based upon the Current Price Index (CPI). This adjustment allows data from different time periods to be compared to each other without the threat of inflation biasing the results.

Dependent Variable

Tax levies. For each question, a school district's equalized adjusted operating tax levy was the dependent variable. An equalized adjusted levy is the sum of the teacher and incidental levies after mandatory rollbacks due to a local sales tax (www.dese.state.mo.us/divadm/finance, 2004). The revenue generated equals the levy per \$100 of the school district's assessed valuation. These data were available for the 1990-01 through the 2005-06 school years from Missouri's Department of Elementary and Secondary Education (DESE).

Histograms of the 1992 and 2003 tax levies provide visual cues as to the changes in tax levies. The 1992 figure shows a more normal distribution of tax rates than the 2003 figure, which clearly indicates Missouri school districts clustered around but especially right at \$2.75.

Figure 5. Missouri School District Adjusted Operating Levies, 1992

1992

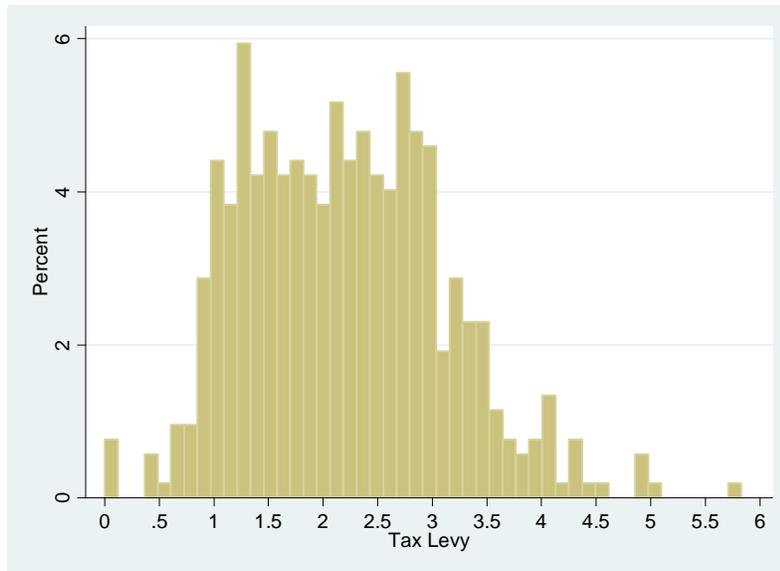
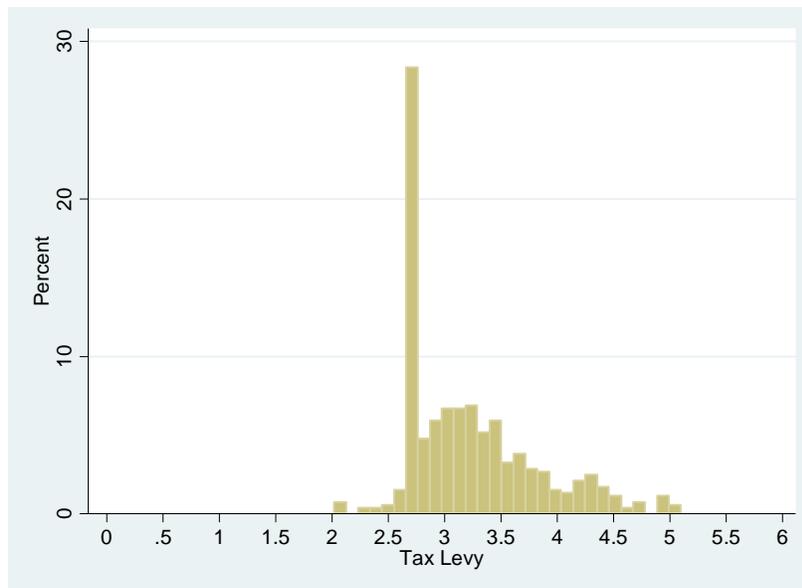


Figure 6. Missouri School District Adjusted Operating Levies, 2003



Percent State Aid. The literature on voting asserts that local taxation may depend on the share of state aid. To avoid making inappropriate conclusions regarding taxation levels relative to family and community risk factors, analyses of the district-level tax levy

are complimented with analyses using the percentage of revenue from the state as the dependent variable. DESE had data on state aid percentages for each district.

The state aid graphs below show how the distribution of state aid changed from 1992, before the levy-based incentive formula, to 2003, after the full implementation of the formula and state revenue withholdings due to state budget shortfalls. In 1992, many districts had between one- and two-thirds of their revenue from state aid, which remained true in 2003, but the tail of the distribution smoothed out, showing that overall, the percentages of state aid varied more, particularly for the districts receiving less than 30 percent of their revenue from the state.

Figure 7. Percent State Aid of Missouri School District Budgets, 1992

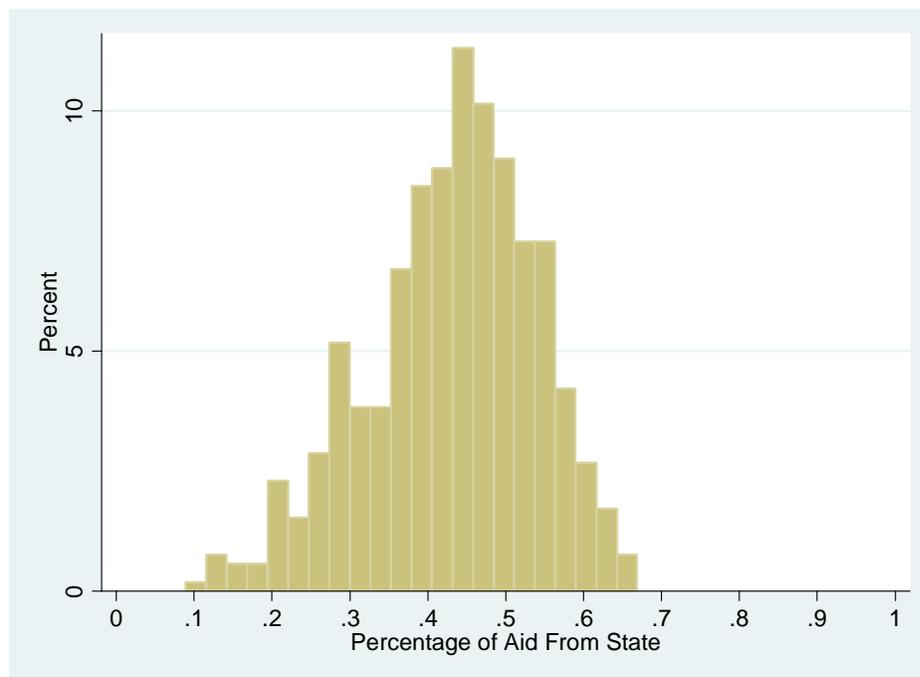
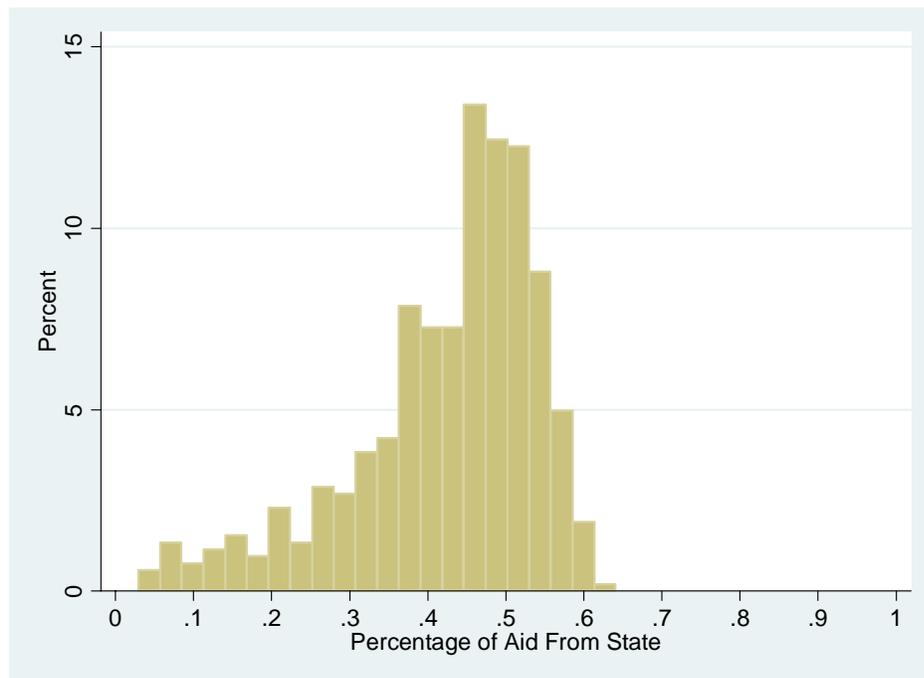


Figure 8. Percent State Aid of Missouri School District Budgets, 2003*Independent Variables*

This study was designed to understand how the household situations that affect student learning may also affect local tax policy decisions and state attempts to equalize opportunity. This policy study used all of Land and Legters' individual risk factors, and one school factor, special education (current Missouri policy considers this as a student risk factor; see Table 1) to assess whether districts respond to changes in risk factors through increases in tax levies. Land and Legters also describe urbanicity (the combination of poverty and location) as a risk factor. Vesely and Crampton use most of these factors in their 2004 school finance policy analysis. Table 1 contains a list of the community, family, and economic factors that are included in the subsequent analyses.

Table 1

Factors Used to Study Missouri's 1993 Incentive Tax Levy

Descriptors	Variables
Community/Family	City/Suburb/Town/Rural (NCES 2006 locale designation) Race/Ethnicity Single parent households Educational attainment Free-Reduced Lunch (FRL) percentages English Language Learner (ELL) population percentages Special education population percentages
Economic	Agricultural assessed valuation/per pupil Commercial assessed valuation/per pupil Residential assessed valuation/per pupil Median household income

Community/Family Factors. Land and Legters note that parental educational attainment is a family risk factor. Using a community's educational attainment as a community condition variable indicated the importance of educational opportunity to the community and therefore what local levy levels are chosen. If communities view K-12 education as an end in itself, will those districts invest more or less locally in their schools? These Census data, including percent with high school degrees and percent with college degrees, were available by district from 1990 through 2003 from The Office of Social and Economic Data Analysis (OSED).

Three additional Land and Legters' factors -- poverty as measured by free-reduced lunch (FRL) percentages, English Language Learners Language (ELL) and special education¹¹ status -- were also used by the Missouri General Assembly to recognize high needs in its 2005 foundation formula and are used here to determine if these risk factors also affect local taxation. DESE had FRL data from 1995-2005, and the federal government's National Center for Educational Statistics' (NCES) Common Core Data (CDD) provides this information along with ELL and special education figures from 1986 through 2004.

NCES locale codes (city, suburb, town, rural) were used to further illustrate the variations in economic and community/family characteristics among school districts. As part of capturing complex risk in Land and Legters' (2002) urbanicity, which notes that the combination of poverty and location is a stronger predictor of academic failure, a geographical factor is included in this analysis. NCES uses a locale code marking school districts as city, suburb, town or rural. It appears that particular communities choose levies based on their geographic situations, which may thwart the effectiveness of statewide finance policy that must balance these various interests. But the effect was probably better accounted for within assessed valuation differences, so locale was used primarily as a descriptive variable for different types of communities (minority, single parents and the elderly, in particular).

Missouri's DESE had all school districts' tax levy data; assessed valuation breakdowns and enrollment figures and free-reduced lunch figures from 1995 through the 2003-04 school year. NCES' CCD has English Language Learner (ELL) and special

¹¹ Land and Legters consider disability status to be a school risk factor rather than individual risk factor.

education data from 1986 through the 2003-04 school year. The OSEDA had educational attainment, single parent household status, race/ethnicity and median income data for each school district from the 1990-2003 U.S. Census data.

Economic factors. In Missouri, assessed valuation, or local wealth to be taxed, is the sum of three property types: residential, commercial and agricultural. When a school district's board sets a tax rate, the school revenue generated is that tax rate per \$100 of that total assessed valuation.

State statute sets residential property assessment at 19% of its value, and commercial at 32% (Podgursky & Springer, 2005; Ogle, 1998). Agricultural property is assessed at 12% of its productivity value as set by the University of Missouri rather than fair market value (Podgursky & Springer, 2005; Ogle, 1998).

As discussed in the literature review, economic theory suggests that communities with greater amounts of non-residential assessed valuation would choose higher taxation since the subsequent services provided are paid for in greater proportion by commercial property owners. To account for the literature that argues that levels of local taxation are related to the ratio of state aid to local aid, and to the amount of non-residential property, assessed valuation percentages per pupil and median income were controls in this analysis.

To capture how local wealth relates to student needs, new variables were be created. Each year's assessed valuation subcategories will be divided by student enrollment to create commercial, agricultural and residential assessed valuation per pupil categories. These data were available from DESE from 1990 through the 2005-06 school year.

Only one household economic factor, median income, was used in order to reveal some clues regarding resident voter preferences for local taxation. This was also partially related to the Land and Legters typology in that parent educational attainment and poverty contribute to a student's chance to succeed at school, and both are strongly correlated to income (Vesely & Crampton, 2004). OSEDA has U.S. Census data on median income by school districts from 1990-2003.

Control variables. A district size variable accounted for changes over time that may also affect a community's choices regarding taxation, because fixed operating costs are a higher percentage of overall operations for small schools as compared to larger schools (Alexander & Salmon, 1995). Average daily attendance created the economic assessment variables, and accounted for district size. The percent of the population over 65 was also included, using OSEDA data. To understand a community's support of tax and expenditure limitations relative to the local taxation effort incentive in the 1993 school foundation formula, two Hancock variables were created using county-level vote information available from the Missouri Secretary of State's archives. Missouri's state-level tax and expenditure limitation constitutional amendment was passed via a 1980 voter referendum, commonly referred to as the "Hancock amendment," but additional language was rejected in 1994. A school district located within a majority of county voters supporting the Hancock ballot issue was coded as 1, a non-supporting county was coded 0. Finally, all monetary variables were adjusted using a 2004 cost-of-living adjustment.

Research Questions

The following research questions provide specific ways to understand how student needs are related to local taxation, and each of these analyses provided unique information on district levies and community attributes. The procedures and their strengths and weaknesses are explained following these questions.

Question 1: Are local school district taxation levy and revenue related to the district's economic, community and family factors?

A simple multiple regression analysis is used to examine how district tax levies and student risk factors were related:

$$\text{LogTax Levy}_i = \alpha_i + \beta'_F \text{LogFamily}_i + \beta'_C \text{LogCommunity}_i + \beta'_E \text{LogEconomic}_i + \delta X_i + \varepsilon_i$$

where LogTax Levy_i is the logarithm of tax levy for each school district i , and LogFamily_i and LogCommunity_i factors included the Land and Legters typology variables for community and family risk factors of locale, race/ethnicity, single parent households, educational attainment, free-reduced lunch percentages, English Language Learner percentages and special education percentages, and LogEconomic_i is a vector containing the combination of assessed valuation amounts per student and median household income (Table 1) for each school district i in years 1992 then 2003. The vector X_i contains other control factors including political variables, age over 65 and enrollment important for the determination of the tax levy level of a district.

The estimating equation for Question 1 is expressed in a double-log format. That is, when estimation is through the double-log form, the estimated coefficients take on a

particular interpretation, that of an elasticity. Elasticities are interpreted as the percentage change in one variable due to a one percentage change in another variable. Specific to the estimating equation for Question 1, β'_F is interpreted as the expected percentage change in a district's tax levy given a one percentage change in the associated family risk factor.

The first question asked about community, family and economic factors in all districts during two different years, prior to the 1993 state policy change, and the most current situation in 2003¹². Including the year prior to the new policy and the latest year in the model isolated the effects of community, family and economic variables rather than their response to the new formula incentive themselves. The regression analyses examined family, community and economic categories relative to each district's tax levy in 1992 and 2003. These procedures highlighted the conditions that prevented some communities from taxing at \$2.75 prior to 1993.

Local taxation choices were shown to be related to state aid, although Chapter 1's graphs show that state aid does not always match relative to local effort. For example, school districts levying at \$2.75 received anywhere from 30 to 60 percent of their revenue from state aid. The analyses therefore used state aid as a dependent variable, to avoid spurious conclusions about the effects of community and family risk factors and economic indicators on local taxation choices. The analyses showed that some community and family factors affected local taxation but not state aid, and vice versa, so that the choices were not always about the state incentive, but about particular values locally.

¹² Community data by school district are only available through 2003.

This set of analyses began to reveal what community and family risk factors related to local taxation in the years prior to and well after the enactment of the 1993 formula, 1992 and 2003. To account for the literature that argues that levels of local taxation are related to the ratio of state aid to local aid, and to the amount of non-residential property, assessed valuation percentages per pupil and median income were controls.

However, this question's analysis only used absolute dollar amounts in tax levies rather than explaining the relative changes in taxation over time. Although it provides two years of analysis to compare, the method of analysis itself did not control for change or account for omitted variable bias, that is, the effects of unobserved issues on taxation.

For that reason, the second question looked at each district's own changes over time, from 1992-93 to the 2002-2003 school year; that is, one year prior to the passage of the 1993 formula, through its two-year phase in, through state budget withholdings in fiscal year 2001 up to the most recent data available. This longitudinal analysis uses district-level fixed effects in a regression to explain how changes in the family, community and economic variables affect changes in the tax levies within each district. This technique accounted for districts' relative change in their tax levies since 1993, and examined those differences relative to community, family and economic factors.

Question 2: What changes in economic and community/family variables affected local taxation changes within districts?

To capture the change effects of community, family, and economic risk factors in both tax levy and percent state aid, a district-level fixed effects regression analysis was estimated of the form:

$$\text{LogTax Levy}_{it} = \alpha_i + \beta'_F(\text{LogFamily}_{it}) + \beta'_C(\text{LogCommunity}_{it}) + \beta'_E(\text{LogEconomic}_{it}) + \delta X_i + \varepsilon_{it}$$

where *Log Tax Levy* was the logarithm of tax levies for each school district *i* in year *t*, and *LogFamily* and *LogCommunity* includes the Land and Legters typology variables for community and family risk factors of locale, race/ethnicity, single parent households, educational attainment, free-reduced lunch percentages, English Language Learner percentages and special education percentages and *LogEconomic* was the vector of logged assessed valuation amounts per student and median household income (Table 1), for each school district *i* in year *t*. The vector X_i contained other control factors important to determining the tax levy level of a district, including political variables, district size, age over 65 and an annual cost-of-living adjustment. Finally, α_i represents the district-level fixed effect, and ε_{it} represents an idiosyncratic error term specific to district *i* at time *t*. As this is a double-log model similar to that in Question 1, all coefficients should be interpreted as elasticities as well.

This analysis provided information on the relative change in taxation of all school districts, including the family and community characteristics. The time period studied also accounted for the significant changes in state budget revenues and the political environment, and, despite initial concern that this analysis would not succinctly capture how districts as a group behaved regarding the 1993 state policy with a \$2.75 minimum tax levies, the findings show that the districts responded to the state incentive.

So the final question asked which districts were responsive to the 1993 and 2001 state policy changes, to look only at the districts that were levying below \$2.75 prior to the 1993's new policy, which set a \$2.75 incentive.

Question 3: Which district attributes were correlated with district responses to the 1993 and 2001 state policy changes?

To show how Missouri's 1993 foundation formula spurred relative change in school district levies, a logistical regression analysis was going to be used to look at factors that explained whether those districts that were below \$2.75 prior to the enactment of the 1993 formula met the minimum incentive levy after its implementation.

$$\text{Logit}(\text{Tax Levy}_{1992}) = \alpha_{1992} + \beta \log(\text{Family}_{1992}) + \beta \log(\text{Community}_{1992}) + \beta \log(\text{Economic}_{1992})$$

where the Tax Levy_{1992} equals 1 for districts above \$2.75 after to 1993, and 0 for districts below \$2.75 after 1993 and the Family and Community factors include the Land and Legters typology variables for community and family risk factors of locale, race/ethnicity, single parent households, educational attainment, free-reduced lunch percentages, English Language Learner percentages and special education percentages, and Economic is a vector containing the combination of assessed valuation amounts per student and median household income (Table 1) for each school district i in years 1992, then run again for 2003.

Although this analysis was to demonstrate which districts factors affected their reaction to the 1993 \$2.75 formula incentive, an initial step of this analysis showed all districts had responded to the incentive levy, with 95 percent at or above \$2.75, so no further research could be completed to answer this question.

Summary

Quantitative analyses explored absolute and relative changes in taxation in Missouri's 524 school districts after the passage of the 1993 foundation formula, which rewarded school districts for local effort, particularly the minimum incentive of \$2.75, relative to community and family risk factors. Although adequacy studies and policy now base aid on student needs and have moved away from distributing state aid based on local wealth and effort, state policy still tends to rely on some local revenue. Therefore, since the community and family risk factors that negatively impact education also affect local taxation, then state policy ought to account for this dynamic to truly close the gap in educational opportunity.

CHAPTER 4

Findings

Introduction

This chapter presents the relevant descriptive statistics, correlations, and regression findings of this study. Woven within the findings are discussions of prior research and some policy implications. The findings are presented by research question.

The purpose of this study was to understand the nature of school finance policy beyond financial considerations--to identify the social conditions related to local school taxation. This study examined the relationship between family and community educational risk factors and local taxation choices. In particular, how do family and community risk factors relate to local tax incentives?

Three research questions were addressed. The first question asked if local school district taxation levy and revenue related to the district's economic, community and family factors. Ordinary least squares analysis was used, first before the state incentive was in place, in 1992, then in 2003, after the full implementation of the 1993 formula that rewarded local effort at \$2.75 per \$100 of assessed valuation. This statistical procedure identified the effects of community characteristics on tax levies and then on state aid in two particular years.

The second question studied changes in economic and community/family variables that affected local taxation changes within districts over time from 1992 to 2003. Fixed effects analyses were used to control for the unobserved effects that might affect taxation choices or percent state aid within a particular district. The model included a cost of living adjustment.

The final question asked which district attributes were correlated with district responses to the 1993 and 2001 state policy changes but this question could not be fully analyzed.

Descriptive Statistics

The 1992 and 2003 descriptive statistics provide the context for this study (see Tables 3 and 4 in the Appendix). In 1992, some school districts reported no local levy. The maximum was \$5.83. Eleven years later, the lowest operating tax levy in a school district was \$2.03, with the standard deviation reduced by a third and the mean rising \$1.05. So clearly local school taxes rose even as the disparity among tax efforts shrunk. Meanwhile, regarding the percentages of state aid districts received, the minimum fell from 8.9% to 2.9%, but the means and standard deviations remained nearly the same. Percentages of state aid may have changed substantially for a given district, but the pattern within Missouri indicates that overall, percentages of state aid within budgets essentially remained unchanged. Similar means and standard deviations prevent a clear conclusion regarding how increased local taxation may have supplemented local budgets.

Free-reduced lunch and special education numbers remained similar from 1992 to 2003. This is not surprising since there were not substantial changes in these federal programs during that time and the percentages of students involved remained about the

same. There were no counts of ELL students in 1992, but 2003 shows that one district had up to 3102 ELL students, with districts serving an average of 28 ELL students. However, with a standard deviation of 189.02, it appears that districts either have very few ELL students or many ELL students.

Property wealth per pupil shows that residential values changed far more than either commercial or agricultural wealth, which remained similar from 1992 to 2003. Residential wealth in 1992 had a mean of .19, or \$19,000 per student, and by 2003 was .27, or \$27,000 per student. The highest 1992 residential wealth per pupil in one district was 40 times the wealth in the lowest district, with a variance of .026.

Correlations

Several correlations inform this analysis, particularly addressing the prior research that indicates strong relationships between several of the community/family variables. The 2003 correlations include ELL and are reported in Table 5 in the Appendix, and focus on community/family factors. Although several factors do have strong relationships with one another, none are so strong as to be concerned with multicollinearity within the analyses, and in fact indicates that in Missouri, these factors are distinctly different.

Free-reduced lunch percentages, an often-used poverty proxy for schools, show the strongest relationships to community and school factors. School districts with higher free-reduced lunch percentages will tend to be located in either predominantly white or predominantly minority communities, with more single parent households and less educational attainment.

The single parent household variable has strong correlations with other community/family variables. The strongest relationship exists between minority and

single parent percentages within communities. Intuitively, it might be expected that the single parent variable is closely aligned with median income and poverty, since presumably these households have only one income. But while a relationship to FRL and median income clearly does exist, it is not as strong as might have been expected.

Communities with higher percentages of single parents tend not to be rural, however, the correlation is low enough to indicate that single parents are located in rural areas as well.

Finally, the single parent variable has a small relationship to community educational attainment, indicating that single parents hold a variety of educational degrees.

Rural and metro school districts have opposite signed correlations on every community/family variable. Rural school districts, using correlations, may be described as having fewer minority students, with fewer single parent households, less educational attainment, higher percentages of free-reduced lunch students, fewer ELL students, nearly the same special education percentages, and less enrollment. Conversely, the 63 metro area districts can be described as having more minority students, more single parent families, higher educational attainment, lower free-reduced lunch percentages, more ELL students and more enrollment. This analysis included the highest poverty districts of Kansas City and St. Louis, so it is likely that the relative affluence of suburban districts somewhat alters the correlations that might have been found otherwise. Median income has a small negative correlation to rural locale and an equal but similarly small positive relationship to metro locale.

1992 and 2003 Snapshots: Community/Family and Local Taxation

Data conversions to logarithms allowed for a more accurate analysis of the three research questions. Without this initial operation, the models would have been vulnerable

to extreme differences brought on particularly by the property wealth variable, assessed valuation (refer to Figure 4 in Chapter 3). Inclusion of a 2004 cost of living adjustment also evened out the data across time, making the results better reflect the effects of family, community and economic variables on taxation and state aid rather than the changes in the value of a dollar over time.

The first research question is a snapshot of two years, 1992 and 2003; that is, before and after the 1993 formula was implemented. This formula assured each district the same revenue as if they had local wealth in the 95th percentile, as long as the district used an actual levy of \$2.75 to generate local funds. Ordinary least squares (OLS) regression was used for this analysis.

To initially highlight the effects of community, family and economic variables relative to each district's tax levy in 1992 and 2003, the first question asked: Are local school district taxation levy and revenue related to the district's economic, community and family factors?

$$\text{LogTax Levy}_i = \alpha_i + \beta'_F \text{LogFamily}_i + \beta'_C \text{LogCommunity}_i + \beta'_E \text{LogEconomic}_i + \delta X_i + \varepsilon_i$$

where LogTax Levy_i is the logarithm of tax levy for each school district i , and

LogFamily_i and LogCommunity_i factors included the Land and Legters typology variables for community and family risk factors of locale, race/ethnicity, single parent households, educational attainment, free-reduced lunch percentages, English Language Learner percentages and special education percentages, and LogEconomic_i is a vector containing the combination of assessed valuation amounts per student and median household income (Table 1) for each school district i in years 1992 then 2003. The vector X_i contains other

control factors including political variables, age over 65 and enrollment important for the determination of the tax levy level of a district.

The model considered community, family and economic effects on tax levy, and then on state aid from 1990-2003. ELL numbers were unavailable prior to 1998 and so are only included in the 2003 analysis. Two tables in the Appendix show the results. Table 6 shows both 1992 and 2003 variables with tax levies as the dependent variable, while Table 7 is the 1992 and 2003 variables with state aid as the dependent variable.

The 1992 and 2003 OLS regression analyses show that community and family factors as well as economic factors affected tax levies and state aid to varying degrees prior to and after the inception of 1993 state incentive.

The 1992 OLS on taxation has an R squared of .36 and .37 in the 2003 OLS. The beta constant is 1.86 in 1992 and 1.80 in 2003. The 1992 OLS on state aid has an R squared of .61 and in 2003 .069. The model explains far more variation in state aid percentages than taxation in both years.

Community/Family Variables

The collective prior research presented in the literature review suggests that the factors in the Land and Legters typology do affect both tax levies and state aid. Several of items on the Land and Legters typology have been studied in school finance, including poverty, single parent status, minority and educational attainment. When Vesely and Crampton (2004) used the Land and Legters typology to study school finance, they found a close relationship of single parent status and poverty and chose not to use single parent status in their research, and combined the highly correlated race and locale into one factor, urbanicity, to show the impact of its close relationship. This analysis purposefully

included all the Land and Legters variables individually in order to fully ascertain the relationships among *Missouri's* community variables, to shape policy conclusions specific to Missouri but especially to avoid improper conclusions based on stereotypes; for example, presuming that all single parents are both poor and uneducated, a notion that began to unravel based on the initial correlations.

The following section summarizes the findings of each of the community/family variables.

Minority. This study's finding parallels prior research, that minority communities do have higher local tax levies but receive less state aid. This result has equity and adequacy implications explored throughout this chapter and the final discussion chapter. As the research suggests, communities with higher percentages of minority populations tended to support higher tax levies in both 1992 and 2003, but had no significant effect on percent state aid in either year. The taxation beta is .013 in 1992, and .005 in 2003. In other words, a one percent increase in minority population equaled a 1.3% taxation increase in 1992 and 0.5% increase in 2003. Although the changes appear small, the subsequent additional local taxation dollars, for the average district, amounted to an average of \$1.2 million additional dollars of local revenue in 1992 and \$3.1 million in 2003. The fixed effects findings regarding the minority effect on tax levy and state aid speaks to the dynamics presented below.

Single parents. In 1992, communities with higher percentages of single parent households had lower school district tax levies, with a small effect on state aid. The taxation coefficient is -.035 in 1992 with a standard error of .011, while the state aid percentage beta was .02. This translates to every one percent increase in single parent

families in communities, the tax levies were 3.5% lower, with just over 2% more state aid to the district. By 2003, this community subset had no significant effect on either tax levy or state aid. This effect is similar to other groups' effects. Considered together, it appears that the state's incentive for local taxation – a clearly defined minimum levy that also matched state aid – dampened the effects of these subgroups on local taxation.

Educational attainment. Educational attainment had no effect on tax levies in 1992, although high school graduate percentages had a small effect on percent state aid (a beta of .005). Neither the 2003 tax levy nor state aid were affected by high school graduate educational attainment. Missouri as a state had a small percentage decrease in the high school graduates from 1990 to 2000 (32.7 percent to 33.1), but with almost eight percent more of these individuals attending college in 2000 (OSED, 2004).

Free-reduced lunch. The 1993 formula was eventually adjusted to account for high-poverty students; additional aid was distributed based on these counts as of 1998 to provide more funding for these high needs students based on the federal desegregation suit settlements in St. Louis and Kansas City school districts. Districts with higher numbers of free-reduced lunch students had lower tax levies and higher percentages of state aid in both 1992 and 2003. Taxation coefficients were -.289 and -.096; state aid betas were .255 and .214 in 1992 and 2003, respectively. The effect of poverty on local taxation dropped by two-thirds from 1992 to 2003, while share of state aid within a school district changed only slightly, from 1.54% in 1992 to 1.35% in 2003 of additional state aid for each percentage increase of FRL students. FRL still tended to decrease local levies, but much less so, while maintaining the same share of state funding within a

district's budget. Further findings regarding FRL, the 1993 formula and the desegregation settlement are discussed under the within-district findings.

Special education. Districts with higher numbers of IEP students had higher percentages of state aid in 1992, with a beta of .255. IEP percentages showed no effect on tax levies in 1992 or 2003, or on 2003 state aid. No prior research has studied the relationship of special needs to local community taxation or state aid, so no particular finding was expected. The lack of effect of special education percentages on local taxation and percent state aid might be explained by the random distribution of special needs within families and communities, so that this particular student need is not tied to family wealth, race/ethnicity, locale, ELL or poverty status, or related to the local district wealth. Further, percentages of state aid revenue within a school district would not substantially change based on special education percentages because every special education student is entitled to a "free and appropriate" public education via federal statute and longstanding case law, which is funded with state and federal dollars.

English Language Learners. NCES began reporting ELL numbers in 1998, so only the 2003 OLS regression used ELL. More ELL students in a district led to higher tax levies, with less state aid, although the effects were small (coefficients were .024 for taxation and -.041 for state aid). No prior research has studied the relationship of ELL populations to local community taxing support, so no particular finding was expected.

Locale. Some researchers noticed that the combination of a school district's location plus other socioeconomic factors creates a compound educational risk (Baker, 2005; Vesely and Crampton, 2004). Missouri has additional school finance interests to consider with the St. Louis City and Kansas City desegregation cases and settlements.

Moreover, the politics of school finance arguments tend to fall along rural, suburban and urban interests. As a result, this study used a locale factor, and used 1992 NCES codes to label districts as metro (N=63), rural (N=450) and mid-city (N=9) either in the descriptive statistics or in the regression analyses. In the end, this variable contributed little to understanding compound risk, but instead proved most useful when interpreting effects of family/community risk factors and economic factors on taxation and state aid.

Rural locale tax levy betas were $-.53$ in 1992, with a standard error of $.086$. In 2003, the beta had shrunk to $-.181$, with a standard error of $.033$, yet rural state aid betas and standard errors stayed similar from 1992 to 2003 ($.201$ ($.062$) and $.215$ ($.082$), respectively). Mid-city status had only one effect, on 1992 tax levies, with a beta of $.333$ and standard error of $.113$.

One interesting finding emerged from this variable. In 1992, school districts in rural locales had 40 percent lower tax levies than mid-city or metropolitan areas, but by 2003, tax levies were only 16 percent lower. And although tax levies increased in rural areas, the state aid effects stayed nearly the same. This study shows that the 1993 tax levy incentive clearly closed the large gap in taxation among locales to improve taxpayer equity. But without an analysis with per pupil expenditures, this observation cannot extend to a conclusion on school finance equity; that is, whether additional state aid and local taxation led to increased per pupil expenditures within districts or a smaller disparity of PPE among districts.

Another question arises from this finding. Recent reports have suggested that rural residential property assessments are less reliable and therefore lower than they should be (Public Finance Institute, 2006), thus their state aid distributions are skewed higher than

they should be with the combination of lower tax levies and lower wealth but higher state aid. Although disparate assessment practices may have affected the guaranteed tax base portion of the formula, the question must now be just how much that affected the overall formula disbursements when the tax levy gap shrunk while their shares of state aid in their budgets remained the same. This could also be answered by using per pupil expenditures as a dependent variable, because although the rural districts' share of state aid within their budgets remained similar, the actual amounts spent may have gone up significantly more than non-rural districts. Further, any locale finding ought to be considered in the context of property wealth types, student needs and the equalizing intentions of state policy and subsequent aid.

Economic

Fischel (2001) and Ladd and Harris (1995) contend that districts with greater wealth, particularly commercial, will tend to lower their levies to share the cost of education. So in the absence of a state incentive for local taxation as in 1992, there should have been an inverse relationship of property wealth to tax levies. Instead, only increased agricultural wealth per student positively affected tax levies, and while residential and commercial property had no statistically significant effect, and the coefficients were positive rather than negative, which was expected. This pointedly goes against previous research.

The inverse tax levy relationship eventually appeared in 2003 to residential and commercial property, with no relationship to agricultural property. By 2003, with a state incentive in place for districts with a \$2.75 levy, and with most districts at or above that, there should have been little to no relationship of wealth to tax levy, and property wealth

should have been negatively related to state aid, as the guaranteed tax base assured all districts revenue as if they had the 95th percentile of local wealth. This is decidedly opposite of what research predicted. Instead, the model revealed that agricultural property had a positive effect on 1992 taxation, with a coefficient of .077 and standard error of .021, but no effect in 2003, when both residential and commercial AV per pupil negatively affected taxation, with coefficients of -.044 and -.024, respectively.

In both years, state aid percentages in a school budget had tremendous changes. For each percentage increase in property wealth per student, districts saw less state aid by 2.7 percent for agricultural property, 5 percent for residential and 25.5 percent for commercial in 1992. Eleven years later, increases in wealth equated to 10 percent less state monies in a school budget for each percentage in increased residential wealth and 20 percent less for each percentage commercial increase.

In 1992, school districts with higher agricultural wealth per student had higher tax levies, while residential and commercial property wealth per pupil had no effect on tax levy. The 2003 relationships were entirely reversed. Agricultural wealth per student no longer had an effect on local tax levies, while residential and commercial wealth did.

The 1992 agricultural relationship resonates given the research on school finance and property values, because those districts likely have a concentration of agricultural property with little commercial or even residential property and therefore had to tax at higher levels to generate revenue. But there was no relationship between commercial wealth per student and local tax levies in 1992; a negative relationship would have been anticipated (higher wealth, lower tax levies), however the non-significant beta was positive.

The 2003 finding shows that the 1993 formula reversed the effects of wealth types on local tax levies; a relationship was present rather than non-existent in 1992 between residential and commercial wealth and tax levies. Research does support the notion that the relationship should be negative (higher wealth, lower tax levies), but also knowing that all districts were assured state aid based on both local effort and local wealth explains the relationships. Local communities could have relatively low levies to draw state aid since they were assured revenue as if they had very high wealth; that is, at the 95th percentile.

As expected, there was an inverse relationship of residential and commercial wealth to state aid in 2003, but agricultural property showed no relationship. All three property types had negative relationships with state aid. The lower the residential, commercial and agricultural property per student, the higher the state aid, and conversely, the higher the residential, commercial and agricultural property per student, the lower the state aid. Commercial had the largest effect on state aid, which is not surprising given the large disparities in commercial wealth across Missouri school districts; the 1992 minimum was no commercial wealth per student with a maximum of \$327,000 taxable dollars per student.

Regarding state aid's negative relationship to property types, the pre-1993 formula offered districts a flat foundation amount, and figured an additional portion of state aid by deducting 57% of a local district's wealth (Otto Fajen, personal communication). Although the local deduction was partial, it is logical that the more wealth a local district had, the less state aid it would receive under a wealth neutralizing formula, so this finding is expected. If a relationship had not existed, it might have

indicated that the formula was not reaching wealth neutrality; that is, equal services for students living in economically diverse conditions.

Median household income. Median household income had no effect on either tax levy or state aid in 1992. By 2003, median household income had a small negative effect on both tax levy and state aid, with coefficient of $-.057$ and standard error of $.069$ in 1992 and a 2003 coefficient of $.062$ and standard error of $.028$.

Other Variables

Age. In 1992, the percentage of a community's population over the age of 65 had a significant effect on both local tax levy and percent state aid. Generally, higher percentages of elderly population had a positive effect on local tax levies, but a negative effect on state aid. In 2003, the percent elderly population had a slight positive effect on local tax levies, and no effect on state aid. The elderly population had small but positive coefficients each year, of $.018$ and $.004$, with small standard errors of $.004$ and $.002$.

Research on the elderly voting population effect on local school tax levies or spending has been contradictory ((Berkman & Plutzer, 2004; Tedin, 1994; Tedin, Matland & Weiher, 2001). This study's finding may best be explained by geography rather than the group's effect on levies.

The percentages of people over 65 are only slightly related to rural locale and slightly negatively related to mid-sized city locale, such as Cape Girardeau. Therefore, it can be assumed that larger percentages of those over 65 live in non-rural, non-mid-sized cities; that is, they are located in suburban and urban locations. Rural locales have negative correlations to tax levy and positive associations with state aid, while the age over 65 populations have the opposite relationships in the OLS analysis.

But from a policy perspective, this may be a useful finding. As elderly citizens on limited incomes successfully lobby for circuit-breaker laws and other tax breaks, the issue may be how these advantages affect local school finance since the bulk of these individuals appear to live in school districts that do not qualify for large percentages of state aid, making their local revenues extremely important. Therefore, a separate set of studies on age and local school finance might be useful. Until then, future research extending from this study should probably not include age to make the model parsimonious.

Political variables. The Hancock amendments were statewide ballot initiatives to establish tax and expenditure limitations on the state of Missouri. The first amendment in 1980 passed; the second proposed amendment, considered in 1994, failed. This dummy variable was used to understand the community values reflected in tax levy analyses in particular. A school district located within a county where a majority of the voters supported the Hancock ballot initiatives was coded as 1, a non-supporting county was coded 0.

A community's support or opposition to Hancock in 1980 shows no relationship to their tax levy choices in 1992 or 2003. Community support of Hancock II in 1994 shows an inverse relationship; that is, communities that supported additional restrictions to the Missouri state budget also had lower tax levies in both 1992 and 2003, although their state aid percentages were an average of 20% higher than those communities that did not support Hancock II. Hancock 1994 betas on tax levies were $-.491$ in 1992 and a 2003 beta of $-.107$. Conversely, these same districts were receiving statistically

significantly amounts of state aid each year; with betas of .162 and .183 in 1992 and 2003.

Communities with lower local school district tax levies also supported statewide tax and expenditure limitations; intuitively, this finding makes sense in that those with lower tax levies would probably support taxation restrictions. The concern from a school finance perspective is that voting for both lower local and state taxation might prevent the adequacy goals within the state's constitution from being achieved, particularly now that the 2005 formula considers the adequate per pupil expenditure to be \$6,117, regardless of revenue sources.

Enrollment. In 1992, enrollment had a positive relationship with tax levy (beta of .241), and a negative relationship to state aid (beta of -.338). The more students, the higher the tax levy but the lower the percentage of state aid. Conversely, the fewer the students, the lower the tax levy and the higher the percentage of state aid.

By 2003, enrollment had no effect on tax levy, but the negative relationship to state aid remained but with a smaller beta of -.17. The more students, the lower the percentage of state aid, and the fewer the students, the higher the percentage of state aid. Schools with lower enrollments have higher fixed costs per pupil (Alexander and Salmon, 1995) than larger school districts, who have more students and therefore can spread the same costs over more students.

Within District Effects of Community/Family and Economic Factors

The second question used fixed effects analysis to better interpret family, community and economic factors and their effects on local taxation choices and subsequent state aid. Several OLS findings, which are snapshots of two different years,

can be more fully understood when considering an over-time analysis. Also, fixed effects shows within-district behaviors across time and pinpoints the effects of community and family factors that had been less clear in the correlations and OLS, which illustrate differences across districts. The advantage of fixed effects is that it controls for unobserved effects; that is, it accounts for any unseen effect on the dependent variables (tax levy and state aid) that are not included in the model, as long as that effect remains constant over time.

The second question asked: What changes in economic and community/family variables affected local taxation changes within districts?

$$\text{LogTax Levy}_{it} = \alpha_i + \beta'_F(\text{LogFamily}_{it}) + \beta'_C(\text{LogCommunity}_{it}) + \beta'_E(\text{LogEconomic}_{it}) + \delta X_i + \varepsilon_{it}$$

where *Log Tax Levy* was the logarithm of tax levies for each school district *i* in year *t*, and *LogFamily* and *LogCommunity* includes the Land and Legters typology variables for community and family risk factors of locale, race/ethnicity, single parent households, educational attainment, free-reduced lunch percentages, English Language Learner percentages and special education percentages and *LogEconomic* was the vector of logged assessed valuation amounts per student and median household income (Table 1), for each school district *i* in year *t*. The vector *X_i* contained other control factors important to determining the tax levy level of a district, including political variables, district size, age over 65 and an annual cost-of-living adjustment. Finally, α_i represents the district-level fixed effect, and ε_{it} represents an idiosyncratic error term specific to district *i* at time *t*. This analysis is for 1998-2003; a longer analysis from 1993-2003 omitted ELL

percentages because they were not available prior to 1998. The longer analysis is the primary one reported here.

A longer analysis, from 1990 to 2003, considered community, family and economic effects on tax levy, then on state aid. The other analysis was from 1998 to 2003 and included ELL numbers, which were unavailable prior to 1998. The longer analysis is primarily presented here. Both analyses used a one-year lag because changes in community factors cannot affect tax levies immediately, as elections occur only several times per year. The fixed effects results are in Table 8 in the Appendix, the shorter analysis is reported in Table 9. The time effects are reported in Table 10.

Community/Family Variables

This analysis found the significant effects of community and family risk factors on taxation and state aid. When coupled with the OLS analysis findings, they show that risk factors do affect local taxation decisions. The R-squared for the tax levy analysis is .55, and is .11 for state aid. This fixed effects analysis explains more independent variables' effects on tax levy than on state aid percentages, and also explains more than the OLS analysis on tax levy.

Minority. Over time, increasing percentages of minority populations within a school district had no effect on local tax levies but had a strong negative relationship to state aid. The beta coefficient is -1.978; that is, for every one percent increase in a community's minority population, state aid decreased by 1.97 percent, which is a large relationship. This finding exhibits the strongest effect of the state taxation incentive: it nullifies the influence of particular groups that had previously had an effect on local school taxation. The consequences depend on the type of school district; it appears that

racially unchanged districts obtained more state aid, other districts lost shares of state aid as more minorities moved into the school district. More research could be done on compound risk, since previous publications (Vesely & Crampton, 2004; Baker, 2005) posit that minority students tend to have compounding factors affecting educational opportunity. This fixed effects analysis held all of those other factors equal, showing that on its own, communities with increasing minority proportions lose state aid and the ability to lower or raise local tax levies.

This finding is consistent with prior research. A thirty year study suggested that relatively homogeneous communities spent more on education, and noted that these demographics may affect local taxation choices, although the study offered no evidence or further insight (Poterba, 1997). Other studies used similar factors as the Land and Legters typology to study expenditures or state aid, but relatively few of these findings apply here, although Rolle's (2004) Indiana case study found that high need districts received less state aid despite the need. He wrote "...school districts with large percentages of low income families, individuals without high school diplomas living in the community, minority students, single parent households, and high student-teacher ratios tended to receive less money per student—on average—than school districts without these characteristics" (p. 296). Past research argues that minority communities tend to support opportunities for government programs, although Chandler (2005) found no minority effect on district spending in his Connecticut study.

Single parents. A district with increasing single parent households could expect lower local tax levies over time, with a one percent increase translating to a .24% decrease in local school taxation. Vesely and Crampton left single parents out of their

policy analysis of state finance systems, claiming it is too closely correlated with poverty. This study indicated some correlation between minority and single parents, although not as strong as might have been presumed. Now this fixed effects finding shows a district with increasing single parents has the opposite effect that minorities do: an effect on tax levies, with a beta of $-.242$, and no effect on state aid. In Missouri, there is a separate effect of single parents and minorities on tax levies and state aid, so that these risk factors ought to be considered separately.

Free reduced lunch. Poverty also shows different effects on local taxation and state aid than the single parent and minority variables. From 1990-2003, free-reduced lunch had no effect on either local tax levies or state aid. By 1998, the state had added a poverty component to the formula as part of the desegregation suit settlement; so increases in state aid percentages might have been expected.

But the inclusion of FRL in the formula cannot explain why poverty has neither a positive or negative effect on local taxation. The OLS analysis and the brief logistical regression analysis showed that school districts' communities tended to respond to the \$2.75 local taxation incentive with matching state aid, which nullified some community effects seen in 1992. As a result, the 1993 formula, with its local tax incentive *and* its additional poverty disbursement, may have managed to strike the proper balance between local effort, local community/family needs, and state aid. This will be discussed further in Chapter 5.

Special education. Special education students are spread throughout Missouri, regardless of locale, income, parental education, and the like, and this variable is the only variable that tends not to be tied together with other risk factors the way other factors are,

such as educational attainment, income and property wealth. IEP had no effect on local tax levies in the longer analysis, and a negative effect on state aid, with a small but statistically significant beta of $-.069^{13}$. Even considering the lack of effects of special education counts in the OLS snapshots, this finding alone justifies the 2005 formula's inclusion of special needs as a calculation for state aid since these high need, high expense students appear to lose both local and state support under a tax levy incentive environment.

English Language Learners. This item is reported only in the shorter time analysis due to data availability. In districts with increasing numbers of ELL students, this had a very small positive effect on their local tax levies with a beta of $.004$ and no relationship to state aid. ELL funding comes as a federal flow-through from Title I and Title III funds. Each state's education agency receives the federal dollars and disburses them according to the programs and services outlined in each Title. This analysis did not account for federal funding for ELL students, which has a history of lagging at least a year behind enrollment changes within a district.

Educational attainment. A district with lower educational attainment had higher tax levies, while a district with more college-educated citizens had lower tax levies. Increasing percentages of those with only high school degrees within a community showed a coefficient of $.23$, while increasing percentages of those with college degrees showed a $-.16$ effect on taxation. So every one percent increase of a community's population having only high school degrees equaled a $.23$ percent increase in tax levy,

¹³ The shorter analysis showed a small negative coefficient of increasing special needs students on both tax levies and state aid.

while a one percent increase in a community's college-educated population equaled a .16 decrease in tax levy.

Several possibilities exist that could explain this unusual finding, but no research or situation seems to fully explain it. First, this may be a structural finding about the formula, with its minimum incentive levy and guaranteed tax base, since education affects personal income, property ownership and property values. In other words, increasing numbers of college-educated individuals in a school district may also equal large amounts of residential wealth per student, which leads to lower taxation. Or, college-educated individuals would rather spend funds on post-high school graduation rather than property taxes to fund K-12 education, while high school graduates view their local schools as the only alternative. In any case, this variable could be finessed for future studies, to better examine the effects of community education on local taxation decisions.

Economic

The implications of property wealth types relative to prior research will be explored at length in Chapter 5. In short, changing wealth within a district has unexpected effects on local taxation when considering past research.

As residential wealth per student increases in a district, tax levies and percent state aid drop. With betas at $-.079$ and $-.236$ respectively, every percent increase in residential wealth per student equates to a .08 percent decrease in local tax levy and a .24 percent decrease in state aid. This is not unexpected knowing that the 1993 formula tried to equalize local taxation and wealth, so the more property wealth of any kind, the less state aid would be expected. This finding also shows that the wealthier homeowners in districts with increasing residential wealth have lower tax levies on their homes.

Commercial property only decreases state aid, not local levies, with a coefficient of $-.112$. This is an unexpected finding for tax levy given Fischel and Ladd's contention that local district voters will share tax costs with commercial property owners. But understanding Missouri formula's guaranteed tax base, which calculated state aid as if every district had local wealth at the 95th percentile, the state aid finding is expected. The finding suggests that communities respond to a state incentive rather than to the local incentive, where voters might chose to share the cost of education in communities with higher commercial wealth, which could include lower rather than higher tax levies. It also suggests that residential owners lose their chance to share tax burden as commercial wealth increases in a given district. This is not unexpected given the widespread use of tax increment financing in local economic development, which defers local taxation for new commercial property, while still adding wealth to its own local community and the statewide guaranteed tax base. The more wealth, the less state aid.

Finally agricultural wealth per student had a small effect on a district's local tax levies from 1992 to 2003, with a .02 percent decrease in tax levy. This effect has several methodological aspects to consider; first, agricultural wealth has been calculated per student, rather than a total, making the numbers smaller than used in policy. Second, both assessed valuation and tax levies were logged, which enabled a tighter set of numbers rather than true numbers which are exponentially larger over time due to reassessments and also among districts. The data transformations made here helped interpretation of the study overall, but for the purposes on informing policy regarding this particular land type, this finding and method are not useful.

Median household income. The longer fixed effects tax levy analysis showed that as median income increased in a district, the local tax levy also increased, with a coefficient of 2.82. Despite the effect on local choices, median household income showed no effect on the percent state aid a district received.

Other Variables

Age. The fixed effects analysis showed an effect of age on local tax levies, but only at the $p < .05$ level. The state aid percentages were positively affected by increasing percentages of those over 65. The OLS found the same dynamics in 1992 and 2003, and this fixed effects analysis upholds the subsequent questions regarding the geographic placement for those over 65 and their homeownership.

Enrollment. From 1992 to 2003, as a district's enrollment increased, local tax levies decreased, with no effect on state aid percentages. The beta coefficient was $-.181$ on tax levies. The larger the school district, the lower the tax levy, and the smaller the district, the larger the tax levy. This contrasts with the OLS findings, which showed a positive enrollment effect on tax levies in 1992 (the larger the district, the larger the levy), and a small but statistically significant negative relationship to state aid.

Time. Table 10 shows the time effects in this analysis. The new formula was phased into effect by 1997, and tax levies clearly show growth from 1993 up to the full implementation, and percent state aid immediately showed effects just after that implementation. This factor shows that the state had an effect on tax levies and percent state aid; state incentives clearly induced local communities to raise taxes, and those communities were rewarded with additional state aid.

Linking Taxation Responses to Community/Family Factors

The final question attempted to identify how Missouri's 1993 foundation formula spurred relative change in school district levies using logistical regression analysis for those districts that were below \$2.75 prior to the enactment of the 1993 formula. The questions was initially developed in the following manner: Which district attributes are correlated with district responses to the 1993 and 2001 state policy changes?

$$\text{Logit}(\text{Tax Levy}_{1992}) = \alpha_{1992} + \beta \log(\text{Family}_{1992}) + \beta \log(\text{Community}_{1992}) + \beta \log(\text{Economic}_{1992})$$

where the *Tax Levy*₁₉₉₂ equals 1 for districts above \$2.75 after to 1993, and 0 for districts below \$2.75 after 1993 and the *Family* and *Community* factors include the Land and Legters typology variables for community and family risk factors of locale, race/ethnicity, single parent households, educational attainment, free-reduced lunch percentages, English Language Learner percentages and special education percentages, and *Economic* is a vector containing the combination of assessed valuation amounts per student and median household income (Table 1) for each school district *i* in years 1992, then run again for 2003.

However, while running descriptive statistics prior to the formal analysis, it was discovered that nearly all school districts had responded to the state's operating tax levy incentive, even the districts that had sufficient local revenue without levying at \$2.75 (Table 2). Therefore it could not be demonstrated which district factors affected reaction to the formula incentive. If this analysis were reworked, it could examine districts taxation changes after 2000, when the state began withholding its funds due to a revenue shortfall. In that way, it might be answered which community/family and economic

factors spurred additional taxation and revenue when the local school district faces reduced services.

Table 2 *Descriptive Statistics on Missouri School District Tax Levies, 1992-1996*

Variable	Mean	SD
1992	.2816	.4498
1993	.3238	.4679
1994	.5556	.4969
1995	.9713	.1671
1996	.9598	.1965

Appendix

Local Taxation and Community and Family Risk

Table 3

1992 Descriptive Statistics of School Tax Levies, Percent State Aid, and Community, Family and Economic Variables in Missouri School Districts, in percentages

Variable	N	Mean	Standard Deviation	Minimum	Maximum
Dependent variables					
Tax levy	522	2.19	.92	0	5.83
Percent state aid	522	.43	.12	.09	.67
Community/Family					
Free-reduced lunch (FRL) %	465	.32	.14	.04	.78
Special education %	522	.12	.12	.05	.38
Minority %	522	3.91	8.12	0	96.2
Single parents %	522	5.39	2.5	0	24.7
High school graduates %	522	39.27	6.74	10.6	59.4
Midcity	522	ii	.12	0	1
Rural	522	.00	.34	0	1
Economic					
Residential assessed valuation per pupil	522	.19	.16	.049	1.97
Commercial assessed valuation per pupil	522	.09	.22	.00	3.27
Agricultural assessed valuation per pupil	522	.08	.08	0	.71
Median household income	522	38.96	11.77	17.84	109
Other					
Enrollment	522	1577.75	3508.19	28	40925
Hancock 1980	522	.83	.37	0	1
Hancock 1994	522	.069	.25	0	1
Over 65 %	522	16.35	4.94	3.1	32

Local Taxation and Community and Family Risk

Table 4

2003 Descriptive Statistics of School Tax Levies, Percent State Aid, and Community, Family and Economic Variables in Missouri School Districts, in percentages

Variable	N	Mean	Standard Deviation	Minimum	Maximum
Dependent variables					
Tax levy	522	3.24	.58	2.03	5.1
Percent state aid	522	.42	.12	.029	.64
Community/Family					
Free-reduced lunch (FRL) %	522	.35	.15	0	.77
Special Education %	522	.16	.05	.05	.43
English Language Learner (ELL) %	522	.01	.02	0	.16
Minority %	522	6.19	9.88	0	98.4
Single parents %	522	7.39	2.48	.1	29.3
High school graduates %	522	40.67	6.96	10.5	57.3
Midcity	522	.01	.12	0	1
Rural	522	.86	.34	0	1
Economic					
Residential assessed valuation per pupil	522	.27	.21	0	2.45
Commercial assessed valuation per pupil	522	.10	.16	0	1.99
Agricultural assessed valuation per pupil	522	.07	.08	0	.46
Median household income	522	34.70	9.06	16.62	83.47
Other					
Enrollment	522	1707.49	3737.63	22	42654
Hancock 1980	522	.83	.37	0	1
Hancock 1994	522	.07	.25	0	1
Over 65 %	522	14.67	3.92	4	30.8

Local Taxation and Community and Family Risk

Table 5

Correlations of Community, Family and Economic Variables in Missouri School Districts, in percentages

2003	Metro locale N=63	Rural locale N=450	% Minority	% Single Parent	High School degree	College degree	% FRL	% ELL	% Special Education	Enroll- ment	Median income
Metro locale	1.00										
Rural locale	-.94	1.00									
% Minority	.49	-.48	1.00								
% Single Parent	.32	-.33	.46	1.00							
High School degree	.14	-.15	-.05	-.29	1.00						
College degree	.29	-.33	.18	-.19	.58	1.00					
% FRL	-.24	.24	-.02	.40	-.65	-.57	1.00				
% ELL	.16	-.16	.26	.14	-.17	.07	.05	1.00			
% Special Education	.02	-.01	.01	.02	-.09	-.01	.23	-.06	1.00		
Enrollment	.51	-.59	.47	.31	.07	.30	-.11	.22	-.06	1.00	
Median income	.01	-.01	.01	.06	-.07	-.03	.04	.03	-.03	-.03	1.00

Table 6

1992 and 2003 OLS Regression Analyses for Community, Family and Economic Variables Predicting Missouri School Districts' Operating Tax Levies, in logarithms

Variable	1992		2003	
	B	SE	B	SE
Community/Family				
Mid-sized city	0.333	(0.113)**	0.022	(0.041)
Rural	-0.530	(0.086)**	-0.181	(0.033)**
Minority	0.013	(0.005)**	0.005	(0.001)**
Single parents	-0.035	(0.011)**	0.002	(0.004)
High school graduates	-0.002	(0.002)	-0.002	(0.001)
Free-reduced lunch (FRL)	-0.289	(0.053)**	-0.096	(0.021)**
Special education	-0.015	(0.019)	0.042	(0.006)
English Language Learner (ELL)			0.024	(0.006)**
Economic				
Residential assessed valuation per pupil	0.062	(0.050)	-0.044	(0.020)*
Commercial assessed valuation per pupil	0.013	(0.019)	-0.024	(0.011)**
Agricultural assessed valuation per pupil	0.077	(0.021)**	0.009	(0.007)
Median household income	-0.057	(0.069)	-0.062	(0.028)*
Other				
Enrollment	0.214	(0.055)**	-0.018	(0.025)
Hancock 1980	0.054	(0.051)	0.012	(0.016)
Hancock 1994	-0.491	(0.103)**	-0.107	(0.016)**
Over 65	0.018	(0.004)**	0.004	(0.002)*
Constant	1.863	(0.367)**	1.802	(0.138)**
Observations	455		511	
R-squared	0.360		0.370	

Note. * $p < .05$ ** $p < .01$.

Table 7

1992 and 2003 OLS Regression Analyses for Community, Family and Economic Variables Predicting Missouri School Districts' State Aid, in logarithms

Variable	1992		2003	
	B	SE	B	SE
Community/Family				
Mid-sized city	-0.103	(0.078)	-0.021	(0.150)
Rural	0.201	(0.062)**	0.215	(0.082)**
Minority	-0.004	(0.003)	-0.000	(0.003)
Single parents	0.020	(0.009)*	0.006	(0.009)
High school graduates	0.005	(0.002)*	-0.002	(0.002)
Free-reduced lunch (FRL)	0.255	(0.041)**	0.214	(0.046)**
Special education	0.044	(0.018)**	-0.003	(0.066)
English Language Learner (ELL)			-0.041	(0.013)**
Economic				
Residential assessed valuation per pupil	-0.133	(0.051)**	-0.304	(0.047)**
Commercial assessed valuation per pupil	-0.243	(0.033)**	-0.303	(0.030)**
Agricultural assessed valuation per pupil	-0.065	(0.017)**	0.005	(0.021)
Median household income	0.076	(0.049)	-0.162	(0.062)*
Other				
Enrollment	-0.338	(0.043)**	-0.170	(0.065)**
Hancock 1980	-0.022	(0.038)	-0.007	(0.033)
Hancock 1994	0.162	(0.047)**	0.183	(0.046)**
Over 65	-0.018	(0.004)**	-0.008	(0.005)
Constant	-1.299	(0.320)**	-1.107	(0.330)**
Observations	457		511	
R-squared	0.61		0.69	

Note. * $p < .05$ ** $p < .01$.

Table 8

*Fixed Effects Regression Analysis for Community, Family and Economic Variables
Predicting District Operating Tax Levies and State Aid from 1990-2003, in logarithms*

Variable	Tax Levy ¹		State Aid	
	N=513		N=513	
	B	SE	B	SE
Community/Family				
Minority	0.285	(0.164)	-1.978	(0.314)**
Single parents	-0.242	(0.065)**	0.177	(0.124)
High school graduates	0.231	(0.059)**	0.086	(0.113)
College graduates	-0.163	(0.055)**	-0.300	(0.104)**
Free-reduced lunch (FRL)	0.001	(0.002)	-0.001	(0.004)
Special education	-0.006	(0.003)	-0.069	(0.006)**
Economic				
Residential assessed valuation per pupil	-0.079	(0.018)**	-0.236	(0.034)**
Commercial assessed valuation per pupil	0.014	(0.009)	-0.112	(0.017)**
Agricultural assessed valuation per pupil	-0.021	(0.010)*	-0.017	(0.019)
Median household income	0.282	(0.059)**	0.121	(0.112)
Other				
Enrollment	-0.181	(0.022)**	-0.038	(0.043)
Over 65	-0.215	(0.099)*	0.592	(0.188)**
Year indicators		Yes		Yes
Year below \$2.75		Yes		Yes
Constant	-1.243	(0.601)*	-1.782	(1.150)
R-squared	0.55		0.11	

Note. * p< .05 ** p< .01.

¹ One year lag

Table 9

*Fixed Effects Regression Analysis for Community, Family and Economic Variables
Predicting District Operating Tax Levies and State Aid from 1998-2003, in logarithms*

Variable	Tax Levy ¹		State Aid	
	N=513		N=513	
	B	SE	B	SE
Community/Family				
Minority	-0.415	(0.170)*	-1.827	(0.857)*
Single parents	-0.165	(0.059)**	0.766	(0.297)*
High school graduates	-0.100	(0.060)	-0.020	(0.300)
College graduates	-0.037	(0.050)	-0.534	(0.250)*
Free-reduced lunch (FRL)	-0.003	(0.001)*	-0.003	(0.007)
Special education	-0.004	(0.002)*	-0.075	(0.008)**
English language learners (ELL)	0.004	(0.002)**	0.003	(0.008)
Economic				
Residential assessed valuation per pupil	-0.037	(0.018)*	-0.193	(0.089)*
Commercial assessed valuation per pupil	-0.037	(0.008)**	-0.148	(0.038)**
Agricultural assessed valuation per pupil	-0.008	(0.008)	-0.001	(0.040)
Median household income	-0.017	(0.049)	0.193	(0.248)
Other				
Enrollment	-0.148	(0.024)**	0.023	(0.121)
Over 65	-0.226	(0.057)**	0.148	(0.288)
Year indicators				
Year below \$2.75		Yes		Yes
Constant	2.234	(0.526)**	-2.716	(2.645)
R-squared	0.28		0.09	

Note. * p < .05 ** p < .01.

¹ One year lag

Table 10

Fixed Effects Regression Analysis Time Effect Predicting District Operating Tax Levies and State Aid from 1990-2003, in logarithms

Variable	Tax Levy N=513		State Aid N=513	
	B	SE	B	SE
1993	0.071	(0.014)**	0.010	(0.028)
1994	0.061	(0.015)**	0.052	(0.029)
1995	0.031	(0.016)	0.076	(0.031)*
1996	0.030	(0.018)	0.156	(0.034)**
1997	0.006	(0.020)	0.218	(0.039)**
1998	0.026	(0.022)	0.241	(0.043)**
1999	0.024	(0.023)	0.210	(0.045)**
2000	0.068	(0.028)*	0.228	(0.053)**
2001	0.086	(0.028)**	0.230	(0.054)**
2002	0.103	(0.029)**	0.246	(0.055)**
2003	0.105	(0.030)**	0.198	(0.058)**
Constant	-1.250	(0.601)*	-1.780	(1.149)
R-squared	0.55		0.11	

Note. * p< .05 ** p< .01.

CHAPTER 5

Discussion

This study examined the effects of community and family risk on local school district taxation choices. Although the time period studied included a state incentive for a school district operating levy at a minimum of \$2.75, with state aid provided as if a school district had wealth in the 95th percentile, several community and family risk factors did affect taxation levels, and not state aid, so that taxation choices were not always about the state incentive, but about particular local values.

In short, providing equity for these communities and families is not just a philosophical or legal obligation outside of the structure of school finance. Instead, the community and family factors that affect student learning also are integral sectors that operate within, not outside of, the same system that attempts to equalize opportunity. These communities and families are not just recipients of state dollars, but decision-makers and stakeholders in local taxation decisions as well, and this dynamic affects the ability of a state's school finance system to achieve equity and adequacy of educational opportunity.

This chapter discusses several main points, the first being that the risk factors that affect educational opportunity have an effect on taxation, both before and after a state incentive for taxation. The implications for policy and research are included in the discussion. Secondary issues include this study's implications on the budget

maximization versus median voter theories, tax and expenditures limitations and property wealth types, with interwoven policy and research discussion. A precursor to this discussion is required to understand the impact each research question had on this study's findings.

Interpreting the Research Questions

This section discusses how this set of research questions showed that Missouri school districts responded to the state's minimum incentive levy, and that the community and family risk factors also affect local taxation choices, even in the presence of the incentive. The usefulness of employing various statistical methods is evident.

The first research question showed 1992 and 2003 snapshots of a community's school taxation choices related to community and family risk factors and economic factors. The second question showed these same factors and choices but over time, from 1992 to 2003. The final question intended to compare community, family and economic variables for districts that did not respond to the \$2.75 incentive. But the final question's initial analysis showed that all districts responded, even those that remained under \$2.75 because they had sufficient local wealth. By 1997, the year of the full phase-in of the 1993 formula, 95 percent of school districts were at or above \$2.75; the remaining districts had sufficient local wealth to remain under this level. Four important implications came out of that limited analysis that affected interpretation of all the questions.

First, for the purposes of this study, knowing that every district did respond to state policy makes the 1992 results far more important; it is the only analysis in this study that shows local choices relative to family and community risk factors in the absence of a

state incentive. Both the 2003 results and over time (1992-2003) results also unearthed the community and family effects on local tax choices, however the conclusions drawn from those must be tempered knowing that all districts were clearly responding to the state incentive to set a minimum local levy.

This finding also speaks to the issues in studying budget maximizing versus median voter theory in school finance, as discussed in Chapter 2 with studies from Chandler, Rolle and Fischel.

Second, the results suggest future research. The next step to understanding differences in family and community risk factors and their effects on local taxation would be to study relative change in local taxation in the absence of a state incentive; in Missouri's case, prior to 1993. Also, question 3 should be reworked; instead of comparing responders versus non-responders based on 1993, it could compare relative taxation to community and family effects after 2001, when the state had revenue shortfalls and began withholding funds. Knowing what types of communities responded to the state shortfalls with increased taxes would be informative, answering a new question: What types of districts value education to the point of additional taxation in a critical environment?

Finally, policymakers now have a basic piece of research showing that districts do respond to state incentives. In Missouri's case, they can be assured that even in the presence of risk factors that affect both a child's educational opportunity and local taxation, communities will respond to state monetary incentives. But the question of how much local revenue the higher risk communities should or should not provide to meet the

state's obligation of equitable and adequate education is not so easily answered or understood, and in truth cannot be obtained in this study.

Idiosyncratic Effects of Community and Family Factors on School Taxation

The crux of this study was to understand how the community and family risk factors in the Land and Legters typology that affect a student's education might also affect local taxation choices, which could affect the ability of the state to provide equal and adequate education. The 1992 analysis is useful to understand how communities value education without an incentive for taxation. The 2003 analysis and fixed effects analysis from 1992 to 2003 show the risk factor effects even when an incentive is in place.

The poverty, minority and single parent factors have an effect on local school taxation outside of the incentive environment. Districts with higher numbers of poverty students and single parent families had lower tax levies. Districts in communities with higher numbers of minority families had higher taxes. Within the incentive environment, single parents and educational attainment affected tax levies over time, while in 2003, minority and ELL had a very small positive effect, and poverty had a much smaller but still negative effect on tax levies.

Despite contentions in the school finance literature that risk factors are closely related, leading to either exclusion of some variables from a model or the inclusion of a combination factors such as urbancity (Vesley and Crampton, 2004; Baker, 2005), this study shows that in Missouri, risk factors have distinctly different effects on taxation. Differences exist between poverty, minority, single parents and locale.

First, there is a difference between poverty and minority status, particularly with regard to their effects on taxation. The long term analysis showed that within a given district, changes in the community's minority counts and FRL student counts made no difference on that district's tax levy, although increasing minorities equaled far less state aid percentages.

Further, the correlations that show strong positive links between single parents and minorities do not account for the distinct and contrary differences in the effects of these distinct populations on local school taxation choices. In 1992, single parents had a negative effect on tax levies, while minorities had a positive effect. The long-term fixed effects analysis showed no effect of minorities on taxation but a large negative effect on state aid, while single parents had a negative effect on levies but none on state aid.

Not only have minority and poverty effects been linked, but single parents and poverty have been linked as well. This study's correlations showed that while communities with higher percentages of single parents tend not to be rural, there are still many single parents families throughout Missouri regardless of locale. The single parent effects on taxation were not confined to urban areas, and had a different effect from minority populations on tax levies.

Using correlations, locale shows that risk factors are spread throughout Missouri and are not necessarily isolated to one locale. Correlations show that rural school districts have fewer minority students, with fewer single parent households, less educational attainment, higher percentages of free-reduced lunch students, fewer ELL students and nearly the same special education percentages. The urbanicity factor put forth by Vesely and Crampton (2005) and urged to study by Baker (2005) is a combination of urban

locale and minority communities. It would not properly capture the compound risk of the poor living in rural locales in Missouri in policy or research. Either urbanicity should be excluded entirely, or other compound factors ought to be constructed considering minority, poverty, single parents, ELL, special education, locale, and perhaps parental/community educational attainment, if further research shows a clear effect on student achievement and/or the finance system.

The educational attainment finding provided conflicting conclusions. There was no effect shown in either 1992 or 2003, but there was an effect over time within a district. As communities had more high school graduates, their tax levies were higher. Although this could show that those that value finishing even a basic education support local school taxation, the result of the increasing numbers of college graduates in a district shows a negative effect on tax levies. Given that higher educational attainment leads to increased incomes, this may make sense, as college graduates are presumably clustered in high wealth districts that need lower taxation levels to fund schools. It would then follow that college graduates and the median income factors would have similar negative relationships; the higher educational attainment and median income, the lower the taxes since that leads to higher local property wealth. But median income's relationship to tax levy is positive; the higher a community's median income, the higher the tax levies over time, although the 2003 finding even contradicts this, with a small but negative effect on state aid. In short, more research is needed to truly understand the effect of community educational attainment on local school taxation in Missouri; this could include a different construction of the variable itself.

This study shows that the family and community risk factors that negatively impact student achievement also affect local school taxation both inside and outside of a state tax incentive. The state sets such an incentive to help achieve their constitutional responsibilities of providing equitable and adequate educational opportunities. Since the financial measures of equity and adequacy are often studied by per pupil expenditures, this study could be expanded to study risk relative to changes in per pupil expenditures. But there are sufficient results here that indicate that the beneficiaries of state aid policy and funding also contribute to the policy's implementation in more complex ways than state policy considers. This is problematic because equalizing opportunity no longer focuses on wealth, but on student needs, and local taxation effort is assumed. The assignment of minimum tax levies or any local effort may need to become more complicated by considering family and community risk not just in the context of state aid calculations, but also in the local effort required to equalize educational opportunity.

Implications for Practice and Research

Knowing state-induced incentives are effective means for increasing local (but perhaps not total) education funding, the new policy context may be affected. The new 2005 formula has no incentive for local taxation, instead deducting local effort as if every school district has a levy of \$3.43 after calculating state entitlement aid based on student need counts. High student needs are weighted at above 1.0; that is, FRL, special education and ELL student counts generate more state entitlement aid than non-high needs students. This study shows a number of dynamics that may indicate some weaknesses in this design. The FRL finding in particular speaks to this.

The effects of free and reduced lunch on taxation and state aid provide much information for both past, present and future policy. By 1998, the state had added a poverty component to the formula as part of the desegregation suit settlement; so increases in state aid percentages might have been expected. From 1992-2003, free-reduced lunch had no effect on either local tax levies or state aid. In the shorter fixed effects analysis, FRL showed a very slight effect on tax levies and again no effect on state aid. The formula's FRL entitlement meant to increase funds for poverty students actually had no effect on a district's percentage of state aid; a high poverty district relied on neither statistically higher or lower percentages of state aid in their budgets as compared to low poverty districts. The OLS snapshots give further context; they showed a negative effect of poverty on tax levies and a positive effect on state aid in both 1992 and 2003.

Over time, poverty does not affect tax levies when a state incentive is in place to draw state aid. FRL affects tax levies in given years; in 2003 FRL had a depressive effect on tax levies, but was much less of an effect than 1992. So the 1993 formula, may have managed to strike the proper balance between local effort, this particular local community/family need (FRL), and state aid by using a local tax incentive that drew state aid but allowed that local need to appropriately affect its local taxation level.

The 2005 formula does calculate state aid by student needs. It deducts local effort from that aid amount as if a district has a levy of \$3.43. But without that statutory minimum incentive, local stakeholder values may take an increasing role in taxation choices, as the 1992 analysis showed (minority, locale (rural and mid-city), single parents, enrollment, age over 65, taxation values (Hancock support), and agricultural

assessed valuation). This would not be a concern as long as taxation led to adequate spending to provide equitable and adequate education, and this study did not examine per pupil expenditures that might have informed a conclusion in this regard.

One variable here could show cause for concern in this regard. In particular, the districts that supported the failed 1994 Hancock amendment, that is, those communities that supported spending limitations for state government, in turn had lower taxes when not receiving state aid based on taxation. A community that values low taxation/spending with lower than the \$3.43 deduction may be more likely to accept that large deduction from state aid in the absence of matching funds or a mandated minimum, rather than using the \$3.43 as an inducement to raise local effort. The end result for those districts would be using state money to maintain current spending rather than using the additional state funds intended for students with particular needs (poverty, special education and ELL learners). And understanding that many stakeholders affected local taxation prior to the 1993 state incentive gives just cause for warning that no statutory minimum, or some sort of incentive, may in fact reduce spending. Again, this may not be cause for alarm as long as spending levels provide adequate and equitable education.

However, this study did not definitively show whether increased state aid or local taxation levels were related to school districts' spending behavior. The future taxing behavior of school districts will provide an opportunity to see if school districts do work to maximize their budgets by keeping current tax levies or raising them (budget maximizing theory), or if additional state aid, now intended for high needs students, will lead to lower taxation thus maintaining the same level of services (median voter theory).

Similarly, because this study omitted per pupil expenditures (PPE), it may not be asserted that minority communities lost funding simply because there clearly was a negative effect on state aid and coupled with a loss of influence to increase local levies. Re-running these analyses with PPE as a dependent variable would provide a way to better contextualize how the an incentive levy affects local spending, but especially would lead to more definitive conclusions about how all of the community and family factors that affect local taxation influences equity and adequacy.

Other Issues

This discussion has posited that the 1992 OLS analysis provides a glimpse of community tax choices for local schools in the absence of a state incentive that prompts state aid, while the 2003 OLS and 1998 to 2003 fixed effects regression analyses shed light on the incentive environment. This claim will follow through the discussion of property wealth types and locale.

The 1993 formula had a profound effect on land-owning taxpayers. Fischel (2001) and Ladd and Harris (1995) contended that homeowners are able to tax themselves less in areas with more commercial property, thus sharing the tax burden. But in 1992 in Missouri, this was not the case; neither residential nor commercial property affected local tax levies, and agricultural wealth did. With the state's tax incentive in place, the situation reversed: residential and commercial wealth now negatively affected taxation and agricultural property had no effect. The fixed effects analysis showed that residential property had a large negative effect on local taxes and an even larger negative effect on state aid. The more residential wealth a district had, the less its proportion of state aid. The commercial property had no effect on tax levies over time, and the more commercial

wealth a district had, a district relied on less state aid. This dynamic likely helps taxpayer equity across districts, but this analysis shows that commercial values do not affect local tax levies in this incentive environment, making residential owners less able to rely on expanded local businesses for some share of tax burden. In fact, increasing commercial property values in a district actually leads to less state aid. Missouri homeowners had no chance to share local taxation with commercial property. But commercial property is taxed at 32% of its assessed valuation, while residential property is taxed at 19%. More research regarding actual revenue, rather than taxation and assessed valuation types, would bring more information forward. Until then, policymakers can know that with no local taxation incentive in place, only agricultural wealth affects tax levies; the more wealth, the more local taxation. With an incentive, relative wealth for all three properties leads to lower taxation across all districts. And within a district, with a tax levy present, state minimum incentive levy decreases tax levies as agricultural and residential wealth increases.

Finally, this study might expand to include local school bond issues, which fund school facilities. Missouri is only one of twelve states that funds its school buildings strictly through local funds. This is a large local obligation, and it may affect a communities' operating levy choices as well.

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