



K-12 Public School Finance in Missouri: An Overview

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The level and distribution of spending for public K-12 education remains a contentious matter of policy in many states because of increasing expectations for school performance and widespread school finance litigation. In this paper, the authors examine the policies that have generated school funding in Missouri and the outcomes of these policies in terms of the overall level of school spending and interdistrict spending gaps. Interdistrict inequality in average spending is higher in Missouri than in surrounding states, but the spending gaps are equalizing in the sense that poor children tend to be concentrated in districts with above-average spending. A new school funding formula is grounded on a purported link between spending and student achievement. Since that association is tenuous statistically, challenges are likely to arise as this new scheme is fully implemented.

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The level and structure of public elementary and secondary education funding is a contentious public policy matter in Missouri and many other states.

Although state revenues and spending grew briskly during the latter 1990s, the 2001 recession produced large deficits and sharp declines in tax revenues in most states. Fiscal recovery has been slow, and growing spending demands in the areas of public safety, social services, and education coupled with rapid growth in Medicaid expenses have resulted in considerable fiscal stress for states (Kane, Orszag, and Gunter, 2003). Voters also have been reluctant to raise tax rates. In Missouri, voter discontent led to the passage of a constitutional amendment in 1980 known as the Hancock Amendment, which limits the growth of state revenues to the growth rate of state per capita personal income (Hembree, 2004).

Two generations of school finance litigation have further complicated fiscal matters. Beginning

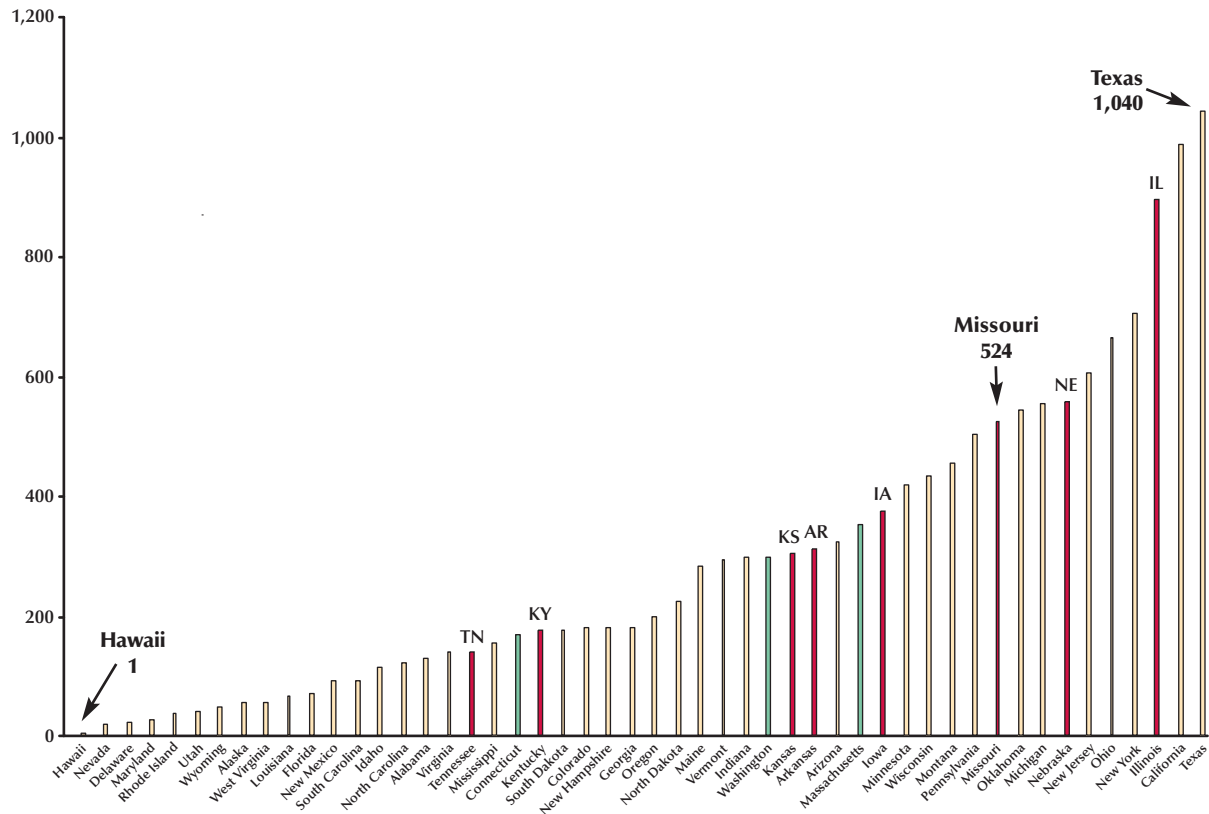
with the 1971 *Serrano v. Priest* decision in California, school finance systems based primarily on local property taxes have been found to violate state constitutions. Interdistrict per-student spending disparities in many states were substantial. In Texas, for example, given identical property tax rates, high-wealth districts were capable of spending over 20 times more per student than low-wealth districts (*Edgewood Independent School District v. Kirby*, 1989). These legal challenges, termed “equity” cases, have been successfully argued in 12 states. Research suggests that they have had the effect of narrowing spending inequality (Murray, Evans, and Schwab, 1998).

Missouri’s school finance system was challenged on equity grounds and found unconstitutional in 1993. The legislature responded by writing into law the School Improvement Act of 1993, which called for an extensive overhaul of the school funding mechanism by means of an increase in elementary and secondary education spending and decoupling of local tax collections from local

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Figure 1
Number of Public School Districts by State, 2001-02



SOURCE: U.S. Department of Education, *Digest of Education Statistics, 2003*, Table 87.

wealth. In theory, districts with identical property tax rates would raise identical revenues. However, the sharp decline in state revenues as a result of the 2001 recession combined with high rates of housing price inflation in some parts of the state made the system unviable.

A second generation of school finance lawsuits, known as “adequacy” or “equity II” (Ladd and Hansen, 1999), emerged following Kentucky’s *Rose v. Council for Better Education* (1989). In these cases, courts have shifted their focus to include examination of what dollars buy, including high-quality teachers, class sizes, textbooks, curriculum materials, facilities, technology, and whether these inputs are adequate to meet constitutional standards for education. An adequacy lawsuit was filed in

2004 in Missouri and once again set the state legislature on course to throw out the old finance system in favor of a very different alternative. A new “adequacy based” finance system, approved in 2005, aims to make available to all students a level of resources sufficient to reach a level of proficiency defined by state standards.

This paper provides a descriptive overview of the Missouri school finance system. The first section provides an overview of the system of school districts in Missouri and some contextual background. The following section gives a rudimentary explanation of the “old” finance regime in Missouri from 1993 to the present, but which is now being phased out. We then examine data on the fiscal outcomes of that system and how Missouri’s per-student

spending compares with neighboring states. We then discuss the new regime, which attempts to determine “adequate” spending levels based on student achievement. Our conclusion briefly summarizes our findings and suggests potential bumps in the school finance road ahead.

INSTITUTIONAL BACKGROUND

Before considering the distributional effects of this regime, it is important to consider some institutional features of the school finance landscape. First, relatively speaking, Missouri has many school districts. Missouri has 522 regular school districts (75 K-8 and 447 K-12).¹ Figure 1 shows that, among the states, there is a wide distribution in the number of school districts in operation, ranging from 1 statewide district in Hawaii to 1,040 in Texas. Missouri is at the high end of the range, and most of the eight states exceeding Missouri have significantly larger populations. In many of our comparisons, we will focus on surrounding Midwestern states. Most of these states, like Missouri, have a large number of school districts, many of which are rural.

Second, Missouri has a highly skewed distribution of students among these districts: Some have very few students and some have many. Table 1 reports the distribution of students by decile of district size, from lowest to highest. The smallest 10 percent of Missouri districts enroll just 0.5 percent of all students. The smallest 20 percent of districts (i.e., 104 of 524) enroll just 1.5 percent of public school students. By contrast, the largest 10 percent enroll over half (57 percent) of the students. In fact, the largest ten school districts enroll just over 25 percent of the students, and the five largest enroll 16 percent. Imagine a parade of school districts marching down the street with each district’s height proportional to its size: one-quarter inch of height per student in the district. The first hundred marchers would average only two and a half feet tall. The next hundred would be about four and a half feet tall and so on, until we reach the last five

¹ Officially, Missouri has 524 school districts. However, for this study we drop two: the St. Louis and Pemiscot County Special School Districts.

Table 1

Enrollment by District Size: 2004-05

Decile by district size	Percentage of students	Cumulative percentage of students
10	0.5	0.5
20	1.0	1.5
30	1.5	3.0
40	2.3	5.3
50	3.1	8.4
60	4.2	12.6
70	5.7	18.3
80	8.9	27.2
90	15.8	43.0
100	57.0	100.0
Largest 5 districts	16.0	—
Largest 10 districts	25.8	—

SOURCE: Missouri Department of Elementary and Secondary Education.

marchers in the parade, who would tower nearly 600 feet into the sky.

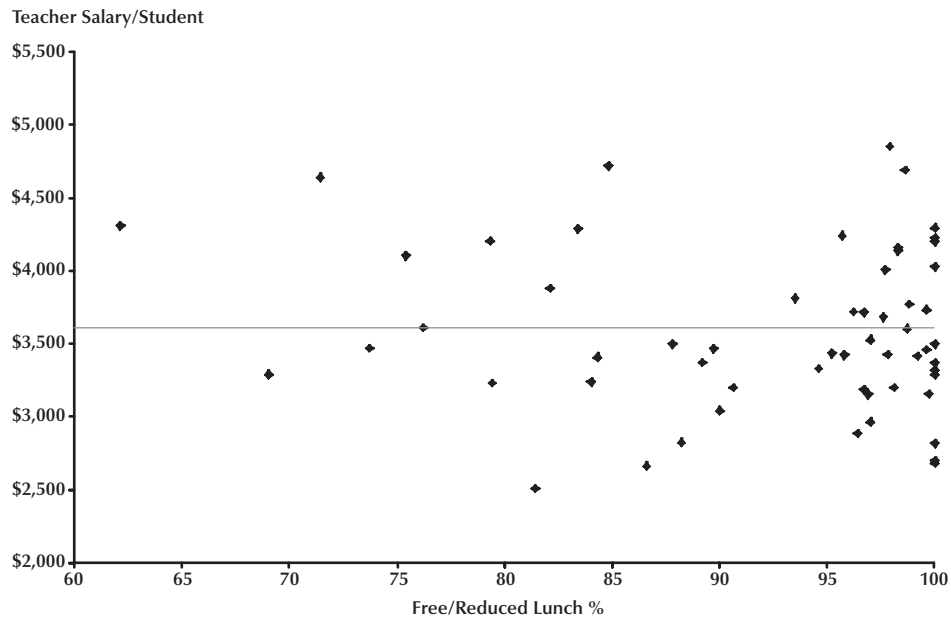
Finally, the analysis in this paper will focus on the distribution of resources among these school districts. However, we should keep in mind that our ultimate concern is the distribution of school resources among children, not school districts. Unfortunately discussions of school finance and equity tend to conflate the two. However, it should be noted that there are likely significant intradistrict inequalities in many school districts—particularly in the larger urban districts.² One source of inequality arises from the use of salary schedules for teachers that set base pay entirely on the basis of years of seniority and graduate credits or degrees. Teacher seniority often varies considerably between schools. For example, because schools with students with higher socioeconomic status are generally considered more desirable places to work by teachers, more senior teachers (who are paid more) tend to transfer to more advantaged schools. On

² Recent research conducted by Roza and Hill (2004) illustrates substantial disparities between school spending in several urban districts.

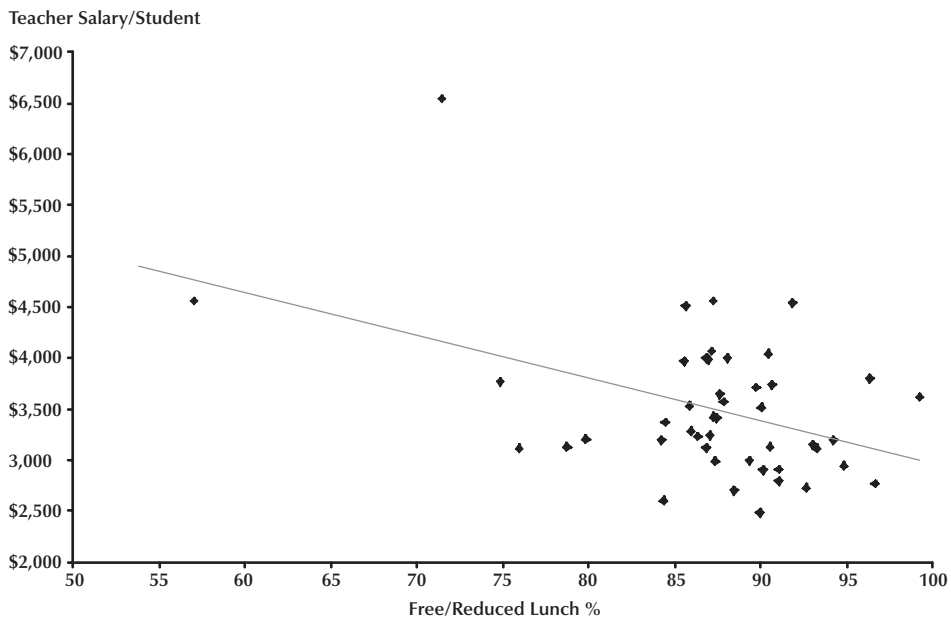
Figure 2

Average Teacher Salary Per Student and Student Poverty Rate in Elementary Schools, 2004-05, in Three Missouri School Districts

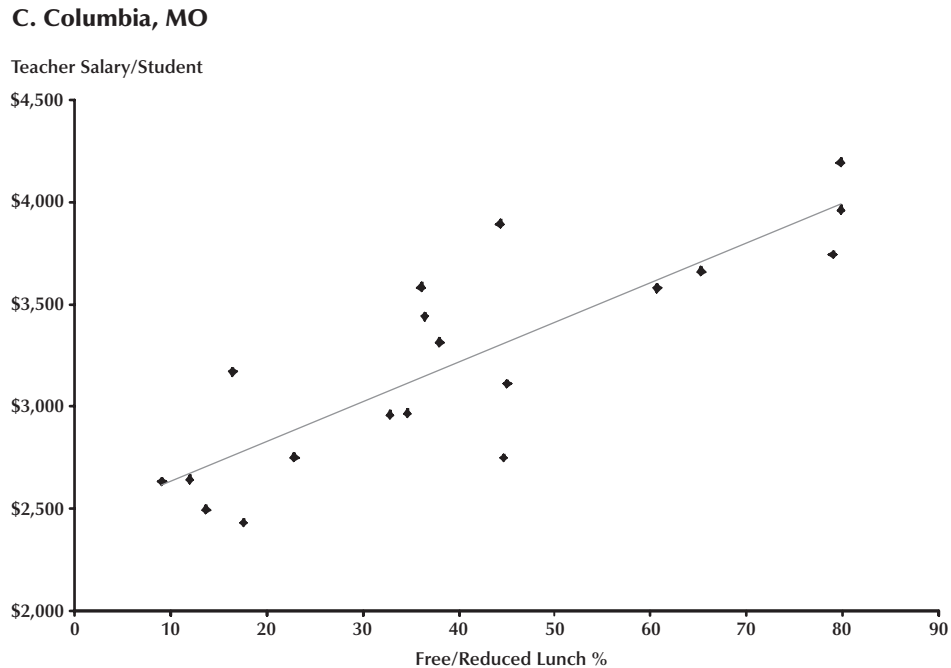
A. St. Louis, MO



B. Kansas City, MO



SOURCE: Missouri Department of Elementary and Secondary Education.

Figure 2, cont'd**Average Teacher Salary Per Student and Student Poverty Rate in Elementary Schools, 2004-05, in Three Missouri School Districts**

SOURCE: Missouri Department of Elementary and Secondary Education.

the other hand, schools with high levels of poverty may receive additional compensatory resources from the district.

Figure 2 presents some illustrative data on this point for three urban districts in the state (St. Louis, Kansas City, and Columbia). We cannot compute total spending per student in the state; however, we can examine the allocation of teacher payroll by school. In Figure 2 we present average teacher payroll per student in regular elementary schools within the three school districts. Variation across schools in this measure would arise from two sources—variation in average pay per teacher and variation in students per teacher. First we note that there is considerable variation between schools in all three districts with nearly all schools roughly falling in a \$2000 band. The three school districts differ significantly in the relationship between spending and school poverty. In the Columbia

public schools the relationship is strongly compensatory. In the Kansas City elementary schools the dispersion is somewhat disequalizing, and in St. Louis it is neutral.³

Unfortunately, aside from teacher and some staff pay, data are lacking on intradistrict patterns of school spending. Thus we will focus on per-student spending at the district level, although it is important to keep these intradistrict issues in mind.

THE OLD REGIME: 1995-2005

From 1995 until the 2005 legislative session, Missouri operated under a formula based on the principle that identical tax effort should yield roughly similar tax revenues. These types of for-

³ The St. Louis and Kansas City data exclude charter elementary schools.

Table 2**Missouri Aid for School Districts, Fiscal Year 2005**

	\$Millions	%
Basic formula	1,808	68.2
At-risk	374	14.1
Transportation	162	6.1
Special education/remedial reading	161	6.1
Vocational education	53	2.0
Career ladder	39	1.5
Early childhood	30	1.1
Gifted	25	0.9
Total	2,652	100.0

SOURCE: Missouri Department of Elementary and Secondary Education.

mulas are sometimes referred to as “power equalization” (Hoxby, 2004). This operational structure emerged after Missouri courts in *Committee for Educational Equality v. State of Missouri* (1993) found the prior system unconstitutional and provided districts with a guaranteed tax base. In principle, districts exerting identical taxing effort in their respective property tax rates would be guaranteed equal resources, with state revenues acting to offset disparities in district wealth. School districts were provided foundation aid roughly as follows:

$$\text{Foundation aid} = (EP \times T \times GTB) - \text{local tax revenues},$$

where EP is the number of eligible students, T is the local school tax rate levy, and GTB is the guaranteed tax base. Senate Bill 180, passed in 1995 in response to school finance litigation, set the guaranteed tax base by the district-assessed valuation of the school district at the 95th percentile of school district wealth. In other words, the formula intended to decouple tax effort from district wealth. A poor school district would be guaranteed as much tax revenue as a rich school district with the same tax rate.⁴

⁴ There was also a supplemental payment to school districts (“at risk”) that provided revenues to school districts based on the number of students eligible for free or reduced price lunches; this program assigns a weight of 1.2 or 1.3 for these students.

Such a formula maintained local control of the setting of property tax rates; however, it also encouraged school districts with below-average levels of district wealth to raise their local tax rates.⁵ A district with half the local wealth per student of the 95th percentile would get one dollar in state aid for every dollar raised locally. A poor district with one-fifth the property wealth would get four dollars for every local dollar. Districts above the 95th percentile of wealth per student would receive no state foundation aid, but none of their local tax revenues would be confiscated either. Unlike some other states, Missouri has no “Robin Hood” provisions for redistribution of local tax revenues (Hoxby and Kuzienko, 2004).

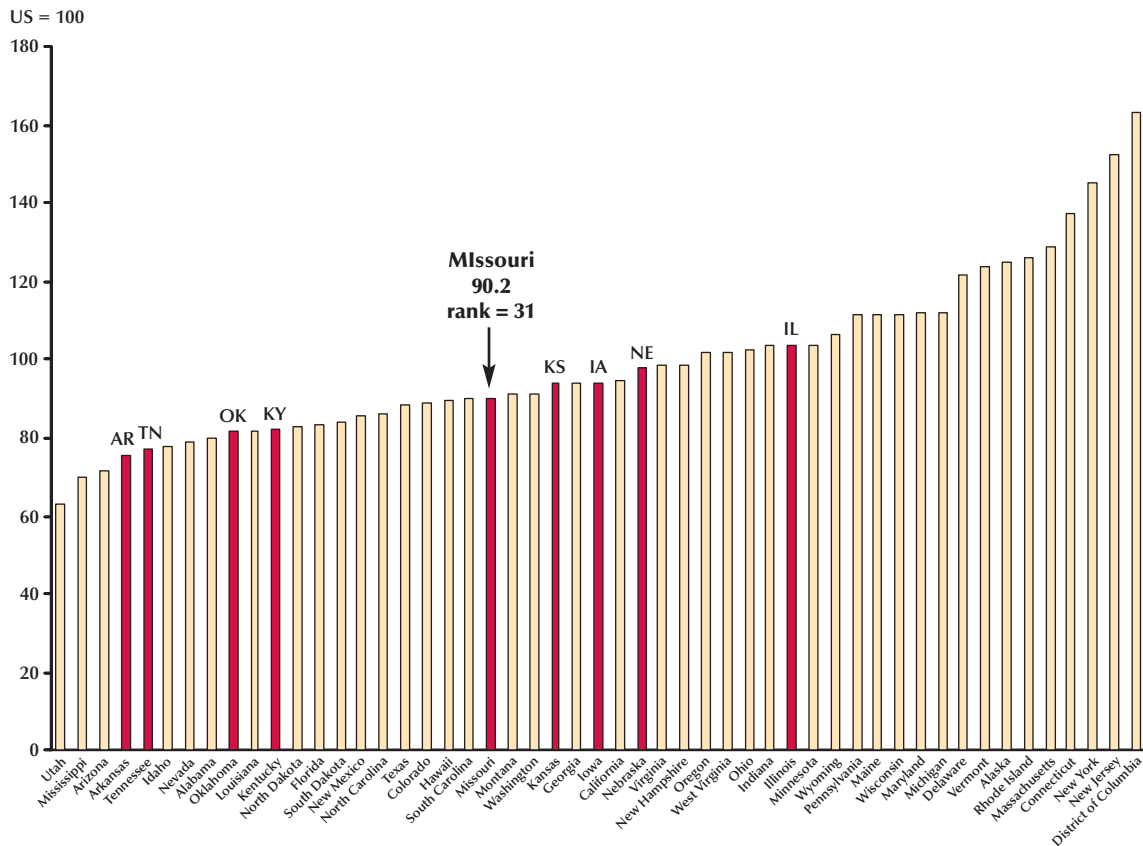
No school finance system ever proves this simple, however. We have omitted a variety of details. The most important omission for our purposes was Senate Bill 180’s “hold harmless” provision. To secure sufficient political support for passage of Senate Bill 180, school districts that were going to lose state aid had their aid frozen at 1992-93 levels. These districts, termed “hold harmless,” were primarily wealthier school districts. Thus, the bill’s equalizing effect was somewhat muted because of the existence, in any year, of 55 or so “hold harmless” districts.

The foundation formula was not the only way in which state aid was allocated to school districts. The state of Missouri also provided “categorical aid”—aid that can be used only for specified purposes—to school districts. The largest categorical aid programs in Missouri included the following:

- transportation
- special education and remedial reading
- career ladder program (i.e., bonus pay for teachers)
- vocational education

Table 2 shows a breakdown of state aid for fiscal

⁵ This formula applied to school districts that set their tax rates at \$2.75 per \$100 of assessed valuation. This was intended to be a floor on the local rates. The small number of districts that set their rates below this rate were not cut off from state aid but were given aid through a less-generous formula. Foundation matching aid was capped at a tax rate of \$3.85. Finally, by statute, residential property is assessed at 19 percent, commercial at 32 percent, and farmland at 12 percent of market value.

Figure 3**Current Expenditure Per Student in Missouri and Other States, 2000-01**

SOURCE: U.S. Department of Education, *Digest of Education Statistics*, 2003.

year 2005. The first two lines are the basic foundation formula. They show that roughly 82 percent of state aid to K-12 education was driven by the local tax formula and that 18 percent was distributed through categorical grants.

Finally, a substantial share of statewide aid is hidden in “local spending.” In 1982, voters passed a statewide sales tax of 1 percent (Proposition C), the proceeds of which were earmarked for elementary and secondary education. However, these revenues were provided directly to school districts on a per-student basis and counted as local rather than state revenue. In theory, half of Proposition C revenues were to be used to reduce property tax payments. However, districts could waive some

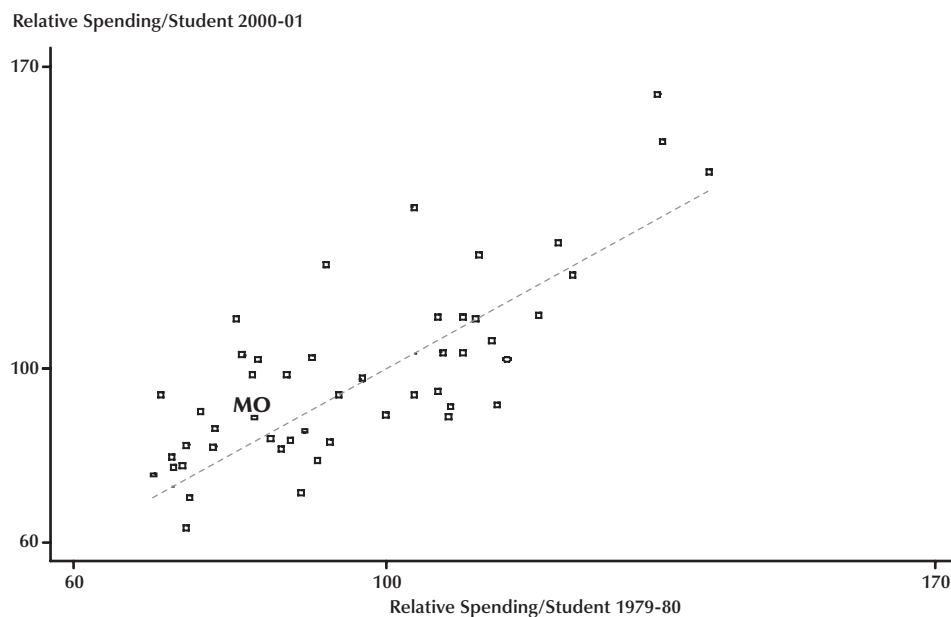
or all of this “rollback” by a majority vote and 471 school districts chose to do that. In fiscal year 2005, the revenues from Proposition C allocated to schools amounted to approximately \$700 million, or roughly 25 percent of formal state revenues provided to schools.

PER-STUDENT EXPENDITURES IN MISSOURI AND OTHER STATES

We begin by examining overall funding for K-12 public education in Missouri. How does Missouri spending compare to the national average? Unfortunately, there is a rather long lag in reporting of state education spending by the National Center

Figure 4

State Relative Spending Per Student, 1979-80 and 2000-01 (U.S. = 100.0)



SOURCE: U.S. Department of Education, *Digest of Education Statistics*, 2003. Alaska is not plotted.

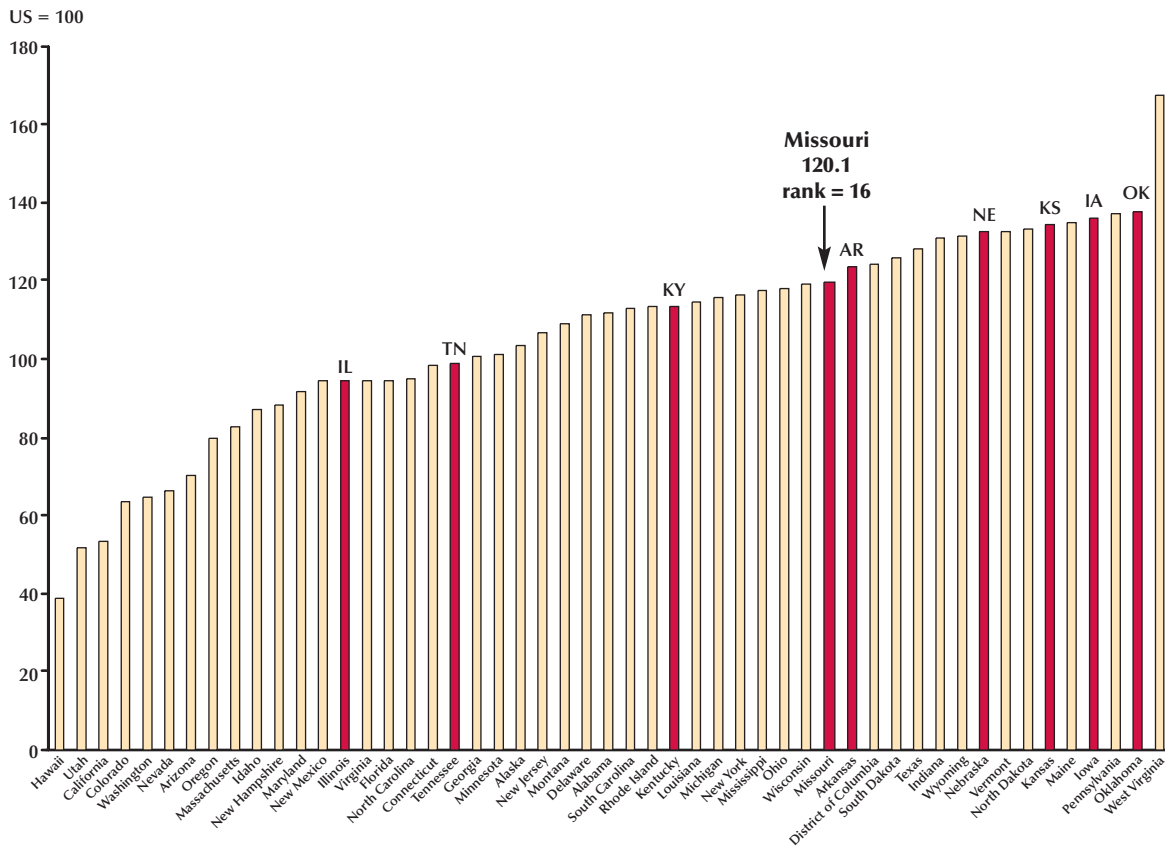
for Education Statistics, the data-gathering arm of the U.S. Department of Education. The most recent data available are for the 2000-01 school year (National Center for Education Statistics, 2002). In that year, Missouri ranked 30th of 50 states plus the District of Columbia. Missouri spending per student was 90.2 percent of the U.S. average (Figure 3). That percentage has been fairly stable over time. Figure 4 reports state spending as a percentage of the U.S. average by state for two school years: 1979-80 and 2000-01. We have included a 45-degree line in the chart. States above the line have moved up relative to the U.S. average over that period, and states below the line have moved down. Missouri is slightly above the line; however, Missouri's spending in both years was close to 90 percent of the national average.

At first glance, these figures suggest that Missouri underfunds elementary and secondary education, at least compared with the national average. However, it is well-known that living costs vary from state to state. Although it is true that

spending per student is lower in Missouri than, say, California, so too are many other costs, such as housing and gasoline. Unfortunately, federal statistical agencies do not compute a cross-section cost of living index because the practical and conceptual problems with constructing such an index are daunting. The national cost of living index (consumer price index, CPI) is designed to measure changes in prices over time (i.e., inflation). Each month, the Bureau of Labor Statistics prices out the change in the cost of purchasing a fixed bundle of goods and services on a typical urban wage by a clerical worker's family. If the CPI rises by 0.2 percent, we conclude that it would take 0.2 percent more money to buy the same bundle of goods. Thus, to compensate a typical family for inflation would require 0.2 percent more income. As long as a family's consumption spending patterns do not differ too radically from this average bundle, then this index would provide a rough approximation of a pay increase necessary to offset this price increase.

Figure 5

Current Expenditure Per Student Relative to Average Housing Prices in Missouri and Other States, 2000-01



SOURCE: U.S. Department of Education, *Digest of Education Statistics*, 2003.

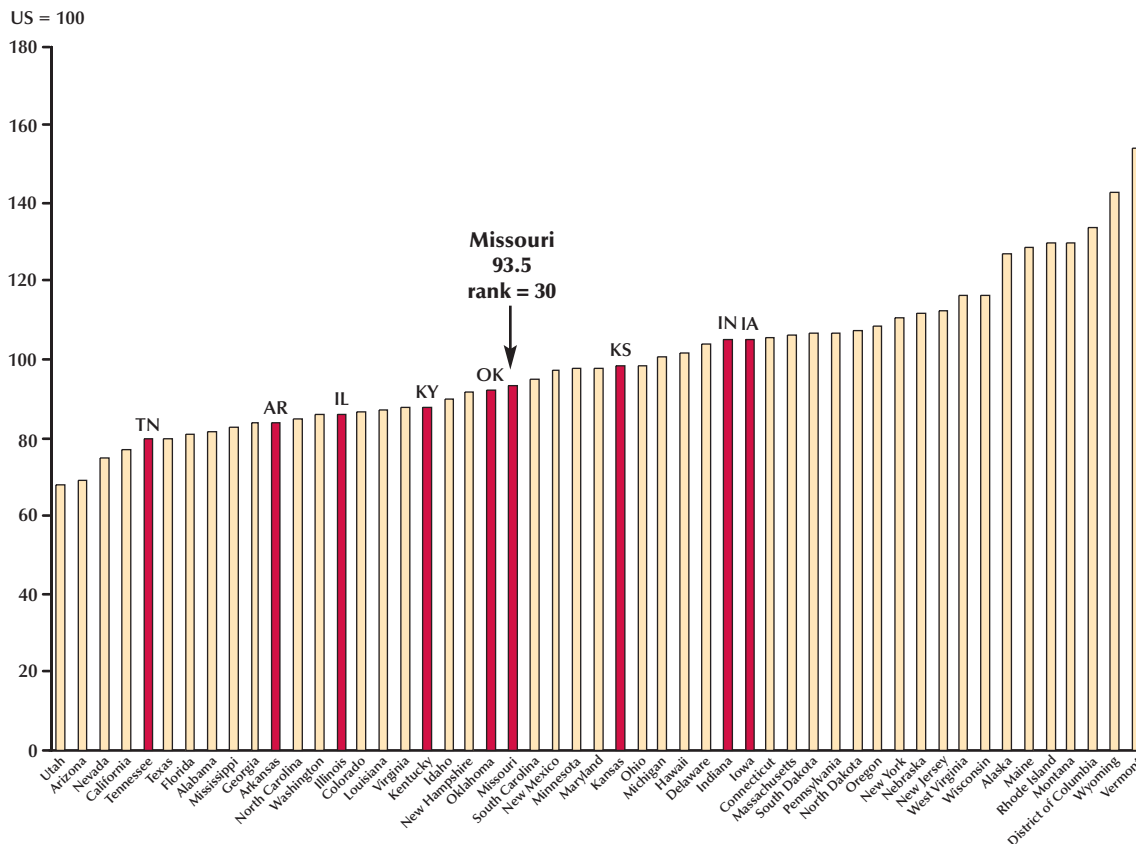
A cross-section index is another matter altogether. It is meant to measure, for example, the differences in costs for a family in Worcester, Massachusetts, to maintain the same standard of living in St. Louis, Missouri. Simply stating the intent illustrates the conceptual problems of measurement. First of all, the bundles of good consumed by an average family may be very different in different locales. Where housing is very expensive, people may live in smaller houses and spend their money on a boat. Winter is much colder on average in Worcester than in St. Louis; hence, a typical Worcester household likely spends more on heating oil. Of course, people who like the ocean and

snow are much more likely to live in Worcester. There is no easy way to account for these individual preferences in a cross-section index.

Figures 5 and 6 provide two illustrative ways to deflate school spending. Figure 5 deflates school spending by a measure of housing values from Census 2000. With this deflator, Missouri's relative spending and rank rise sharply. Compared with the average price of a house, Missouri school spending is 20 percent above the national average, and the state ranks 16th in the nation. However, such an index almost certainly overadjusts Missouri's spending for two reasons. First, the index accounts for less than half of consumer spending, and there

Figure 6

Current Expenditure Per Student Relative to Young College Graduates' Earnings in Missouri and Other States, 2000-01

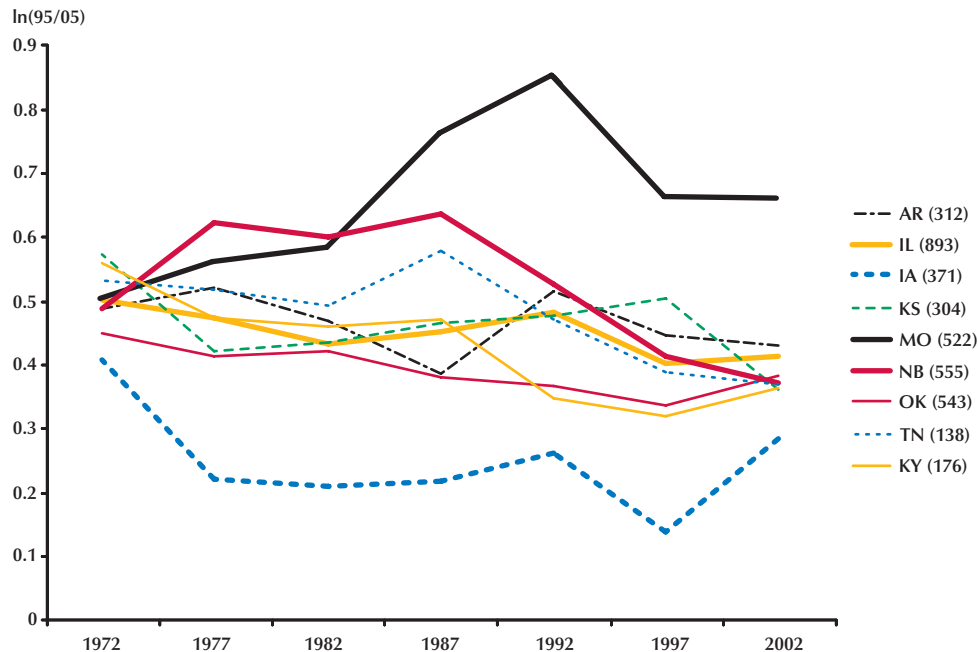


SOURCE: Spending per student: U.S. Department of Education, *Digest of Education Statistics, 2003*; doctor and dentist annual incomes, 2000 Census of Households, 5 percent public use microdata sample (PUMS) computed by author.

is no reason to believe that the prices of other consumer goods and services follow those of housing. Second, housing prices reflect the value of amenities such as sunshine, scenic views, etc. Houses cost more in California than in Iowa because most people prefer California weather and amenities (e.g., beaches and mountains). If a scientific study showed that living next to cornfields doubled life expectancy, then you could be sure that housing prices would skyrocket in Iowa and much of Missouri.

Figure 6 takes a different approach. Here we deflate school spending by an index of the earnings of young people (aged 25 to 35) who have a college

degree or higher. Young people are very mobile geographically. Thus, if real earnings, taking into account living costs and amenities, are higher in California than Idaho, we would expect young people to migrate from the latter to the former. This migration would tend to raise the earnings in Idaho and reduce them in California. The relative pay adjustment would continue until net migration halted, at which point any remaining pay gap would reflect the “value” of living in California relative to Idaho. It is interesting to note that there is only a modest effect on Missouri’s position when we deflate Missouri education spending by college graduate earnings. Indeed, instructional spending

Figure 7**Measured Inequality in Current Spending Per Student in Missouri and Surrounding States, 1972-2002**

NOTE: Inequality measure: $\ln(95\text{th}/5\text{th percentiles})$. Number of regular school districts (2002) are in parentheses in the legend.
SOURCE: U.S. Census Bureau, Elementary and Secondary School System Finance Data Files (F-33).

is 93 percent of the U.S. average, and Missouri's rank rises just one position, from 31st to 30th.

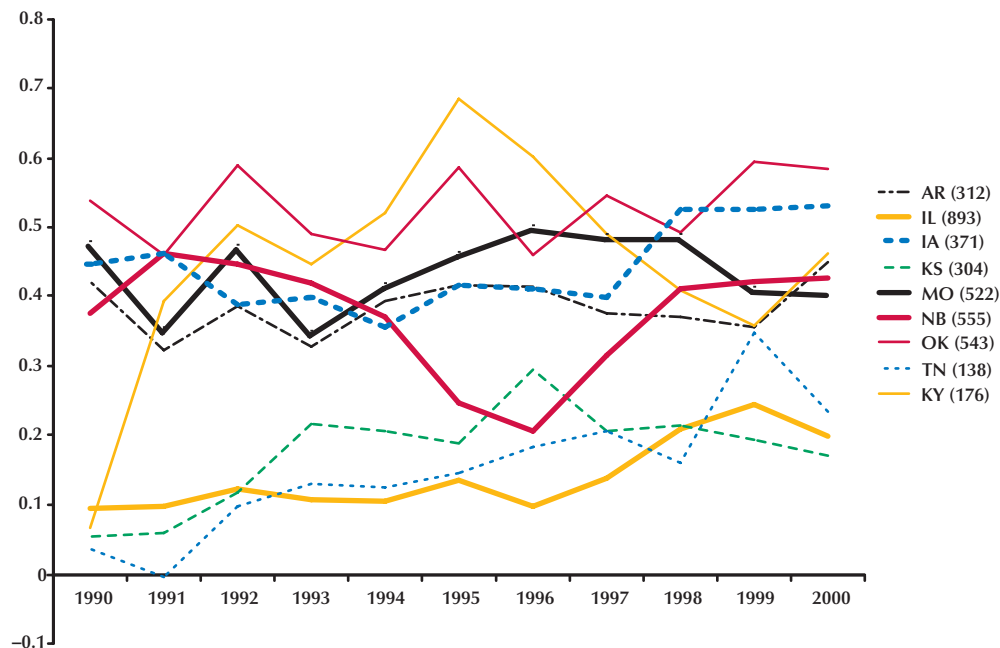
We conclude from this exercise that Missouri's "real" spending for K-12 education may be somewhat closer to the national average than Figure 2 suggests, but it is probably not above the national rate.

VARIATION IN SCHOOL SPENDING BETWEEN DISTRICTS

One concern in school finance is equity or "fairness." However, there are different notions of what constitutes fairness in school spending. Many researchers in the field distinguish "horizontal" and "vertical" equity (e.g., Berne and Stiefel, 1983). If real spending per student were identical for all students in the state, regardless of family back-

ground, location, or need, that would constitute perfect horizontal equity. Vertical equity, on the other hand, takes account of need and seeks to equalize educational opportunity or outcomes given gaps in family incomes. If more spending per student is required to equalize educational opportunity for children from poor families, then the ideal distribution of spending from this point of view would not be equal but compensating.

Horizontal equity is the easiest to measure. The measure we will use is the ratio of the natural logarithm of spending per student at the 95th and 5th percentiles, a measure commonly used in studies of horizontal equity (e.g., Murray, Evans, and Schwab, 1998; Hussar and Sonnenberg, 2000). This measure has two desirable properties. First, with so many small districts in Missouri, the impact of extreme outliers is attenuated. Second, the approach allows us to decompose trends in

Figure 8**Correlation Between Current Spending Per Student and Student Poverty in Missouri and Surrounding States, 1990-2000**

NOTE: Inequality measure: $(\ln(95\text{th}/5\text{th percentiles}))$. Number of regular school districts (2002) are in parentheses in the legend.
SOURCE: National Center for Education Statistics, Longitudinal School District Fiscal-Nonfiscal Data File.

inequality above and below the median of the distribution of spending.⁶

Figure 7 shows inequality trends in resource distribution from 1972-2002 for Missouri and surrounding states. During the 1972-92 period, Missouri clearly diverged from the trend in these states. While there was a general upward drift in inequality in the surrounding states, the increase was much more pronounced in Missouri. The leveling effect of the 1995 School Improvement Act is also visible. Nonetheless, by the end of the period, spending inequality was still significantly higher in Missouri.

Figure 8 presents data on “vertical equity” in school spending in Missouri and its neighbors. Here we plot the correlation between average spending per student and student poverty (i.e., the percent of students eligible for free or reduced-price

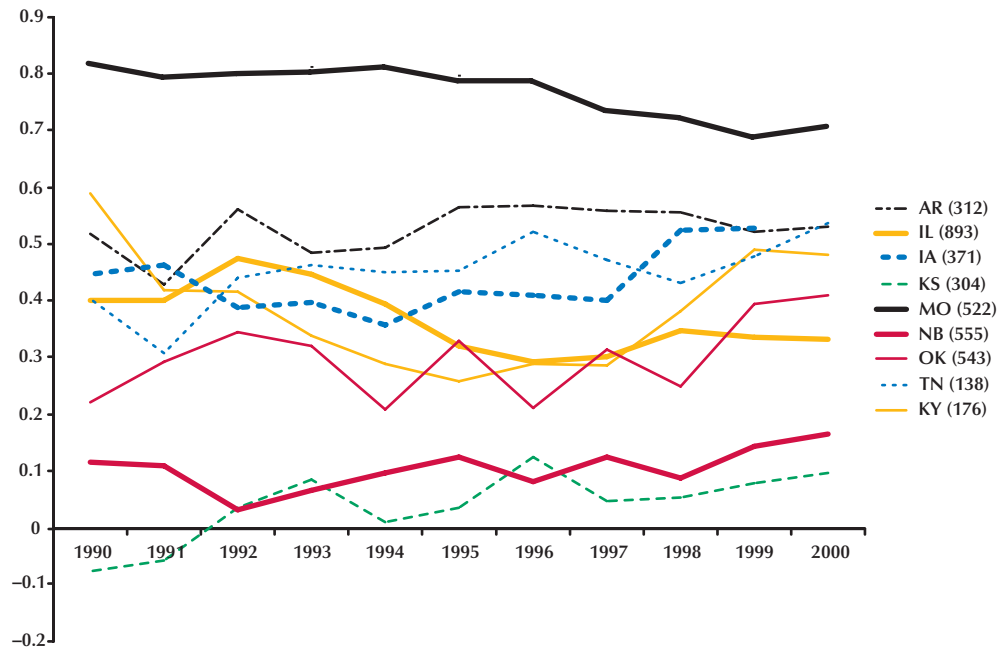
lunches) between 1990 and 2000. (2000 is the most recent year for which free or reduced lunch data are available by district for all these states.) Here the story changes considerably. In all of these states there is a positive correlation between spending and student poverty. In Missouri the average correlation between student poverty and school spending hovers around 0.4. In other words, when districts are weighted by enrollments, on average districts with more students in poverty have higher spending per student. While there was some convergence at the end of the period, over the period as a whole, spending was more equal in Missouri than most of its neighbors as measured by this vertical equity measure.

Figure 9 examines another dimension of vertical equity: racial spending disparities. The large gap between black and white test scores is well-documented. For example, the gap in the Missouri state assessment scores between black and white

⁶ All of our measures of inequality are weighted by student enrollment in the district.

Figure 9

Correlation Between Current Spending, Per-Student Spending and Percent Minority in Missouri and Surrounding States, 1990-2000



students is nearly 1 standard deviation—a very large gap. Thus, one might view as favorable spending inequality that arises from high compensatory spending in districts with more minority students. Figure 9 shows the correlation between the percentage of minority students and school spending in Missouri and adjacent states. There is a strong positive correlation in Missouri—much larger than any of the surrounding states.

Thus, by horizontal equity measures, Missouri interdistrict inequality seems relatively high, at least compared with neighboring states. However, from a vertical equity perspective, Missouri compares favorably, with much of the spending inequality having a compensatory character.

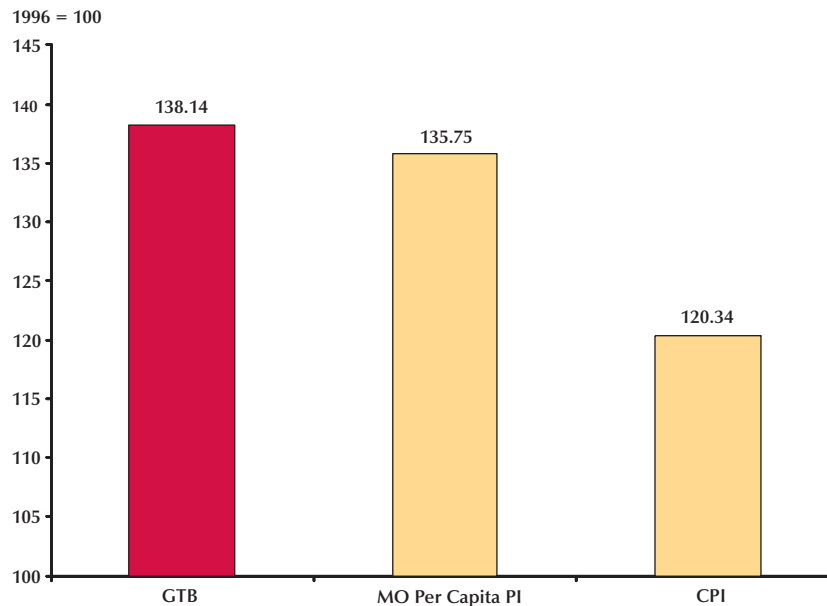
“ADEQUACY” AND THE NEW SYSTEM

The school finance system put in place after the 1993 lawsuit proved difficult to sustain. Fully

funding the formula would tie school spending not to tax revenues or personal income, but to housing price inflation, in particular, housing price inflation in the wealthiest school districts in the state. It turns out that the guaranteed tax base rose somewhat faster than personal income per capita, and considerably faster than the CPI between 1996 and 2004 (Figure 10). Faced with a second-generation adequacy-based legal challenge, the Missouri legislature revamped the school finance system during the 2005 legislative session. The first wave of school finance cases focused on the fact that, because of different levels of property wealth per student, local school districts with identical tax rates could end up with very different levels of educational revenues. However, plaintiffs in the new round of school finance lawsuits claim a different constitutional standard, namely that the overall level of spending in high-poverty school districts is simply not adequate to meet state educational goals. Under the No Child Left Behind Act (NCLB), in theory

Figure 10

Inflation in Guaranteed Tax Base (GTB), Missouri Per Capita Personal Income (PI), and Consumer Price Index (CPI), 1996-2004



NOTE: GTB values from 1996-97 to 2004-05, PI for calendar years, CPI September values.

SOURCE: Missouri Department of Elementary and Secondary Education, U.S. Commerce Department, Bureau of Labor Statistics.

school districts are expected to have all students proficient or better on state assessments by 2014. States, in general, set somewhat less ambitious educational goals, but nonetheless expect school districts with low levels of performance on state assessments to raise proficiency overall and close achievement gaps.

In principle, one might estimate a level of spending that would be the minimum necessary to achieve these educational goals. In Missouri, a study commissioned by the Missouri School Boards' Association by two educational consultants, Augenblick and Myers (2003), attempted to do just that. These authors took two approaches. The first, a "professional judgment" approach, convened a panel of Missouri public school teachers and administrators. These panels were charged with the task of determining a bundle of resources that would enable schools to meet state targets for student achievement. They were also charged with pricing this bundle of inputs. Specifically, the

spending target, based on 2001-02 costs, was the amount of money required for all students to attain a "nearing proficient or higher" score on the MAP tests in communications and math. Like all state assessments, the MAP is criterion-referenced with five performance levels: level 1 (unnamed), advancing, nearing proficient, proficient, and advanced. NCLB requires that all children be "proficient" or "advanced" on their state assessment by 2014 and make adequate yearly progress toward that goal in the interim. Augenblick and Myers (2003) set a lower target of "nearing proficient or higher" for their expert panels. These panels arrived at an estimate of \$7,832 per student to achieve this target.⁷

Augenblick and Myers then took a second, "successful schools" approach to determining

⁷ "Professional judgment" estimates have become very popular. According to *Education Week*, by the end of 2004 professional judgment studies had been undertaken for 15 states (*Education Week*, 2005, pp. 38-39). For a critical assessment of these methods, see Hanushek (2005).

adequacy. Each year the Missouri Department of Elementary and Secondary Education scores every school district in the state on the basis of MAP performance and related academic variables such as the percentage of students taking the ACT. Augenblick and Myers computed the average spending of 102 school districts that had perfect or nearly perfect scores on this report card (\$5,664). This was their second measure of adequacy.⁸ Obviously, these are very different numbers. Augenblick and Myers tried to reconcile the disparity by arguing that, because only 61 percent of students in the successful schools met the “nearing proficient and above” standard and the expert panel target was based on 100 percent proficiency, 61 percent of \$7,832 is close to \$5,664.⁹

Although the state legislature did not adopt Augenblick and Myers’s estimates wholesale, they did adopt the principle of an “adequacy” target based on a “successful schools” perspective. Recall that under the old finance regime what became equalized was revenue for identical tax effort. This formula embodied a concept of fairness that said, in effect, if district X set the same property tax rate as district Y, then both should collect the same tax revenues. By tying state aid to local fiscal effort, poorer school districts leveraged local tax dollars with matching state aid. The “adequacy” concept employs a very different approach, claiming there is a minimum adequate level of spending and that it is the responsibility of the state government to make certain the level of spending per student meets that target regardless of local tax effort. Low-income districts that tax themselves at a high rate will retain those dollars and will not lose equivalent

amounts of state aid. However, those local dollars will no longer be leveraged.

In 2005, the legislature determined that the minimum adequate level of spending was \$6,117 dollars per student. The legislature arrived at this figure by calculating the average operating spending per student for the 113 districts with perfect or nearly perfect scores on the annual performance report (APR) conducted by the Department of Elementary and Secondary Education; these scores are heavily weighted toward performance on the MAP assessment. This figure will be recomputed every two years. In theory, the figure could go down; however Senate Bill 287 specifies that the old level will stay in effect should that occur.

Simplified greatly, the new formula works roughly as follows:

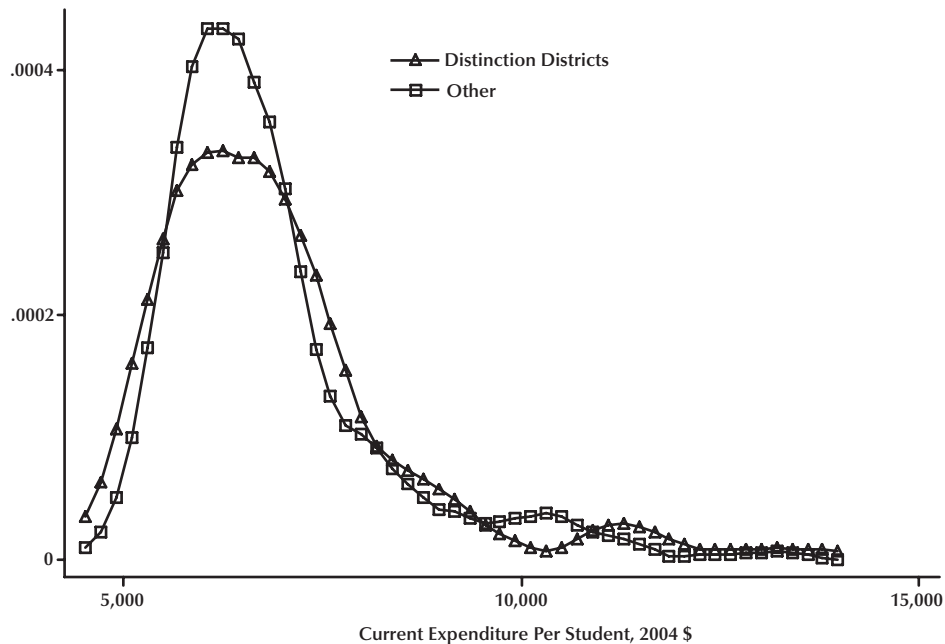
$$\text{Foundation aid} = (\text{weighted ADA} \times \$6,117) - (\$3.43 \times \text{Local Tax Base}).$$

There are no penalties in this formula for local tax effort. Districts keep every dollar of tax revenue raised locally. However, there will no longer be a leverage effect for low-wealth districts. Each district will get a dollar of educational spending for every dollar raised locally. In other words, the “tax price” of additional local spending will be 100 percent (Hoxby, 2001).

Several other changes were made as well. Because the new system was predicated on the concept of an adequate level of resources, a question of cost-of-living arose. As of 2004, nine states used intrastate cost-of-living adjustments in their state aid formula (*Education Week*, 2005). Until now, Missouri had not. Clearly, cost-of-living adjustments will tend to reduce payments to rural districts, while raising payments to urban and suburban districts. The new system phases in a cost-of-living adjustment based on average earnings in the county or the metropolitan area. The new system also adjusts student counts for poverty and limited English proficiency populations if they exceed certain thresholds. Some categorical aid is also now folded into the basic aid. Finally, the new funding mechanism will be phased in over seven years. In the first year, only 15 percent of district aid is determined by the new formula. This figure rises in a stepwise fashion to 100 percent by the 2012-13 school year.

⁸ By construction, many of the “successful schools” will have spending that is less than adequate. In fact, 69 of 102 successful school districts spent less than \$5,664 per student. Note that Augenblick and Myers estimate costs to educate a regular student (i.e., one who is not poor and does not have limited proficiency in English). Poor students and English-language learners are assumed to cost more.

⁹ This argument assumes that there is a proportionate relationship between spending and student achievement, i.e. that if district A spends twice as much as district B, then twice as many students will be nearing proficient or above. They present no evidence in support of this assumption. In fact, actual test data in spring 2002, the test data used by the consultants, cast some doubt on the “professional judgment” estimate. In spring 2002 only 12 K-12 school districts had 100 percent of their students “nearing proficient” or above on the math and communications arts assessments at all grade levels and all 12 of these districts spent less than \$7,832 per student.

Figure 11**Distribution of Current Spending Per Student in “Distinction” and Other Missouri Public School Districts, 2004**

SOURCE: Missouri Department of Elementary and Secondary Education.

Whether or not the new formula passes muster with the courts, the entire concept of determining “adequate” levels of finance with reference to student achievement levels is problematic. We have already seen that the determination of adequacy in the Augenblick and Myers study was at variance with the MAP data used in the same year. More generally, it is very difficult to establish a reliable relationship between any level of spending and student achievement. A basic thesis put forth by “adequacy” proponents is that research can establish a reliable causal relationship between spending and student achievement. On the basis of that relationship, we can then choose a level of student achievement (e.g., all students “nearing proficient or better”) and measure the minimum level of spending necessary to reach that achievement target. The new school finance formula is built on a similar concept. The adequacy target is the average level of spending for school districts that earn perfect

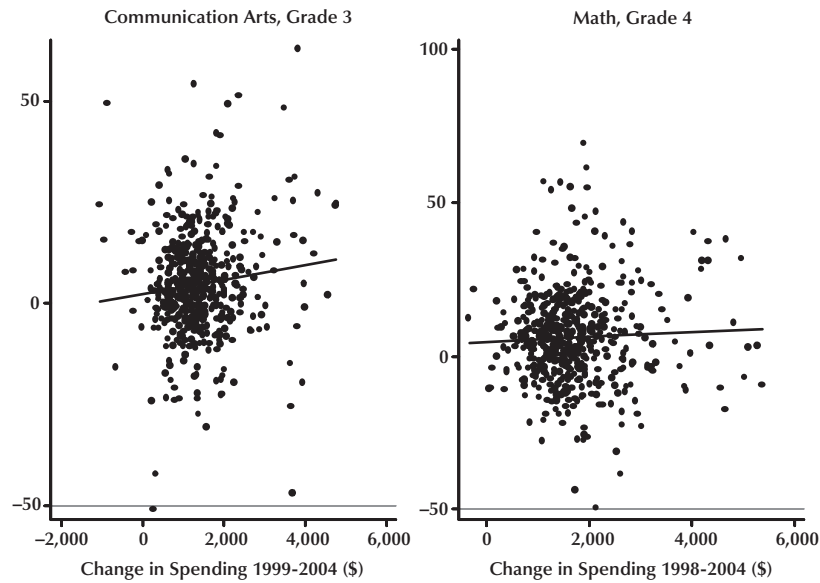
scores on their annual performance report. This target is to be updated every two years. However, average test scores exhibit considerable variation from year to year. Thus, the list of districts with perfect scores is likely to vary from year to year and is surely going to get smaller as the performance bar rises under NCLB.¹⁰

In fact, the research literature cannot reliably identify a causal relationship between spending on any type of resource and student achievement. Surveys of this literature routinely note the difficulties of identifying causal links between school resources and student achievement gains (e.g., Hanushek, 2003). Figures 11 through 14 illustrate the problem with Missouri data. In Figure 11 we plot 2004-05 spending in the 113 “distinction” districts (as designated by the Missouri Department

¹⁰ The Missouri School Improvement Program system for scoring school districts’ annual performance report is due for major revision in 2006.

Figure 12

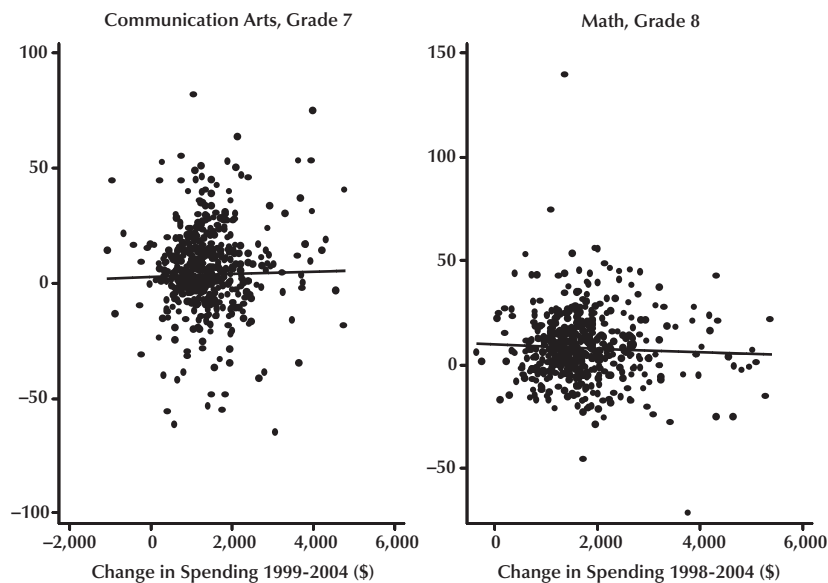
Changes in Elementary School MAP Scores and Spending Per Student: First Mandatory MAP Year to 2004



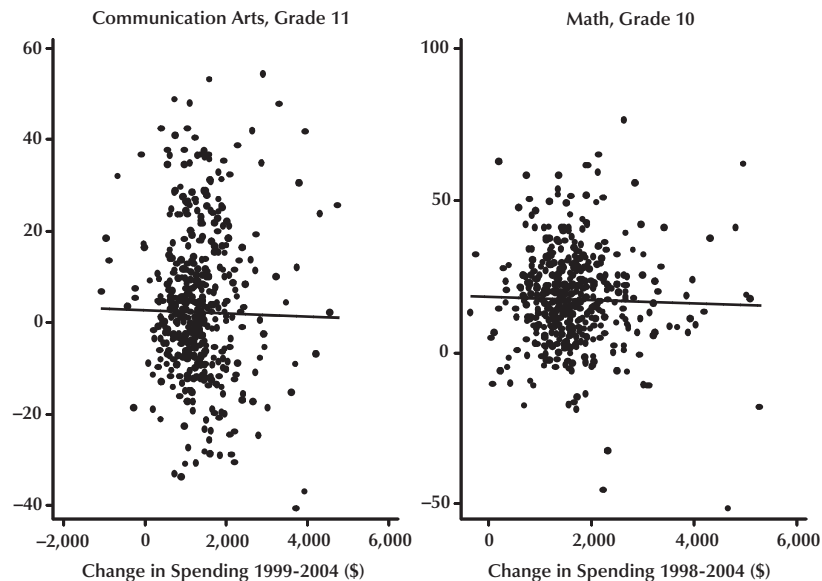
NOTE: All reported District MAP scores with at least 25 valid test scores in beginning and ending year.
 SOURCE: Missouri Department of Elementary and Secondary Education.

Figure 13

Changes in Middle School MAP Scores and Spending Per Student: First Mandatory MAP Year to 2004



NOTE: All reported District MAP scores with at least 25 valid test scores in beginning and ending year.
 SOURCE: Missouri Department of Elementary and Secondary Education.

Figure 14**Changes in High School MAP Scores and Spending Per Student: First Mandatory MAP Year to 2004**

NOTE: All reported District MAP scores with at least 25 valid test scores in beginning and ending year.

SOURCE: Missouri Department of Elementary and Secondary Education.

of Elementary and Secondary Education). Average spending in these districts forms the basis of the “adequate” spending estimate in the new law. We also plot spending per student in the 409 remaining “non-distinction” districts.

If spending per student were an important determinant of school performance, we would expect to see two things. First, the level of spending for distinction districts would be noticeably higher. Second, we would expect a tight distribution of spending around the higher distinguished mean. After all, districts that are more homogeneous in their performance ought to be more homogeneous in their spending, if spending is an important determinant of performance. In fact, we observe neither. Although the mean of the distinction districts is slightly higher, the two distributions overlap almost entirely. In addition, spending among the distinction districts is noticeably more dispersed than among the non-distinction districts.

Figures 12 through 14 give us some indication of how reliably we can predict achievement gains

given changes in expenditure per student. In these charts we plot changes in student achievement on MAP from the first mandatory testing year, 1998 for math and 1999 for communication arts, to spring 2004. We plot these student achievement changes against changes in spending per student. To reduce the statistical “noise” in the changes in test scores, we include only districts with at least 25 students taking the test in both the beginning and ending years. For the most part, the relation between changes in spending and changes in test scores is very erratic and nearly random. Only in third grade communication arts do we find a statistically significant positive relationship. These charts further undermine the proposition that levels or changes in spending can reliably predict school performance.

CONCLUSION

The level and distribution of spending for public K-12 education remains a contentious matter

of policy in many states because of increasing expectations for school performance and widespread litigation. Missouri is no exception. In this paper, we have examined the level and trend of school funding in Missouri over the past decade and a half. The old system was put in place in response to litigation challenging inequality in spending. It aimed to provide a guaranteed tax base for nearly all school districts and thereby equalize revenues for districts exerting the same tax effort. Rapid increases in housing values in high-wealth districts in the state as well as sharp declines in state revenues made that system unworkable. A new system is now being phased in as a response to claims about educational “adequacy” and purported links between spending and student achievement. While the notion of a minimum adequate level of spending for all students may be attractive philosophically, attempts to establish adequacy based on levels of student performance are problematic. There is little basis in education research generally or in Missouri’s experience with the MAP for establishing a level of district spending that can reliably produce a given level of student achievement.

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