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Recommended Citation
Brunner, Eric J. and Sonstelie, Jon, "California's School Finance Reform: An Experiment in Fiscal Federalism" (2006). *Economics Working Papers.* Paper 200609.
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Department of Economics Working Paper Series

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Working Paper 2006-09

April 2006

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This working paper is indexed on RePEc, http://repec.org/

Abstract

The 1971 ruling of the California Supreme Court in the case of Serrano v. Priest initiated a chain of events that abruptly ended local financing of public schools in California. In seven short years, California transformed its school finance system from a decentralized one in which local communities chose how much to spend on their schools to a centralized one in which the state legislature determines the expenditures of every school district. This paper begins by describing California's school finance system before Serrano and the transformation from local to state finance. It then delineates some consequences of that transformation and draws lessons from California's experience with school finance reform.

Journal of Economic Literature Classification: H1, H2, I2

Keywords: School Finance Reform, Centralization, Fiscal Federalism

Though public education is the largest category of local public expenditure, Tiebout (1956) didn't make public schools the primary example in his classic theory of those expenditures. Perhaps inspired by his locale, he chose to exemplify his theory by a community with a 500 yard beach. Whatever the motivation, his choice was a prudent one. It is one thing to argue for the efficiency of partitioning families among communities according to their demand for beach space; it is quite another to advance the same argument for partitioning families according to their demand for something as important as the education of their children.

Oates (1969) was more forthright. In his seminal paper on capitalization, he explicitly defined and estimated the price of public school quality. Families got good schools for their children if they were willing to pay for them. Moreover, in his theory of fiscal federalism, Oates (1972) had a ready answer for those who might object that the willingness to pay for good public schools is determined largely by a family's income. The equitable distribution of income is best addressed at a higher level of government, Oates argued; a public service should be provided by the lowest level of government consistent with economies of scale. Because economies of scale in education are achieved at very low populations (Kenny (1982)), public education ought to be provided by many, small school districts; higher levels of government can deal with the inequities stemming from that system.

Legal theorists didn't see it that way. Looking at the local provision of public education through the lens of *Brown v. Board of Education (1954)*, they saw the wide disparities in spending per pupil across school districts as just another violation of the equal protection clause of the Fourteenth Amendment. This view had its first legal victory in California with the ruling of the state's Supreme Court in *Serrano v. Priest (1971)*. The ruling initiated a chain of events that abruptly ended local financing of public schools in California. In seven short years, California transformed its school finance system from a decentralized one in which local communities chose how much to spend on their schools to a centralized one in which the state legislature determines the expenditures of every school district. The *Serrano* ruling led to similar rulings in other states, although no state reacted quite as radically as California.

It would be an exaggeration to claim that California's transformation was a natural experiment in fiscal federalism. The *Serrano* ruling could have led the state down many different paths, and the path California chose reflected its own complex politics. That qualification notwithstanding, California's story has many lessons for students of fiscal federalism. We begin that story by describing California's school finance system before *Serrano*. We then trace the transformation from local to state finance and delineate some consequences of that transformation. Our account concludes with lessons from California's experience.

1. School Finance in 1970 and the *Serrano* Ruling

California school districts differ considerably in size and grade span. In 1969-70, there were 236 unified districts (kindergarten to grade 12), 723 elementary districts, and 120 high school districts. Sixty-four percent of students were enrolled in unified districts, with an average enrollment of 12,452. One of those districts, Los Angeles Unified, had over 650,000 students, 14 percent of the state's total. No other district was even remotely as large (San Diego was second with 130,000 students), though there were twelve districts with more than 35,000 students. All twelve were unified districts. In contrast, the average enrollment for the elementary districts was only 1,573. High school districts averaged 4,488 students. Though these smaller districts were numerous, it is important to remember that per pupil statistics for California public schools are significantly influenced by a few large districts.

California school districts were larger on average than districts in other states. In California, the average was about 4,200 students; in the rest of the country, the average was less than 2,500. The larger average for California was partly due to the state's program to encourage the unification of elementary and high school districts. In 1935, the state had over 3,000 districts, none of them unified. By 1965, there were less than 1,500 districts, 191 of which were unified. In addition, during the same period in which the number of districts fell by half, the state's population tripled.

Before the *Serrano* decision, California's school finance system was similar to systems in other states. School districts levied their own property tax rates, and the state supplemented that revenue with apportionments from the state school fund. The state apportionments were based on a foundation formula with a minimum, called basic aid. The state imposed a maximum on each district's general purpose tax rate, and that maximum could only be exceeded if approved by a majority of a district's voters. In 1968-69, all but eleven districts had rates in excess of this maximum, making school levy elections a regular occurrence. Districts could also impose of number of special tax rates without voter approval. The revenues from these special rates were earmarked for specific purposes. Property taxes were about 55 percent of the total revenue of school districts.

Assessed value per pupil differed widely across districts. In unified districts, 25 percent of students were enrolled in districts with assessed value per pupil above $13,456, and 25 percent were in districts with assessed value per pupil less than $7,946, a gap of 69 percent. The gap between the top 5 percent and the bottom 5 percent was 343 percent. Similar disparities existed for elementary and high school districts.

The disparities in assessed value per pupil were greater than the disparities in revenue per pupil. The state apportionment formula distributed more state aid to school districts with lower assessed value per pupil, and school districts with low assessed value tended to levy higher tax rates. For students in

unified districts, the gap in revenue per pupil between the top 25 percent and the bottom 25 percent was only 14 percent. However, the gap between the top 5 percent and the bottom 5 percent was 70 percent.

Disparities in both revenue and assessed value caused the *Serrano* complaint. Specifically, the plaintiffs argued that those differences violated the equal protection clause of the Fourteenth Amendment. Under the legal framework that was developed from previous Supreme Court rulings, a state could classify people differently under the law if it had a reasonable rationale for doing so. Under certain circumstances, however, the state faced a higher hurdle in proving that its laws were reasonable. If a law affected a fundamental right, such as voting, and involved a suspect classification of people, such as race, the state's law would be subject to "strict scrutiny." The Warren Court expanded the definition of both fundamental rights and suspect classifications. In *Brown v. Board of Education (1954),* it declared that education was a fundamental right. In *Harper v. Virginia Board of Elections (1966),* it overturned Virginia's poll tax because it declared individual wealth a suspect classification. In *Baker v. Carr (1962),* the Court declared that legislative districts had to have equal populations, making geography, in some respects, a suspect classification. Reviewing those rulings, Wise (1967) argued that the local provision of education must also violate the Fourteenth Amendment. The Court had ruled that education was a fundamental right and that wealth and geography were suspect classifications, so a system in which the quality of local public schools depends on geography and the wealth of families and their neighbors would not pass judicial scrutiny.

Similar theories were being advanced by Harold Horowitz (1966), a law professor at UCLA. Horowitz found a receptive audience in Derrick A. Bell, Jr. Bell had worked with Thurgood Marshall in the NAACP Legal Defense and Education Fund and was head of the Western Center of Law and Poverty, a public interest law firm funded by the federal Office of Economic Opportunity. The two decided to test Horowitz's theories in court, making the *Serrano* suit the product of the "egalitarian revolution" spawned by the Warren Court (Kurland (1963)) and the war on poverty initiated by President Lyndon Johnson. The plaintiffs were a number of school children and their parents, including John Serrano, Jr., a parent. The defendants were a number of state and local government officials, including Ivy Baker Priest, state treasurer.

In their complaint, the *Serrano* lawyers made two specific claims. The two claims seem quite different, but they were connected by the plaintiffs' belief that assessed value per pupil was highly correlated with family income.[1] One claim was that, because assessed value per pupil varied across school districts, taxpayers in districts with low assessed value per pupil had to pay higher tax rates to achieve the same spending per pupil. The other claim was that students from disadvantaged families might require more educational resources than other students to have the same educational opportunities. The assumed correlation between income and assessed valuation implied that the taxpayers in districts

with low assessed value per pupil were also low-income families who needed to spend more on their children's education. To provide the same educational opportunity for their children, low-income families would have to pay higher tax rates than other families. With regard to a fundamental right, education, the state treated individuals differently according to a suspect classification, wealth.

The *Serrano* complaint was filed in Los Angeles Superior Court, but the claims of the plaintiffs were not immediately tested in court. The defendants demurred, the plaintiffs appealed, and the case eventually reached the California Supreme Court. Because of two other events, the *Serrano* lawyers narrowed their argument to the fiscal inequities of the school finance system. The first event was the ruling of a federal court in *McInnis v. Shapiro.* In that case, the plaintiffs claimed a violation of equal protection because the school finance system in Illinois did not provide enough revenue to meet the educational needs of disadvantaged students. The federal court rejected that argument because educational need was too nebulous to adjudicate. *McInnis* was appealed to the U.S. Supreme Court, which affirmed the decision of the lower court. As a consequence, in their appeal to the California Supreme Court, the *Serrano* lawyers downplayed their claim about the additional resource needs of disadvantaged students and focused more on the fiscal inequities arising from variations in assessed value per pupil. The *Serrano* lawyers were aided in this new focus by the second event, the 1970 publication of *Private Wealth and Public Education*, by Coons, Clune, and Sugarman. Coons and his co-authors took a more conservative approach than Horowitz in their legal critique of public school finance. They did not include differing educational needs as an element in their critique, taking revenue per pupil as the measure of educational quality. This measure put a spotlight on the fiscal inequities due to variations in assessed value per pupil.

The California Supreme Court accepted the logic of Coons and co-authors. It ruled that education was a fundamental right and school district wealth was a suspect classification. Differences in revenue per pupil due to differences in assessed value per pupil thus violated equal protection. In declaring district wealth a suspect classification, the court had entered new territory. The defendants argued that the concept of a suspect classification was meant to be applied to individuals, not to government entities. This argument would have required the plaintiffs to show that there was a correlation between the assessed value of a district and the income of families living in that district. The court rejected that argument, however, ruling that discrimination on the basis of district wealth is as invalid as discrimination based on individual wealth. The Supreme Court returned the case to the Superior Court for hearing, but its ground rules determined the outcome. The lower court was not required to examine evidence about the relationship between assessed value and family income or spending per pupil and family income. It could focus instead on variation in assessed value per pupil and whether school districts with lower

assessed value per pupil had to levy higher tax rates to have the same spending per pupil. The answer to both questions was clearly affirmative, and the Superior Court ruled in favor of the plaintiffs.

If the Supreme Court had asked the Superior Court to examine the link between individual wealth and district wealth, the outcome may have been different. That examination would have been difficult at the time because Census data was not aggregated to the school district level. The Census Bureau completed that task in the late 1970s, however, allowing us now to examine the evidence.[2] Our framework for doing so is a simplified version of the median voter model due to Borcherding and Deacon (1972) and Bergstrom and Goodman (1973). A family's demand for school spending is a function of its income and its tax-price for school spending. The tax-price is the increase in the family's property taxes if the school district increases property tax revenue by one dollar per pupil. That tax-price equals the assessed value of the family's home divided by the district's assessed value per pupil. In logarithmic terms, this price is $p=h-v$, where h is the log of the family's assessed value and v is the log of the district's assessed value per pupil. Assume that the assessed value of a family's house is determined by its income, $h = h_0 + \theta y$, where y is the log of the family's income and θ is the income elasticity of housing demand. Assume further that a family's demand function for spending per pupil has constant price and income elasticities, $s = s_0 + \varepsilon p + \eta y$, where s is the log of the demand for spending per pupil, ε is the price elasticity of demand and η is the income elasticity of demand. Combining the previous three equations, the demand for spending per pupil is $s = \beta_0 + \beta_1 v + \beta_2 y$, where $\beta_0 = s_0 + \varepsilon h_0$, $\beta_1 = -\varepsilon$, and $\beta_2 = (\varepsilon\theta + \eta)$. With the assumptions that spending per pupil in a district equals the demand of the median voter and that the median voter has median income, this demand function leads to the regression reported in Table 1.

Table 1

Coefficient Estimates for Median Voter Regressions, 1969-70
Dependent Variable: Log of Spending Per Pupil (Standard Errors in Parentheses)

Coefficient (variable)	Elementary Districts	High School Districts	Unified Districts
β_1 (log of assessed value per pupil)	0.171	0.265	0.267
	(0.013)	(0.025)	(0.015)
β_2 (log of median family income)	0.137	0.002	0.035
	(0.029)	(0.043)	(0.033)
Observations	401	110	228
Adjusted R-squared	0.346	0.508	0.569

The model in Table 1 excludes several important factors. For example, it ignores the fact that renters may face a different tax-price than homeowners (Oates (2005)) and that parents with children in private school may have different demands for public school spending than parents with children in public schools (Sonstelie (1982)). Yet, despite these omissions, the model explains more than 30 percent of the variation in spending per pupil for elementary districts and more than 50 percent for high school and unified districts. Moreover, the estimated coefficients are consistent with expectations. The coefficient β_1 should be positive because it is the negative of the price elasticity of demand. The coefficient is positive and more than ten times its standard error in all three regressions. The coefficient β_2 is a function of the price elasticity of the demand for school spending, ε, the income elasticity of the demand for spending, η, and the income elasticity of housing demand, θ. Specifically, $\beta_2 = (\varepsilon\theta + \eta)$. Because both income elasticities should be positive and the price elasticity negative, β_2 could be positive or negative. In fact, as Table 1 shows, the coefficient is positive for all three types of districts, but not significantly different from zero for high school and unified districts.

The insignificant coefficients on median family income seem to suggest that income had little effect on spending per pupil, at least for high school and unified districts. That is, two districts with the same assessed value per pupil but different levels of median family income had roughly the same spending per pupil. While this is strictly true, the qualification about assessed value is important. Because housing is a normal good, the assessed value per pupil of residential property should rise with family income. If two districts had the same assessed values but different incomes, the lower income district must therefore have had either more non-residential property per pupil or fewer students per

family. Either factor would lower the district's tax price and thus offset the negative effect on demand of its lower income.

The critical relationship between income and assessed value is best illustrated with a simple example. Suppose that all property is residential and all districts have the same number of students per family. Then, assessed value per pupil would be roughly proportional to median family income, the tax-price of education would be approximately the same for all districts, and spending per pupil would primarily be a function of family income. The two variables in our median voter regressions would be nearly collinear, making it difficult to estimate their coefficients. A simple regression of spending per pupil on median family income would work very well, however. Most importantly, in this world, the complaint of the *Serrano* lawyers would have been exactly right. The quality of public schools, as measured by revenue per pupil, would have been determined almost solely by family income.

This example points to the critical role of the correlation between the log of median family income and the log of assessed value per pupil. In the example of the previous paragraph, that correlation is close to unity. Among California school districts in 1969-70, the correlation was far short of unity. For elementary districts, it was 0.12. For unified districts, it was only 0.04, and for high school districts it was actually negative, -0.05.

These low correlations of median family income and assessed value per pupil could be due to two basic factors. The first is variations in students per family. As Fischel (2004) pointed out in his analysis of voting patterns on Proposition 13, districts with many senior citizens had relatively high assessed value per pupil because they had fewer students per family. A second factor is the distribution of non-residential property. While we do not know the value of non-residential property in each school district, assessed values for California's largest school districts seem consistent with an uneven distribution of non-residential property. Among the largest ten school districts, San Juan and Garden Grove, both middle-income suburban districts with little commercial or industrial property, had the lowest assessed value per pupil (less than $7,000 per pupil). On the other hand, Oakland, Long Beach, and San Francisco, central cities with large amounts of industrial and commercial property had assessed values greater than $15,000 per pupil.

Both of these factors, variations in non-residential property and students per family, surely explain some of the variation in assessed value per pupil across districts. The question is whether they can explain the unexpectedly low correlation between median family income and assessed value per pupil. In particular, did the distributions of either variable across districts offset what we presume to be a strongly positive correlation between median family income and the average value of residences? In the case of students per family, the correlation with median family income would have had to have been strongly positive. In fact, the correlation between the logs of those two variables was very small for

unified districts (0.01) and negative for elementary and high school districts (-0.21 and -0.04). The distribution of students per family was not the explanation of the low correlation between median family income and assessed value per pupil.

This finding leaves the distribution of non-residential property as a possible explanation. Evidence in favor of this explanation is the low correlation between median family income and assessed value per family. That is, when total assessed value, residential and non-residential, is normalized by families instead of students, the correlation with median family income is low. For unified districts, the correlation was 0.05, for elementary districts -0.21, and for high school districts -0.04. If total assessed value per family is not correlated with median family income, a negative relationship between non-residential property per family and family income must have offset the almost certainly positive relationship between assessed values of houses and the income of their residents.

Whatever the explanation, because assessed value per pupil was not strongly correlated with median family income in a district, high-income districts faced, on average, higher tax-price for public school spending. The higher tax price partially offset the direct effect of income on demand for public school spending resulting in a weak relationship between spending per pupil and family income. In 1969-70, the correlation of the log of spending per pupil to the log of median family income was 0.26 for elementary districts, 0.07 for unified districts, and -0.05 for high school districts. In the Appendix, the correlation of median family income and spending per pupil is expressed as a function of the correlation of median family income and assessed value per pupil, providing a mathematical representation of the intuition we have presented for this result.

This focus on median income is revealing; and, if California school districts were very homogeneous with respect to family income as the Tiebout model suggests, it would be all there is to say. In fact, however, districts were not homogeneous, and the variation in family income within school districts was also part of the story. To incorporate this variation, we determined the distribution of spending per pupil by income class. We took families in specific income ranges and attached to each the spending per pupil in the school district in which it lived. We then determined the percentage of families in each income class that lived in districts with less than a certain level of spending per pupil. By making these calculations, we trace out the distribution of spending per pupil for each income class. The results are displayed in Table 2.

Table 2

Distribution of Total Revenue per Pupil by Income Class, 1969-70,
Percentage of Families in Income Class with Less Revenue per Pupil in their District*

Elementary Districts

	Revenue per Pupil				
Family Income	$600	$700	$800	$900	$1,000
$0-2,999	7.8%	50.8%	78.7%	91.3%	94.7%
$3,000-5,999	8.0	50.7	79.0	91.1	94.8
$6,000-7,999	6.9	50.4	79.4	91.1	94.5
$8,000-9,999	5.7	50.1	78.4	91.0	94.3
$10,000-11,999	4.9	49.4	77.5	90.8	94.3
$12,000-14,999	4.3	48.6	76.2	90.1	94.0
$15,000-24,999	4.0	45.0	71.7	87.4	92.6
$25,000 & above	4.8	37.7	61.6	79.1	87.8

High School Districts

	Revenue per Pupil				
Family Income	$800	$900	$1000	$1100	$1200
$0-2,999	11.6%	29.8%	70.5%	85.2%	89.6%
$3,000-5,999	11.3	29.2	70.7	85.5	90.9
$6,000-7,999	13.0	30.1	69.7	84.5	89.2
$8,000-9,999	13.8	31.9	69.4	83.6	88.6
$10,000-11,999	13.9	31.3	68.3	82.7	88.1
$12,000-14,999	14.4	30.9	67.5	81.9	87.5
$15,000-24,999	13.6	28.6	63.7	79.8	85.2
$25,000 & above	10.3	22.3	55.4	75.1	79.0

Unified School Districts

	Revenue per Pupil				
Family Income	$700	$800	$900	$1,000	$1,100
$0-2,999	6.9%	34.3%	80.7%	89.8%	91.7%
$3,000-5,999	7.4	36.7	82.2	90.8	92.7
$6,000-7,999	7.9	37.5	82.2	90.8	92.6
$8,000-9,999	9.4	39.7	82.6	91.5	93.1
$10,000-11,999	10.2	40.5	83.0	91.6	93.2
$12,000-14,999	9.9	40.1	83.0	91.5	93.2
$15,000-24,999	9.0	37.0	81.9	90.6	92.5
$25,000 & above	5.4	26.9	77.7	86.8	89.6

*Source: Controller's Annual Report and 1970 Census

The distribution of spending per pupil is quite similar across income classes. For example, for families in unified districts with incomes over $25,000, 77.7 percent lived in districts with revenue per pupil less than $900. In comparison, for families with incomes between $10,000 and $12,000, 83.0 percent lived in districts with revenue per pupil below $900, a very slight difference. Similar

comparisons hold true for other income groups and other types of districts. High income families in elementary districts fare considerably better than other income groups in those districts, but the differences are still quite small.

Part of the explanation for the similarities displayed in Table 2 is the low correlation between median family income and spending per pupil. Even if the distribution of income differed widely across districts, the distribution of spending per pupil by income group would be quite similar if higher income districts did not tend to have significantly different levels of spending. But that is only part of the explanation. The second part is the similarity of the income distribution across communities. To take the extreme case, if the distribution of family income were the same in every district, the distribution of spending per pupil would be the same across income groups, regardless of the distribution of spending per pupil across districts. More generally, if there were more variation of family income within districts than across districts, the distribution of spending per pupil would be similar across income groups. In fact, most of the variation was within districts. For elementary school districts, 90 percent of the variance in family income was due to variance within districts. This portion was even larger for unified and high school districts.

2. Revenue Limits, Proposition 13, and the Transformation from Local to State Finance

Though the facts about spending, assessed value, and income were never thoroughly examined by the courts, they began to come to light as the legislature attempted to fashion a response to the *Serrano* ruling. At first, the legislature focused on equalizing spending per pupil across districts by establishing a system of revenue limits for districts. A district's revenue limit was a cap of the sum of its local property taxes and its state non-categorical aid. Each district's revenue limit was based on its revenue per pupil in 1972-73 and then increased annually from that base with the limits of low-spending districts increasing at a faster rate than the limits of high-spending districts. In addition, to encourage them to reach their limits, the legislature increased state aid to low-spending districts. Over time, this increase in state aid in combination with the convergence in revenue limits would cause revenue per pupil to converge across districts.

The limits on high-spending districts were politically unpopular, particularly because several large, urban districts were high-spending districts. Not only were these districts well represented in the legislature, they also had large percentages of disadvantaged students and could thus argue that they required higher revenue to meet the educational needs of their students. In response to these arguments, the legislature established a categorical program, Education for Disadvantaged Youth, that directed additional state funds to large urban districts. The legislature has continued this pattern to the present, using categorical programs to address special needs and to respond to politically powerful districts. In

fact, the school finance model crafted in response to the first *Serrano* ruling remains in place today. Revenue limits determine the bulk of district revenue, and categorical revenue is added to that base.

The legislature's response to the *Serrano* ruling did not satisfy the Los Angeles Superior Court. The equalization of revenue limits would take too long, and school districts constrained by the limits had a ready escape. They could override their limits with a simple majority vote of their residents. Because almost all California school districts had been regularly passing levy elections before *Serrano*, the override provision eviscerated the revenue limit system.

The Court's rejection of this system caused the legislature to attempt a more ambitious reform. It kept revenue limits and the override provision, but subjected overrides to power equalization. For districts with low assessed value per pupil, the state would supplement their tax revenue from an override so that every school district would receive the same revenue from the same increase in property tax rates. This additional aid would be costly to the state, but it had a surplus at the time, which many legislators were earmarking for a solution to the *Serrano* ruling.

Power equalization was never implemented. Less than a month before it was slated to begin, the voters of California passed Proposition 13, which set a one-percent limit on the property tax rate and gave to the legislature the authority to allocate the revenue from that rate among local governments. The legislature based its allocations on historical patterns; but, because the one-percent rate was less than half of the average rate before Proposition 13, those allocations fell far short of what governments had previously received. To compensate, the state increased aid to local governments, using the surplus it had accumulated. For school districts, state aid was determined by revenue limits. Each district's aid was the difference between its revenue limit and the property tax revenue it was allocated.[3] In other words, each district's revenue limit was the revenue per pupil it received from the property tax and state aid. In that sense, the state now determines each district's revenue.

Fischel (1989, 1996, 2001, 2004) has argued that the *Serrano* ruling caused Proposition 13. Faced with the prospect of losing control of their property tax revenue, homeowners voted to limit it. As evidence of his explanation, Fischel pointed out that voter had earlier rejected ballot initiatives to limit the property tax and to shift the financing of public schools towards the state. Only after the *Serrano* ruling placed the nexus between their taxes and their schools in jeopardy, Fischel argued, did voters change their minds and decide to limit property taxes. In any event, Proposition 13 did provide the legislature with a relatively straightforward response to the *Serrano* ruling. It made the property tax a state tax and ended what remained after *Serrano* of the local finance of public education.

Since Proposition 13, the legislature has gradually equalized revenue limits and thus revenue per pupil. In 1986, the Los Angeles Superior Court found that this equalization had gone far enough to satisfy the *Serrano* ruling. The legislature has continued to equalize revenue, however, by periodically

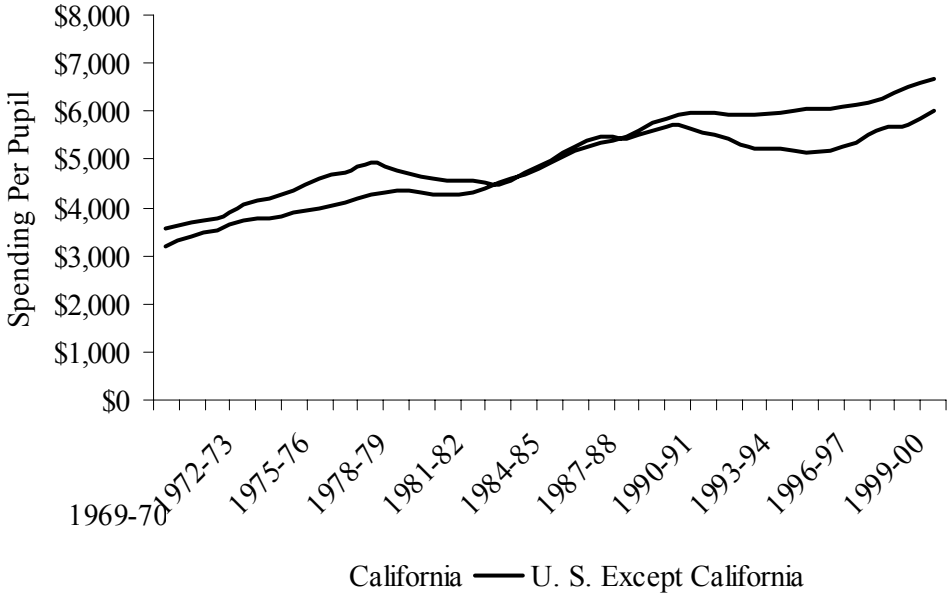
bringing up the revenue limits of districts below the average. By 1999-2000, these differences were quite small. In unified districts, 25 percent of students were enrolled in districts with revenue limit funds greater than $3,901 per pupil, and 25 percent of students were enrolled in districts with revenue limit funds less than $3,806. The gap between the 75th and 25th percentile was only 2 percent. For the 95th and 5th percentile, the gap was 11 percent. In contrast, the equivalent gaps for 1969-70 were 14 percent and 70 percent.

State categorical programs have continued to grow. In 1999-2000, these programs constituted 25 percent of the revenue of unified districts, 22 percent of the revenue of elementary districts, and 18 percent of the revenue of high school districts. The legislature has also allowed districts to levy a tax on parcels of real property. We discuss this tax in more detail below.

State and federal categorical programs widen the disparities in revenue per pupil. In general, however, these disparities favor districts with high proportions of disadvantaged students. For example, for total revenue per pupil in unified districts in 1999-2000, the gap between the 75th and 25th percentile is $962, much higher than the $95 gap in revenue limit funds. A simple regression of revenue per pupil on the percentage of low-income students (measured by eligibility for the free or reduced-price lunch program) reveals that most of that gap can be explained by categorical revenue favoring low-income students. For unified districts in 1999-2000, a low-income student yielded about $1,018 more revenue than other students. For an elementary school district, this increment was $451, and for a high school district, the increment was actually negative, specifically -$301. There are large variations around these averages, however.

Though the finance of public schools has been centralized, the governance of those schools is still a local function. Local voters still elect school boards for their districts, and the school boards hire and fire top management, approve school district budgets, and set district policies. Each school district bargains with its employee unions over salaries, benefits, and working conditions, though the parameters for that bargaining are established by the budget decisions made in Sacramento. A key issue, of course, is the total revenue provided to schools. For collective bargaining, another important issue is the division of that total revenue between unrestricted revenue and categorical revenue. Unrestricted revenue funds salaries; categorical revenue is often protected from collective bargaining. For those reasons, the employee unions are active lobbyists in Sacramento, fighting to increase the flow of unrestricted revenue and thus the pool of money available for salary increases for their members. On the other hand, some categorical programs such as the large K-3 Class Size Reduction program were motivated at least partly by the desire to limit those salary increases. As a consequence, the legislature's decisions about how much district revenue to make unrestricted and how much to tie up in categorical programs are the first round of collective bargaining between districts and their employee unions.

Figure 1
Real Spending Per Pupil



The legislature has not been particularly generous with its public schools. From 1969-70 to 1999-2000, spending per pupil in California fell about 22 percent relative to spending per pupil in all other states (Figure 1). In 1969-70, spending per pupil in California was 12 percent higher than in other states. It was actually 16 percent higher in 1977-78, the year before Proposition 13. This margin fell to 9 percent the next year and continued to decline in subsequent years. California's spending per pupil reached a relative low in 1994-95, 15 percent below the level of other states. It recovered slightly to 10 percent below other states by 1999-2000.

This 10 percent gap understates the gap in resources. In 1999-2000, the teacher-pupil ratio in California was 26 percent lower than the ratio in other states. The gap in resources is larger than the gap in spending per pupil because California teachers were paid about 16 percent more than teachers in other states. The strong teachers' unions in California explain some of the difference in teachers' salaries, but the 16 percent premium is not far out of line with other salary differences. In 1999-2000, employees with bachelor's degrees earned about 14 percent more in California than in the rest of the country (Rose and others (2003)).

Since *Serrano*, courts have overturned school finance systems in several other states. California's relative decline in spending per pupil is not a general trend among these states. Manwaring and Sheffrin (1997) compare public school spending in states with court-order reform to spending in other states.

Using a dynamic model that allows for lagged adjustment to reform and for the effect of reform to depend on a variety of state characteristics, they find that the expenditures of some states are higher than they would have been without reform while expenditures in others are lower. Downes and Shah (1995) use a similar approach and reach a similar conclusion. Murray, Evans, and Schwab (1998) examine this issue at the school district level, revealing the effect of reform not just on average spending per pupil in a state but also on the distribution of spending per pupil across districts. They find that court-order reform tended to level up spending per pupil within a state. It raised expenditures in low-spending districts and had no effect on high-spending districts. Aware of the inconsistency of their results with California's experience, they re-estimated their model without California districts and found that omitting these districts increased the positive effect of reform on expenditures. They attributed California's exceptional response to court-ordered reform to the strict revenue equality demanded by California's courts, though they did not explain why revenue equality necessarily leads to a leveling down.

One possible explanation of California exceptional response is simply that it was first. Before the *Serrano* ruling, state legislatures could not have reasonably anticipated that the courts would overturn their school finance systems. After the *Serrano* ruling, however, many state legislatures began to examine their own liabilities and to reform their school finance systems. As a consequence, it is not quite so clear that the world can be neatly divided into states that reformed their systems after a court order and states that did not. Among both classes are surely some states that reformed their systems in an attempt to thwart a court order to do so.

Another possible explanation of California's exceptional response is that its school finance reform was accompanied by a property tax limitation. As we have noted above, Fischel has argued that *Serrano* caused Proposition 13, an argument that would disqualify property tax limitations as an independent explanation. But several states had tax limitations without court-ordered reform, providing an opportunity to separate the effects of tax limitations from the effects of court-ordered reform. Figlio (1997) demonstrated the promise of that explanation by showing that, after enacting limits, states increased student-teacher ratios and decreased teacher salaries. As further evidence of this negative effect, Figlio and Rueben (2001) showed that states with property tax limits experienced a reduction in the average quality of new public school teachers.

Though these studies do not identify the mechanism through which a property tax limitation affects public school quality, the mechanism seems obvious. The limit reduces property tax revenue, which reduces funds for public schools and thus public school quality. But, lower property tax revenue can be replaced by other taxes or by increased aid to local governments from the state. In fact, California followed exactly this path. Despite the limit on the property tax rate, in 1999-2000 state and local governments in California spent 9 percent more per capita than governments in other states. Thus,

California's relatively low public school spending cannot be explained by a generally low level of public expenditures. In an accounting sense, California's low public school spending is due to two factors. First, it had about 8 percent more pupils per capita than other states. Second, despite the first factor, the state allocated a lower share of public funds to schools than other states. In California in 1999-2000, the expenditures of public schools constituted 22 percent of state and local public expenditures. In the rest of the country, this share was 24.6 percent. California's relative decline in spending per pupil does not reflect a general decline in the public sector but rather a choice about the allocation of a relatively abundant stream of state and local revenue.

Another explanation for California's relative decline in spending per pupil focuses on how school finance reform changed the tax-price of school spending. In response to court orders, other states implemented district power equalization and other financing schemes that alter the tax-price for school district spending, but left districts with some authority over their own property tax rates. California took away from school districts the authority to tax property, which, from the perspective of school districts, made the property tax-price infinite. Hoxby (1999) determined how school finance reforms altered tax-prices for districts and then estimated how spending per pupil in districts responded to those changes in tax-prices. The tax-price in her analysis is the increase in district property tax revenue required to increase spending by one dollar. Before *Serrano* in California, this price was unity; after *Serrano*, it is infinite. Hoxby estimates than an increase in tax-price from unity to infinity decreases spending per pupil by 15 percent, thus explaining most of California's relative decline.[4]

This explanation is misleading, however, because it implicitly assumes that school spending decisions in California are made at the school district level. As we show in what follows, some limited school spending decisions are made at the school district level through parcel tax elections. However, the most important spending decisions are made by the legislature when it decides whether to increase revenue limit funding and categorical programs. At that level, the tax-price of school spending is certainly not infinite. School spending can be increased by increasing income or sales tax rates or by decreasing expenditures in other areas. Of course, legislatures in other states make similar decisions when they decide to increase foundation or equalization aid. What distinguishes California from those other states is the balance between state and local decisions. Almost all the spending decisions that count in California are made by the state legislature. Virtually none are made locally.

Picus (1991) focused directly on this issue, arguing that the indirect link between taxpayers and their local public schools has caused California's relative decline in school spending. Homeowners pay property, sales, and income taxes, which are then blended in Sacramento and returned to their local public schools. Compared to the days before *Serrano* in which they could simply vote to increase their property tax rates, taxpayers and families have no simple way to affect the funds of their local public schools. It is

less clear why this should lead to lower spending on schools, however, because school districts and teachers' unions are very well represented in Sacramento.

Silva and Sonstelie (1995) propose another explanation which is also based on the change in the level of government at which educational spending decisions are made. If the demand for education is determined by family income and families are partitioned among school districts according to their income as the Tiebout model suggests, the statewide average of spending per pupil should approximately equal the average demand, which is then the demand of a family with average income. Under state finance, however, average spending per pupil, which will be the same in every district, should reflect the demands of the median voter, which is the demand of the family with median income. Because average income is greater than median income, the average of spending per pupil under local finance will be greater than spending per pupil under state finance. With this explanation, Silva and Sonstelie can explain about half of California's decline in spending per pupil. The difficulty with this explanation, however, is that school districts in California were not homogeneous with respect to family income. In 1970, there was much more variation of family income within school districts than across districts. Furthermore, non-residential property was inversely correlated with median family income, and thus many school districts with low median income had high spending per pupil.

A related explanation was offered by Fernandez and Rogerson (1999), who incorporate the foundation aid system that California had in 1970. Under that system, low-income school districts find it cheaper to increase their spending by increasing the foundation than by increasing their own taxes. They thus support a relatively high foundation level, which higher-income districts supplement with their own taxes. The result is a higher level of spending than if all districts are required to have the same level of spending, as under state finance. Like Silva and Sonstelie, this explanation depends on the unrealistic assumption that school districts are homogeneous with respect to family income and that all property was residential. In addition, it has the unrealistic implication that many school districts do not supplement state foundation aid. In fact, as related above, all but 11 California school districts in 1970 voted in favor of property tax rates exceeding the statutory maximum, and every California school in 1968-69 supplemented its foundation aid by at least $130 per pupil.

A fourth explanation is directly related to the median voter model in Table 1. In 1969-70, the property tax was the source of marginal funds for school districts. For a homeowner, the tax-price of spending per pupil was its assessed value divided by the assessed value per pupil in its school district. For the state as a whole, non-residential property made up 45 percent of that total (Sonstelie, Brunner, and Ardon (2000)). Thus, on average, homeowners received a 45 percent subsidy for school spending. Proposition 13 put a strict lid on property tax revenue, and so the source of marginal funds for schools

became the income and sales taxes. Both sources tax individuals directly with very small percentages paid by business. Thus, Proposition 13 increased the tax-price of school spending by about 45 percent.

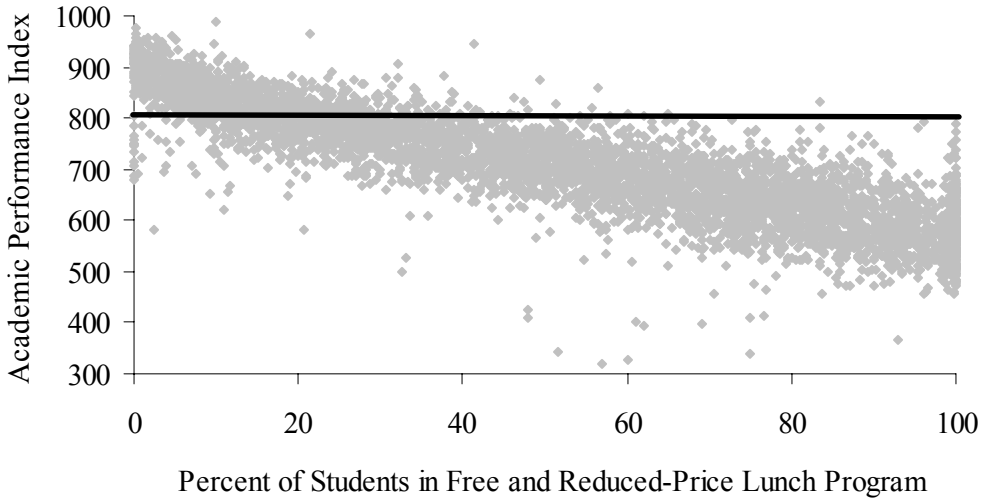
The effect of this price increase is determined by the price elasticity of demand, which is the negative of the coefficient on assessed value per pupil in the simple median voter model in Table 1. That number is probably an underestimate, however. Spending per pupil was positively correlated with state aid, which was negatively correlated with assessed value per pupil. Thus, our estimate of the price elasticity is biased towards zero. Because of the flypaper effect (Hines and Thaler (1995)), state aid may have had a relatively large effect on school district spending, making this bias quite large. In any event, our estimate of the price elasticity is -0.171 for elementary districts, -0.265 for high school districts, and -0.267 for unified districts. Based on that evidence and the likelihood that the price elasticity is lower than our estimates, let us suppose that the price elasticity was -0.25. A 45 percent increase in the tax-price of spending per pupil would then entail an 11 percent reduction in spending per pupil, which would explain about half the relative reduction California experienced.

If this explanation has validity, it only raises another question. Why doesn't California find another tax source to fund its schools, a source with the same subsidies from business? In fact, some school districts appear to be groping towards that solution as they refine their implementation of the parcel tax. These refinements are discussed in Section 3.

If school resources affect student achievement, California's relative decline in resources per pupil should be reflected in a relative decline in student achievement. This appears to have occurred. During the 1990s, California students performed poorly on the National Assessment of Educational Progress (NAEP), a standardized test in writing and mathematics administered to a sample of fourth and eighth graders throughout the country. This poor performance partly reflects the large percentage of immigrant students in the state, but even when corrections are made for family characteristics, California students are well below students in other states. As reported in Carroll and others (2005), for the battery of NAEP tests administered between 1990 and 2003, California students scored 0.18 standard deviations below the national mean after adjusting for family characteristics. California's average adjusted score was the lowest of any state participating in the NAEP.

California students performed considerably better in the period before the transformation from local to state finance. The first piece of evidence comes from the National Longitudinal Study of the High School Class of 1972 (NLS). The study administered a standardized test to a sample of high school seniors in 1972 and also collected information about the characteristics of their families, including race, ethnicity, family income, and parental education. Using that data, Sonstelie, Brunner, and Ardon (2000) regressed test scores on family characteristics and a dummy variable indicating whether the student was a California resident. The coefficient on that dummy variable was not significantly different from zero. A

Figure 2
Elementary Schools, 2001-2003 average



similar regression produced the same result with data from High School and Beyond (HSB). The HSB test was administrated to tenth and twelfth graders in 1980, two years after the transformation from local to state finance. However, the students taking the test would have received most of their education before the transformation.

This apparent decline in average performance would be less troubling if it were accompanied by an equalization of achievement across districts and income groups. There is little evidence of equalization across school districts, however. Downes (1992) examined district averages on a state-mandated achievement test. The distribution of district scores is very similar in 1976-77 and 1985-86. Moreover, in school districts with low spending per pupil in 1976-77, and thus relatively large increases in spending from 1976-77 to 1985-86, student achievement did not rise faster than in other districts.

There is less evidence about the equalization of achievement across income groups. Because of the growing number of categorical programs, school districts with high proportions of low-income students do tend to receive more revenue per pupil. Yet, schools serving primarily low-income students have considerably lower scores on state-mandated achievement tests than do other schools. California now has a battery of achievement tests, which are aggregated into an Academic Performance Index (API) for each school. Figure 2 shows the API for California elementary schools plotted against the percentage of their students eligible for free or reduced-price lunch. This percentage and the API number are averages for the years 2001, 2002, and 2003. As the figure shows, the majority of schools in low-poverty neighborhoods achieved an 800 API, which is the state's goal for each school. However, very few achieved that goal in high-poverty neighborhoods. In fact, among the 752 elementary schools that have

90 percent or more of their students eligible for free or reduced price lunch, none had an average API exceeding 800, and only 18 had an average exceeding 700. In contrast, among the 584 elementary schools with 10 percent or fewer of their students eligible for free or reduced price lunch, all but 36 had an API exceeding 800. We do not have comparable data for the period before California's school finance reform, so we cannot determine whether the data displayed in Figure 2 represents an improvement. If it is indeed an improvement, it must be a modest one.

Three other studies put these California results in national perspective. Downes and Figlio (1997) examined student achievement on the NLS of 1972 and the National Educational Longitudinal Study (NELS) of 1992 and found that states that enacted tax or expenditures limitations experienced a significant drop in student achievement. However, court-ordered reform did not have a significant effect on student achievement, echoing the findings of Figlio (1997) concerning the effect on spending of tax limitations and finance reforms. Limitations have an effect, but reform by itself does not. These results suggest that California's decline in student achievement was due to its particular approach to school finance reform. Husted and Kenny (2000) focus on how different approaches to school finance reform affected student achievement. They measured reform by the extent to which a state has equalized spending per pupil across districts, the one measure by which California's reform ranks near the top. Using SAT scores from 1987 to 1992 as a measure of achievement, they found that average achievement was lower in states than had equalized spending. Furthermore, they also found that equalization had no effect on the disparity in student achievement within a state.

Card and Payne (2002) also investigate SAT scores but use a different measure of school finance reform. For each state, they estimate the relationship across school districts between median family income and spending per pupil. Court-ordered reform tends to flatten that gradient, and states that have flattened their gradients have also narrowed the gap between the SAT scores of students from highly and poorly educated families. The effects are relatively small, however. The estimated reductions are for SAT scores in 1990 through 1992 compared to scores in 1978 through 1980. For the 12 states that implemented a court-ordered reform during this period, the achievement gap was reduced by about 5 percent. California was not one of those states, and we do not know whether the SAT achievement gap in California narrowed in the 1980s.

Table 3

Percentage of School Children Enrolled in Private Schools by Family Income Deciles

	1970		1980		1990		2000	
Income Decile	CA	U.S. Except CA	CA	U.S. Except CA	CA	U.S. Except CA	CA	U.S. Except CA
Lowest	3.8%	4.8%	5.5%	5.4%	4.2%	3.6%	3.6%	4.8%
Second	4.4	6.0	6.7	6.3	3.7	5.1	4.0	5.6
Third	4.8	7.3	7.3	7.9	5.2	6.5	4.5	7.0
Fourth	5.5	10.3	7.7	9.1	6.3	8.2	5.9	7.9
Fifth	8.5	11.8	9.1	10.2	9.1	9.0	7.0	8.9
Sixth	9.2	12.9	10.6	10.8	8.5	9.5	8.6	9.7
Seventh	9.3	13.6	10.5	11.4	10.3	10.7	10.1	10.9
Eighth	10.3	14.7	13.7	12.8	13.5	12.4	12.2	12.3
Ninth	10.7	16.1	12.8	14.0	14.4	14.5	15.0	14.5
Highest	13.1	19.8	17.2	19.9	20.8	21.3	22.6	21.9

3. Responses to Reform

The transformation described in the previous section affected the educational opportunities perceived by California families. After the transformation to state finance, public school resources were much more equally distributed across school districts, but lower on average than districts in other states. As a consequence, for many California families, local public schools must have had fewer resources than they were willing to pay for. How have these families responded to this gap between their demand and the opportunities presented by the public sector? One possible response is private schooling. Another response is to supplement the public school resources provided by the state through either voluntary contributions or by enacting a local parcel tax. In this section we examine the magnitude of each of these responses.

Private School Enrollments

We examine trends in private school enrollment using data on families with school-age children from the 1970, 1980, 1990, and 2000 Public Use Microdata Samples (PUMS). For each year, we assigned families to deciles based on their annual income and then calculated the percentage of students enrolled in private school in each income decile. Table 3 shows the results of that exercise.[5]

Private school enrollment has increased among higher-income families. For example, among children from families in the highest income decile, 13.1 percent attended private school in California in 1970, 17.2 percent in 1980, 20.8 percent in 1990, and 22.6 percent in 2000. A similar pattern of rising private school enrollments in California holds for children from families in the eighth and ninth deciles.

Furthermore, among the top three income deciles, a considerably lower percentage of California students were enrolled in private school in 1970 than in the rest of the country. By 2000, however, private school enrollment rates among high-income families in California had reached the rate for similar families in other parts of the nation.

Factors other than school finance reform have undoubtedly contributed to the rise in private school enrollment among high-income families in California. For example, Betts and Fairlie (2003) use PUMS data from 132 metropolitan areas in 1980 and 1990 to examine the impact of immigration on propensity of native-born families to send their children to private school. Their results suggest that private school enrollment tended to rise in areas that experienced inflows of immigrant children. Over the last three decades, California has certainly experienced large immigrant inflows suggesting that some of the rise in private school enrollment is due to its effect. Nevertheless, it seems reasonable to conclude that at least part of the increase in private school enrollment was due to school finance reform.

Several recent studies provide evidence consistent with that notion. Using district-level data from California in 1970 and 1980, Downes and Schoeman (1998) found that private school enrollment rose in districts that experienced a decline in real spending per pupil over the same time period. They concluded that roughly half of the rise in private school enrollment in California between 1970 and 1980 could be directly attributed to school finance reform. Similarly, Husted and Kenny (2002) examined changes in private school enrollment in 159 metropolitan statistical areas (MSAs) in 1970, 1980, and 1990. They found that private school enrollments tended to rise in MSAs located in states that adopted policies designed to equalize spending per pupil. Furthermore, their results suggest that the leveling of school spending had a particularly large effect on private school enrollments in high-income MSAs.

These studies suggest that at least part of the rise in private school enrollment in California was a direct response to school finance reform. Nevertheless, it still seems surprising that more families did not opt out of the public sector. Nechyba (2003a, 2003b), provides an explanation for this moderate response. In his analysis, school finance centralization and spending equalization have two distinct effects on private school enrollment. First, while equalization causes spending per pupil to fall in some districts, it also causes spending per pupil to rise in other districts. As a result, while private school enrollment rates may rise in previously high-spending districts, they may fall in previously low-spending districts. Second, when public schools are financed at the local level with property tax revenues, families wishing to send their child to private school have an incentive to reside in low-quality/low-spending districts to take advantage of lower housing prices and to reduce their tax burdens. In contrast, when public schools are financed at the state level with statewide income tax revenues, families can no longer reduce their tax burdens by living in a low-quality/low-spending district. Consequently, school finance centralization increases the opportunity cost of living in a low-quality district and sending a child to private school. As

a result, some families that previously chose to send their child to private school and live in a low-quality district may now choose to move to a high-quality district (those with high student peer quality) and send their child to public school. Simulations conducted by Nechyba suggest that this secondary effect of school finance centralization may be quite significant.

Voluntary Contributions

While school finance reform may not have engendered a dramatic increase in private school enrollments, it did provoke another response. In the aftermath of school finance reform, many districts established educational foundations to channel private contributions into public schools. Prior to 1970 there were fewer than 10 of these organizations operating in California. There are now more than 500. In addition, over the last several decades Parent Teacher Associations (PTAs) and booster clubs have become much more active in raising private contributions to supplement local school budgets. To examine how successful schools and school districts have been at raising voluntary contributions, we used data from the Internal Revenue Service's Master Business File to identify the contributions raised by all nonprofit organizations that supported either an individual school or a school district in California in 2001.[6] At the school level, contributions are raised primarily by PTA's and booster clubs. At the district level, contributions are raised primarily by local educational foundations.

As Table 4 demonstrates, a number of schools and school districts have been quite successful in raising voluntary contributions. For example, 36 schools had contributions per pupil in excess of $500 in 2001, and among those schools the average contribution per pupil was $805. Similarly, 12 districts had contributions per pupil in excess of $500 and among those districts the average contribution per pupil was $1,776. As the fourth column demonstrates, the schools and school districts that were most successful in raising voluntary contributions were populated by the highest income families.[7] Family income averaged $223,759 in the 12 districts with contributions per pupil in excess of $500. In contrast it averaged only $68,690 in the 63 districts with contributions per pupil of less than $10.

Table 4

Characteristics of Schools and Districts with Voluntary Contributions in 2001

Contributions Per Pupil	Number of Schools/ School Districts	Average Contribution Per Pupil	Average Family Income	Average Enrollment
		Contributions to Schools		
Less than $10	45	$ 5	$ 70,342	1,754
$10 - $24	214	18	72,981	1,216
$25 - $49	450	37	78,132	918
$50 - $99	494	71	89,704	771
$100 - $249	353	154	112,086	777
$250 - $499	97	338	150,927	665
$500 and above	36	805	185,374	549
		Contributions to Districts		
Less than $10	63	$ 5	$ 68,690	20,415
$10 - $24	29	17	81,003	12,643
$25 - $49	20	36	81,881	4,408
$50 - $99	26	79	90,586	4,633
$100 - $249	25	164	123,207	4,903
$250 - $499	16	391	155,196	1,623
$500 and above	12	1,776	223,759	660

Note: Contributions to single-school districts are included as contributions to districts.

Despite the fact that several schools and school districts have been successful at raising voluntary contributions, overall the use of voluntary contributions is quite limited. In 2001, there were over 8,000 schools operating in California and only 36 of those schools managed to raise more than $500 per pupil. Similarly, of the 986 districts operating in California in 2001, only 12 managed to raise more than $500 per pupil. California's wealthiest communities have been the most active in raising voluntary contributions; but even in those communities, the use of voluntary contributions remains limited. Brunner and Imazeki (2005) find that even among the 1,425 elementary and middle schools with the highest average family incomes in 2000, fewer than a quarter of those schools raised more than $100 per pupil in 2001 and fewer than 2.5 percent raised more than $500 per pupil.

The final column of Table 4, which shows how voluntary contributions varied with school or school district enrollment, provides a partial explanation for the limited use of voluntary contributions. At both the school and school district level, contributions per pupil tend to decline with enrollment. For example, the average enrollment in schools with contributions per pupil in excess of $500 is only 549 students. In contrast, the average enrollment in schools with contributions of $10 or less is 1,754

students. The inverse relationship between school size and contributions per pupil alludes to an important limitation schools and school districts face when attempting to replace lost property tax revenue with voluntary contributions. Property tax payments are mandatory, contributions are voluntary. That distinction is particularly important given the public good nature of voluntary contributions. Once a family contributes to their local public school, their contribution benefits not only their own child but also the children of all other families who attend the same school. As a result, it is in the self interest of any one family not to contribute and free ride off the contributions of other families. Furthermore, as noted by Sandler (1992) among others, the incentive to free ride tends to increase with the group size. Using data on voluntary contributions to California's public schools in 1994, Brunner and Sonstelie (2003) find that a one percent increase in student enrollment leads to a 0.56 percent reduction in contributions per pupil. Thus, a doubling of school size would lead to a 56 percent decline in contributions per pupil. These results illustrate an important point: when the source of discretionary revenue is changed from the property tax to voluntary contributions, the price of school spending is likely to rise since no enforcement mechanism exists to ensure each family contributes. Thus, even in California's highest income communities, the ability to replace lost property tax revenue with voluntary contributions is likely to be quite limited.

Parcel Taxes

For taxpayers seeking to supplement the revenue of their local public schools, another option is the parcel tax. Unlike the property tax, the parcel tax is tax on real estate parcels, not the value of those parcels. Prior to the passage of Proposition 13, the state constitution explicitly prohibited the use of parcel taxes because it required property to be taxed in proportion to its full value. However, Section 4 of Proposition 13 gave local governments, including school districts, the authority to levy "special taxes" subject to the approval of two-thirds of the local electorate. Shortly after the passage of Proposition 13 the state legislature successfully argued that parcel taxes were special taxes as long as they were earmarked for a particular purpose (Doerr (1997)). School districts in California first began placing parcel tax initiatives on their local ballots in 1983. As of 2005, there have been 369 parcel tax elections held by school districts and of those elections, 189 were successful.[8]

Table 5

Characteristics of Districts with Parcel Taxes in 2003-04

Parcel Tax Revenue Per Pupil	Number of School Districts	Average Revenue Per Pupil	Average Family Income	Average Enrollment
Less than $250	17	$ 136	$ 79,319	7,221
$250 - $499	15	364	133,674	4,289
$500 - $749	9	600	179,553	3,300
$750 - $999	3	909	168,426	1,801
$1,000 and above	14	1,536	170,773	2,034

Table 5 summarizes the size and distribution of parcel tax revenue per pupil in 2003-04. As the table illustrates, the parcel tax has been used successfully by several districts to raise large sums of discretionary school revenue. For example, 14 districts managed to raise more than $1,000 per pupil through the parcel tax, and among those districts parcel tax revenue per pupil averaged $1,536. Two school districts, Kentfield Elementary and Bolinas-Stinson Union Elementary (both of which are located in Marin County), levy parcel taxes that raise over $2,000 per pupil. In those districts, parcel tax revenue accounts for over 20 percent of total school district revenue. Similar to districts that were most successful in raising voluntary contributions, districts that were most successful in raising revenue through the parcel tax were populated by families with the highest incomes. In the 14 districts that raised more than $1,000 per pupil through the parcel tax, the average income of families was $170,773. In contrast, in the 17 districts that raised less than $250 per pupil in parcel tax revenue, the average income of families was only $79,319.

The use of parcel taxes by school districts mirrors the use of voluntary contributions along another important dimension: overall, usage of the parcel tax remains quite limited. Of the 989 school districts operating in California in 2004, only 58 levied a parcel tax. Furthermore, among those 58, only 26 managed to raise more than $500 per pupil in parcel tax revenue.

The use of the parcel tax has been limited by two factors. First, to enact a tax, districts must receive the approval of two-thirds of its voters, a high hurdle. Second, the tax-price of school spending is considerably higher for the parcel tax than for the property tax. As discussed above, when the source of discretionary tax revenue is the property tax, the tax-price of school spending is $H/(V/S)$, where S is the total number of students in a district, H is the assessed value of a family's home, and V is the total assessed value of all property in the district. In contrast when the source of discretionary tax revenue is the parcel tax, the tax price of school spending is $1/(N/S)$ where N is the total number of parcels within a district. A comparison of the two tax-prices reveals that, if V/N is greater than H, switching the source of

discretionary tax revenue from the property tax to the parcel tax increases a family's tax-price. As it turns out, the tax-price of school spending does tend to be larger under the parcel tax. Brunner (2001) compares the tax-price of school spending under the property tax with the tax-price under the parcel tax for school districts located in Los Angeles County in 2000. His calculations suggest that switching the source of discretionary school revenue from the property tax to the parcel tax increases the tax-price of school spending for the average family by approximately 35 percent.

The primary reason for this sharp increase in the tax-price of school spending is related to the subsidy homeowners receive from non-residential property. With the property tax, the size of the subsidy depends on the *value* of non-residential parcels as a percentage of total assessed value. With the parcel tax, the size of the subsidy depends on the *number* of non-residential parcels as a percentage of the total number of parcels. Using data on the value and number of residential and non-residential parcels in four California counties in 2000, Brunner (2001) found that the subsidy from non-residential property is much higher under the property tax than it is under the parcel tax.[9] For example, homeowners in Los Angeles County would have received a 34 percent subsidy from non-residential property if the source of discretionary school revenue were the property tax and only an 11 percent subsidy if the source of discretionary school revenue were the parcel tax.

For most districts in California, switching the source of discretionary school revenue from the property tax to the parcel tax led to a large increase in the tax-price of school spending, an increase that most likely made the parcel tax unappealing to all but the wealthiest districts. In support of that notion, nearly all districts that have managed to raise significant amounts of revenue through the parcel tax are located in suburbs and populated by high-income, highly educated, and white families. The one big exception is Emory Unified, a relatively small, urban school district located in Alameda County with an average family income of only $43,582 and a student population that is over 98 percent nonwhite. Despite those facts, the school district raised $1,727 per pupil through the parcel tax in 2003-04. Why has Emory been so successful in raising supplemental revenue through the parcel tax? The two most compelling answers to that question are related to the composition of Emory's property base and the type of parcel tax utilized by the district. In contrast to most other school districts with parcel taxes, Emory Unified contains a significant amount of commercial property. Furthermore, unlike most other school districts, which have imposed parcel taxes on a per-parcel basis, Emory imposes a parcel tax of $0.10 per square foot of improved property (i.e. structures such as homes, retail shops and factories).[10] Because commercial and industrial property tends to be larger than residential property, under a square footage parcel tax, the owners of non-residential property pay a larger share of any increase in school spending. As a result, such a parcel tax restores the subsidy from non-residential property that existed under the

property tax. In the case of Emory Unified, that subsidy was quite large: approximately 75 percent of Emory's parcel tax revenue comes from non-residential property (Smart Voter 2003).

In addition to restoring the subsidy from non-residential property, a parcel tax based on square footage has another advantage: because parcel size tends to increase with homeowner income, a tax on the square footage of parcels is less regressive than a fixed dollar tax per parcel of land. In light of these advantages, it seems natural to ask whether a square footage parcel tax might represent a viable source of discretionary tax revenue for other districts seeking to supplement their revenues. As noted by Brunner (2001), the answer to that question depends on whether such a tax would violate the guidelines set forth by the California Supreme Court in *Serrano v. Priest*. Recall that the court mandated the state to develop a school finance system that was fiscally neutral, implying that identical property tax rates should yield the same revenue per pupil. Unfortunately, a parcel tax based on square footage is unlikely to satisfy the court's definition of fiscal neutrality. To illustrate that point, consider two school districts, A and B, that are identical in every relevant respect (same number of students and the same number of parcels) except that in district A, each parcel is 1,000 square feet and in the district B each parcel is 2,000 square feet. If both districts levied the same tax rate per square foot of property, district A would raise only half as much revenue as district B. As a result, such a tax would most likely violate the court's interpretation of fiscal neutrality – identical tax rates would not yield the same revenue per pupil. While the legality of square footage parcel taxes has not been challenged in court to date, it seems likely that broader use of the square footage parcel tax could lead to another *Serrano*-style lawsuit.[11]

4. School Finance Reform and Support for Private School Vouchers

Private schooling, voluntary contributions, and parcel taxes are local actions, options for individual families in the case of private schools or for groups of families connected to a school or school district in the case of contributions and parcel taxes. Californians have also had the opportunity to respond on a larger scale. In 1993 and then again in 2000, California voters placed private school voucher initiatives on the statewide ballot, initiatives that would have dramatically overhauled California's system of public school finance and increased the range of educational opportunities available to California families.[12] Did families in California view the voucher as a means of undoing school finance reform?

On one level the answer to that question must surely be negative: both the 1993 and the 2000 voucher initiative lost by approximately a 2 to 1 margin. On another level, however, the answer is less clear. Approximately two-thirds of all households in California have no school-age children. If those households tended to vote against the voucher (perhaps due to concern over vouchers fiscal impact) it could still be that families with children were relatively supportive of the voucher. Furthermore, even

Table 6

Support for Private School Vouchers by Household Income

Household Income	Percentage Voting Yes on Voucher Initiative	
	Children in Public School (Obs=1,343)	No School Children (Obs=2,923)
Less than $20,000	62.2%	53.8%
$20,000 - $39,999	54.2	44.5
$40,000 - $59,999	50.8	40.3
$60,000 - $79,999	51.2	40.5
$80,000 - $99,999	50.9	44.3
$100,000 of more	41.5	42.6

among families with children, one would expect support for the voucher to vary with income. Because high-income families with children were the group most constrained by school finance reform, they should be the group most likely to support the voucher.

To examine those possibilities, we used the results of a survey conducted by the Public Policy Institute of California (PPIC) in the months just prior to California's 2000 voucher initiative. Between August and October of 2000, PPIC surveyed approximately 6,000 potential voters concerning issues related to the November 2000 ballot. The survey asked respondents to report their household income, whether or not they had children in public school, and how they intended to vote on the voucher initiative.[13] Table 6 shows the results of that survey. The table illustrates how support for the voucher varied with a respondent's household income and whether or not the respondent had children enrolled in public school.[14]

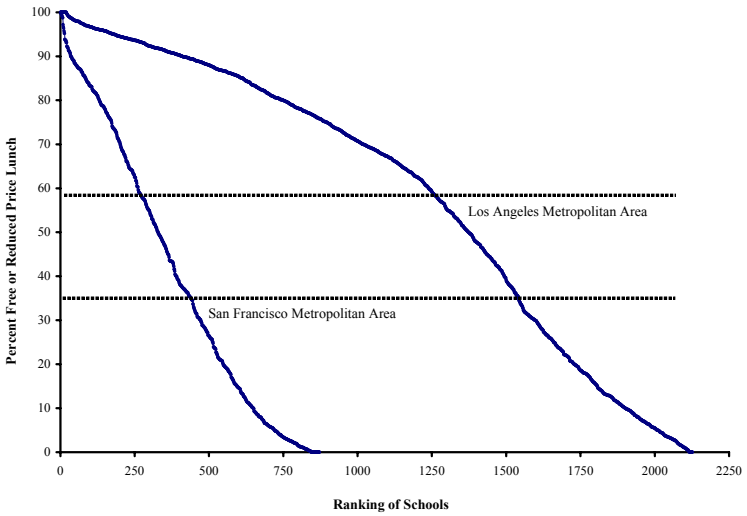
The results of the PPIC survey reveal that voters with children in public school were indeed more likely to support the voucher than voters with no school-age children. For example, among voters with children in public school, 54.2 percent of those with income between $20,000 and $39,999 stated they would support the voucher initiative. In contrast, only 44.5 percent of voters with no school-age children in the same income range stated they would support the voucher. However, contrary to expectations, high-income voters with children were less likely to support the voucher than low-income voters with children. Voters with children in the highest income groups were over 20 percentage points less likely to support the voucher than voters with children in the lowest income group. In fact, voters with children in the highest income group were no more likely to support the voucher than voters of similar income with no school children. Thus, despite the fact that high-income families with children were the group most constrained by school finance reform, they were also the group least likely to support the voucher.

What explains these puzzling reactions? Our answer to that question begins with a fundamental observation: school quality depends on more than just spending per pupil; it also depends on factors such as the quality of a student's peer group and school efficiency. To the extent that these other factors are important determinants of school quality, equalizing spending will not equalize school quality. This point was demonstrated by Nechyba (2003b, 2004) using a computable, general equilibrium model. In the model, school quality depends on both spending per pupil and a vector of inputs correlated with parental income. Those inputs include student peer quality, parental monitoring, and voluntary contributions. His simulations suggest that centralization and the equalization of spending per pupil results in only a modest decline in residential income segregation. With state finance, school districts are still stratified by income, peer quality, and thus school quality. Epple and Romano (2003) reach a similar conclusion using a general equilibrium model that characterizes how families sort across neighborhood schools within a single school district. In their model, student achievement depends both on a student's own ability (which is assumed to be correlated with family income) and the ability of the student's peer group. Because all neighborhood schools are assumed to have the same level of spending per pupil, variation in school quality arises solely from variation in average student peer quality across schools. Equilibrium in their model is characterized by income, peer quality and school quality stratification, with the highest-income families living in neighborhoods with the highest quality schools (schools with the highest-quality peer group), and the lowest-income families living in the neighborhoods with the lowest quality schools.

These studies suggest that even in California, where spending per pupil has been essentially equalized, there may still be significant income stratification across neighborhood schools and school districts, stratification that perpetuates large differences in school quality. To examine that possibility we used data from the California Department of Education on the percentage free or reduced-price lunch students (low-income students) in each elementary school in 2003-04. Figure 3 illustrates how low-income students are distributed across the 2,127 elementary schools in the Los Angeles metropolitan area and the 849 elementary schools in the San Francisco metropolitan area.[15] In the figure, schools are ranked in descending order according to their percentage of free or reduced price lunch students. If low-income students were randomly distributed across schools, each school should contain roughly the same percentage of these students. In the Los Angeles metropolitan area, this would imply that roughly 62% of students in each school were eligible for free or reduced price lunch (as illustrated by the horizontal dotted line). Similarly, in the San Francisco metropolitan area, random assignment would imply that roughly 40% of student in each school were eligible for free or reduced price lunch. As Figure 3 makes clear, however, that is not the case: in both the Los Angeles and San Francisco metropolitan areas there is a significant degree of income stratification across schools.[16]

Figure 3

Distribution of Low-Income Students across Elementary Schools in 2003-04



The stratification of schools by family income is also a stratification of schools by student achievement. The relationship between student performance and family income is clearly represented in Figure 2, a relationship that is consistent with the basic assumption underlying the model of Epple and Romano: school quality depends both on a student's own ability and the ability of his or her peers.

These differences in school quality may explain why high-income families were unwilling to support the voucher. Numerous studies have shown that houses located in neighborhoods with high-quality public schools sell at a significant premium. For example, using data on housing sales in the Los Angeles metropolitan area in 1992-93, Brunner, Sonstelie and Thayer (2001) find that homes located in the best school districts sell at a significant premium. Similarly, using 1990 block-level Census data on the value of homes located in the San Francisco Bay area, Bayer, Ferreira, and McMillan (2003, 2005) find that homes located in neighborhoods with high-quality schools command a significant premium.[17] Because the voucher would have decreased the price of private alternatives to good public schools, it also would have reduced the premium families would be willing to pay to live in such neighborhoods, causing property values in those neighborhoods to fall. As a result, high-income families located in neighborhoods with good public schools would have experienced significant capital losses had the voucher been implemented.

The threat of such losses clearly provided those families with an incentive to vote against the voucher. Brunner, Sonstelie, and Thayer (2001) find evidence consistent with that conclusion. Using

precinct-level voting returns from California's 1993 voucher initiative, they find that homeowners located in school districts with high housing price premiums were significantly less likely to support the voucher than homeowners located in neighborhoods with low housing price premiums. They conclude that the most plausible explanation for their results is that homeowners located in good school districts voted against the voucher to protect their housing values. Brunner and Sonstelie (2003) reached the same conclusion based on their analysis of individual voting behavior on California's 2000 voucher initiative.

While the results of the studies discussed above may explain why homeowners located in good school districts were unwilling to support the voucher, they can not explain why both California's 1993 and 2000 voucher initiatives lost by a 2 to 1 margin. Does the overwhelming lack of support for school vouchers suggest that Californians were by and large satisfied with their public schools? Results from the PPIC's August 2000 survey suggest the answer to that question is clearly no. When asked to grade the quality of their local public schools on a scale of "A" to "F", less than 10% of voters gave their local public schools and "A" and more than 60% of voters gave their schools a grade of "C" or lower (Baldassare (2000)). Evidently, even though the majority of California's voters are unsatisfied with the quality of their local public schools, that dissatisfaction has not engendered widespread support for school vouchers.

5. Conclusion

The lessons to be drawn from California's experience depend on the perspective one brings to it. For champions of decentralized government, the lessons are easy to draw. Since the centralization of school finance in California, school resources and student achievement have declined relative to other states. Families have attempted to circumvent the centralized system by opting out into the private sector and by using voluntary contributions and parcel taxes to supplement the inadequate public school resources provided by the state. Centralization has been a dubious achievement.

For fiscal conservatives, the lessons are very different. Under local finance, commercial and industrial property subsidized school spending. The subsidy was ended by Proposition 13, and now families are facing the true cost of public school spending. Given that cost, they have chosen to spend less, thus tempering the rapid rise in real spending per pupil over the last three decades (Hanushek and Rivkin (1997)). The dismal performance of California students on achievement tests is a disappointment, but that performance is due more to the inefficiency with which funds are deployed than to the paucity of those funds.

For supporters of centralization, the lessons are more complicated. The centralization of school finance has permitted the state to direct more resources to school districts serving low-income students. Those students still do not perform at the level of other students, so there is more work to be done.

Furthermore, families have done very little to circumvent the new system. Private school enrollment is not significantly higher than other states, voluntary contributions are not a major factor, parcel taxes have been enacted in only a few districts, and voters have overwhelming rejected the voucher. Centralized finance is politically stable, thus providing a platform for an even more progressive redistribution of educational resources.

Supporters of centralization might also add that their preferred system has not been given a fair test. California has centralized the finance of its public schools without centralizing the governance of those schools. This mismatch between finance and governance has undermined the effectiveness of the school system and made centralization less successful than it could be. For example, because school districts still engage in collective bargaining with their employees, the legislature feels obligated to tie up funds in categorical programs that may undermine the effectiveness of those funds. Furthermore, possibilities for addressing the needs of low-income students would likely increase if local governance were eliminated. In the current system, those needs are addressed through categorical programs that attempt to channel funds from the state to schools serving disadvantaged students. Those funds must pass through school districts, however, where local politics may frustrate the state's intention.

The transformation from local governance to state governance will not occur as rapidly as the transformation from local finance to state finance. Though they handed the property tax to the state legislature, the voters of California deeply distrust Sacramento, and it is impossible to imagine that they would favor an initiative to eliminate school districts and local school boards. Yet, there are clear signs that the institutions of local governance are crumbling. Schrag (1998) notes that, because property tax rates are not determined at the local level, business in California has lost interest in local school districts, diminishing a traditional source of fiscal conservatism on local school boards. California's ambitious accountability system has also eroded local governance. The state has yet to take over a failing school, but it clearly has the power to do so, and it is only a matter of time before it does. Likewise, after an initial experiment with bonuses for teachers in high performing schools, the state ran into fiscal difficulties and suspended the program. However, it seems only logical that an improved system of performance bonuses will be instituted as soon as the state's budget improves. Lastly, it is not impossible to imagine that the state's current bi-level system of collective bargaining—once with the state legislature and again with each school district—will yield to a more rational system of statewide collective bargaining. Any one of these changes would make the others more likely.

Champions of decentralized government will argue the folly of this trend. A school system that reports directly to Sacramento will become disconnected from the concerns of local residents, lose political support, and deteriorate even further. For these critics of the current direction, hope lies with the parcel tax. If the threshold for enacting the parcel tax were reduced to a simple majority, many more

parcel taxes would be passed. Each such event would reconnect residents to their local school districts and reinvigorate local governance. A constitutional amendment is required to reduce the two-thirds requirement to a simple majority, but California's constitution must be the most pliable of any state's.

Endnotes

[1] In their petition to the California Supreme Court, the *Serrano* lawyers wrote, "the relative wealth of school district residents correlates to a high degree with the relative wealth of school districts as measured by the assessed valuation per pupil."

[2] The tabulation was done for only 739 of the 1,079 districts existing in 1969-70, but those 739 districts enrolled 98 percent of students in 1969-70.

[3] A few districts receive more property tax revenue than their revenue limit. Under the current law, they keep that excess and also receive a small amount of basic aid from the state. The number of these districts changes as their enrollments and property tax revenues change. However, the number has never been large. Today there are only about 50 of these districts, enrolling less than 3 percent of the state's students.

[4] Because a least squares regression is impossible when a regressor has an infinite value, Hoxby estimated spending per student as a function of the inverse of the tax-price. California's inverse tax-price is unity before *Serrano* and zero after *Serrano*. All school districts in New Mexico have inverse tax-prices of unity before reform and 0.05 after reform. In Oklahoma, some districts have inverse tax-prices as low as 0.15 after reform. In all other states, the lowest inverse tax-price after reform is 0.53 and inverse tax-prices are unity in 36 states after reform. Thus, the tax-price effect of school finance reform appears to be primarily identified by the post-reform, relative decline in spending per pupil in California, New Mexico, and Oklahoma.

[5] For each year, Table 3A of the Appendix shows the maximum income for each decile measured in 2000 dollars.

[6] While the IRS Master File includes all nonprofit organizations supporting K-12 schools in California, it only contains revenue data for those organizations with revenues of $25,000 or more. Thus, we are unable to identify the amount of revenue raised by organizations with revenues of less than $25,000. As a result, our data provide a lower bound on the actual amount raised by organizations supporting K-12 schools in California. For a detailed description of the methodology used to identify nonprofit organizations supporting K-12 schools and the revenue raised by those organizations, see Brunner and Sonstelie (1996) and Brunner and Imazeki (2005).

[7] District-level data on average family income in 2000 was obtained from school district demographic files prepared by the U.S. Census Bureau. Data on average family income by school attendance zone is not available. As a result, we used data on the location of each school in California to match schools to census tracts in 2000. We then used the average family income of the census tract in which the school was located as a proxy for the average income of families within a school attendance zone.

[8] Almost all school districts have imposed parcel taxes on a per-parcel basis (e.g. $100 per parcel) and for a relatively short time period (e.g. five years).

[9] The four counties analyzed were Los Angeles, San Diego, San Mateo, and Marin.

[10] Two other districts, Albany Unified and Berkeley Unified have imposed parcel taxes that are based on the square footage of property.

[11] As noted by Brunner (2001), if tax revenues from a square footage parcel tax were subject to district power equalization, a system of local school finance based on a square footage parcel tax would be fiscally neutral. As a result, the square footage parcel tax could be turned into a viable and flexible source of discretionary school revenue for school districts.

[12] In 1993, voters in California placed Proposition 174 on the statewide ballot, an initiative that would have provided parents with $2,600 for every child enrolled in a private school. In 2000, voters placed Proposition 38 on the statewide ballot. That initiative would have provided parents with a scholarship of approximately $4,000 for every child enrolled in private school.

[13] For a more detailed description of the PPIC survey see Brunner and Sonstelie (2003).

[14] Of the 6,006 survey respondents, a total of 1,343 reported having children enrolled in public school and also answered the questions about their household income and how they intended to vote on the voucher initiative. Similarly, a total of 2,923 respondents reported having no school-age children and answered the questions about household income and how they intended to voter on the voucher.

[15] The Los Angeles metropolitan area includes the counties of Los Angeles, Orange, San Bernardino, and Riverside, while the San Francisco metropolitan area includes the counties of San Francisco, Alameda, Contra Costa, Marin, San Mateo, and Santa Clara.

[16] Epple and Romano (2003) present similar evidence of income stratification across high schools in the Los Angeles metropolitan area. Similarly, Bayer, Ferreira, and McMillan (2003, 2005) estimate an equilibrium model of residential sorting across neighborhood schools located in the San Francisco Bay area. Their results reveal substantial stratification along racial and socioeconomic lines across neighborhoods, with white, highly-educated, and high-income households clustering in neighborhoods that contain the highest quality schools.

[17] Note that the premiums found in these studies were not the result of higher spending per pupil since school spending has been equalized in California. The premiums were primarily due to student peer quality and other determinants of school quality that still vary across schools.

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Appendix

The median voters model is $s = \beta_0 + \beta_1 v + \beta_2 y$. Applying this linear relationship, the correlation between spending per pupil, *s,* and median family income, *y,* is

$$\rho_{sy} = \frac{\beta_1 \sigma_v \rho_{vy} + \beta_2 \sigma_y}{\left(\beta_1^2 \sigma_v^2 + 2\beta_1 \beta_2 \rho_{vy} \sigma_v \sigma_y + \beta_2^2 \sigma_y^2\right)^{1/2}},$$

where σ_v and σ_y are the standard deviations of *v* and *y* across school districts and ρ_{sy} and ρ_{vy} are the correlation coefficients of *s* and *v* with *y* across districts. When the correlation between assessed value and income (ρ_{vy}) is unity, the expression above also reduces to unity.

The partial derivative of ρ_{sy} with respect to ρ_{vy} is

$$\frac{\partial \rho_{sy}}{\partial \rho_{vy}} = \frac{\beta_1 \sigma_y \left(\beta_1^2 \sigma_v^2 + \beta_1 \beta_2 \rho_{vy} \sigma_v \sigma_y\right)}{\sigma_s^3}.$$

If β_1>0, β_2>0, and ρ_{vy}>0, $\frac{\partial \rho_{sy}}{\partial \rho_{vy}}$>0. Also, if ρ_{vy}=0 and β_2>0, $\rho_{sy} > 0$. Thus, assuming β_1>0, β_2>0, and ρ_{vy}>0, ρ_{sy} is a positive, increasing function of ρ_{vy}, which reaches a maximum of unity when ρ_{vy} is unity.

Table 3A

Maximum Family Income for Family Income Deciles in 1970, 1980, 1990, and 2000

Decile	1970	1980	1990	2000
Lowest	$17,752	$14,137	$12,973	$14,000
2	27,072	23,165	22,471	23,000
3	35,061	31,357	31,225	31,000
4	40,830	38,682	39,525	39,800
5	47,044	45,484	47,035	48,300
6	53,257	52,266	55,335	58,000
7	61,690	60,614	65,876	69,400
8	71,897	71,074	79,051	85,000
Highest	91,869	89,861	102,661	114,400