

## **Do Non-School Resources Substitute for School Resources? A Review of the Evidence**

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January 2007

**Abstract:** Researchers have shown that the responses to school finance reforms and tax limitations of states, localities, and of private citizens are varied in their type and magnitude. One response that has been discussed but has not been quantified is the substitution of increased public spending on parks and recreation and other services benefiting children when education spending is constrained. The goal of this paper is to determine if, when fiscal constraints are imposed, provision of non-school provided services to children increases. To accomplish this goal, I take a two-pronged approach. First, using data from the Census of Governments from 1972 to 2002, I attempt to determine if, in those states in which constraints have been imposed on education spending, growth in non-school spending has been more rapid, when compared to growth in spending in unconstrained states. While the finance data will enable me to determine if spending trends have been different in states with and without constraints, these data provide little information on the extent to which private sector substitution has occurred. To document cross-state differences in the use of non-school substitutes for school services, I draw upon the 2001 Before- and After-School Programs and Activities Survey. Neither the analysis using these data nor the analysis using the fiscal data produces evidence of substitution in the dimensions considered. Specifically, the estimates of fiscal responses to constraints indicate that K-12 education spending appears to be favored relative to other expenditure categories. Similarly, the estimates of the relationship between the participation in after-school activities and the existence of fiscal constraints provide no evidence of increased participation in after-school activities in states in which fiscal constraints are present.

## **Introduction**

Numerous authors (e.g., Sonstelie, Brunner, and Ardon, 2000) have documented the fact that per pupil spending in California declined, relative to spending in other states, in the aftermath of the second *Serrano* decision and Proposition 13. The constraints imposed on localities by the combination of Proposition 13 and the policy responses to the *Serrano* decision contributed to this relative decline, as did other constraints imposed on the ability of the state government to raise revenue. Researchers have not established whether relative decline in spending is a necessary result of court-ordered school finance reforms or tax limitations. But what researchers have shown is that the responses to school finance reforms and tax limitations of states, localities, and of private citizens are varied in their type and magnitude. Some of these varied responses have been much studied. Other responses have been discussed but have not been quantified. One response that falls in this latter category is the substitution of increased public spending on parks and recreation and other services benefiting children when education spending is constrained.

The absence of research on the degree of substitution of other public services for education motivates the question that this paper addresses. Specifically, the goal of this paper is to determine if states and localities increase provision of non-school provided services to children when constraints are imposed on education spending. To accomplish this goal, I take a two-pronged approach. First, using data from the Census of Governments from 1972 to 2002, I determine if, in those states in which constraints have been imposed on education spending, growth in non-school spending has been more rapid, when compared to growth in spending in unconstrained states. Because I have assembled data on states and localities over a three decade

period, I can control for other factors that might affect trends in education and other spending and, thus, can isolate the effects of the constraints on these trends.

While the finance data enable me to determine if spending trends have been different in states with and without constraints, these data provide little information on the extent to which private sector substitution that has occurred. To document cross-state differences in the use of non-school substitutes for school services, I draw upon the 2001 restricted-use version of the Before- and After-School Programs and Activities Survey. These survey data provide information on the extent to which Californians used substitutes for schooling services and the degree to which this use compares to the use of these services by residents of other states. The nature and timing of this survey means that the results of these comparisons cannot be used to document the extent to which constraints on school spending have resulted in cross-state differences in the utilisation of substitute services. But, by enabling us to provide a richer picture of the nature of substitution, the analysis of these data complements nicely the analysis of trends in school and non-school finances.

Neither approach produces evidence of substitution in the dimensions considered. Specifically, the estimates of fiscal responses to constraints indicate that K-12 education spending appears to be favored relative to other expenditure categories. Similarly, the estimates of the relationship between the participation in after-school activities and the existence of fiscal constraints provide no evidence of increased participation in after-school activities in states in which fiscal constraints are present.

The next section of this paper presents a stylized theoretical model that helps clarify the links between publicly-provided education, other publicly-provided services, and privately-

purchased services that supplement the services delivered by the public schools. I then summarize the literature that has examined the fiscal response to constraints. An overview of the limited literature on private responses to fiscal constraints follows a brief discussion of the degree to which the unique circumstances in California might limit the scope of substitution of non-education spending for education spending. The data and methods used in the empirical analyses in the paper are then discussed. The results of these empirical analyses are then presented, with the paper concluding with some remarks on the consistency of these results with those of related work in the literature on fiscal constraints.

### **Fiscal constraints and substitution - Brief review of the relevant theory**

How constraints on the ability of localities or states to spend on elementary and secondary education could translate into increased spending on other public services can be best understood by turning to a stylized model of local decision. By adding to this model an achievement production function that accounts for household inputs (Houtenville and Conway, 2005), the potential impact of increased private spending on education-related services can also be elucidated.

Suppose that the preferences of household/voter  $i$  in a community are given by  $U_i(C_i, G_e^i, O_o)$ , where  $C_i$  is consumption by the household of a composite consumption good,  $G_e^i$  is the quality of education consumed by that household, and  $O_o$  are other publicly-provided goods consumed by that household. The community in which this household resides produces both education,  $O_e$ , and other publicly-produced goods,  $O_o$ , according to the production functions:

$$(1) \quad O_e = f(X, O_o, B)$$

and

$$(2) \quad O_o = g(Z,D) .$$

Here,  $X$  and  $Z$  are vectors of purchased inputs, and  $B$  and  $D$  are a vectors of attributes of the community that influence its ability to produce these outputs. Households translate the publicly-produced quantity of education into the quantity of education consumed according to the production function:

$$(3) \quad G_e^i = h_i(O_e, E_i) .$$

Here,  $E_i$  is a vector of inputs purchased by the household<sup>1</sup> that affect how the publicly-produced quantity of education is translated into the consumed quantity.

If the publicly-provided goods are financed through a combination of property taxes, user fees, and intergovernmental aid, then each household chooses its consumption of the composite consumption good and the inputs into household production subject to the budget constraint

$$(4) \quad p_E E_i + p_C C_i + \tau V_i + T_i = Y_i ,$$

where  $\tau$  is the nominal property tax rate in the community,  $V_i$  is the property wealth of the household,  $T_i$  are the fees paid by the household, and  $Y_i$  is the income of the household. Further, if the local source of revenues for education provision is the property tax and the local source of revenues for the provision of other goods are the user fees paid,<sup>2</sup> then the local governments producing education and other publicly-provided goods face the budget constraints

$$(5) \quad p_X X = \tau V_T + A_e$$

and

$$(6) \quad p_Y Y = T_T + A_o ,$$

1 Among the inputs households could purchase are tutoring time and time devoted by parents to the a child's education. The latter is purchased in the sense that time devoted to a child's education costs the household lost wages or lost parental leisure.

2 In reality, property tax revenues finance all services, and revenues from fees are used to finance education provision. The artificial division here is made to simplify the discussion of the impact of constraints on provision of other publicly-provided goods and on consumption of household inputs into education.

where  $V_T$  is the total property tax base of the community,  $T_T$  are total revenues from fees,  $A_e$  is intergovernmental aid for education provision, and  $A_o$  is intergovernmental aid for the provision of other publicly-provided goods.

The household decides how much of its resources to allocate to the purchase of inputs into the private production of education conditional on the public provision of education and of other publicly-provided goods (i.e., conditional on levels of  $O_e$  and  $O_o$ ). Formally, the amounts purchased will be chosen to satisfy

$$(7) \quad \begin{pmatrix} \frac{\partial U_i}{\partial G_e} \\ \frac{\partial U_i}{\partial C_i} \end{pmatrix} = \begin{pmatrix} p_E \\ p_C \frac{\partial h_i}{\partial E_i} \end{pmatrix} .$$

This relationship makes clear that, the higher is the marginal productivity of purchased inputs

$\left( \frac{\partial h_i}{\partial E_i} \right)$ , the more of those inputs the household will purchase, all else equal. Since fiscal constraints will limit either the property tax revenues or the expenditures on education, those constraints will tend to reduce public-provision of education from its unconstrained level ( $O_e^*$ ) to a constrained level ( $O_e^{\max}$ ). By reducing the household's tax burden ( $\tau V_i$ ), these constraints will free up resources that can be used to purchase inputs to household production.<sup>3</sup> Further, this purchasing of inputs to household production will be driven in part by the household's desire to limit the decline in  $G_e^i$  so as to maintain overall well-being. On the other hand, reducing the level of one input would tend to reduce the marginal productivity of other inputs, making these

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3 Formally, comparative static analysis of the first-order conditions of the household's optimization problem indicates that the derivative of purchased inputs with respect to income is positive as long as the utility function is strictly quasi-concave.

inputs seem relatively more expensive. Unless the magnitude of this change in marginal productivity is large, however, the combination of the reduced tax burden and the reduced public-provision of education will result in the household increasing its purchases of inputs to household production.<sup>4</sup>

To characterize the impact of fiscal constraints on provision of other publicly-provided goods  $O_o$ , assume that provision in each community is determined by the median voter, or some other decisive voter in that community. Thus, in effect, there is a decisive household in the community that internalizes the balanced budget conditions and chooses  $O_e$  and  $O_o$ . Let  $O_e^*$  and  $O_o^*$  represent the levels of provision chosen by this decisive voter/household prior to the imposition of fiscal constraints. As noted above, if constraints are imposed that limit either property tax revenues ( $\tau V_T$ ) or expenditures on inputs to education production ( $p_X X$ ), the effect will be to constrain the public provision of education to  $O_e^{\max} < O_e^*$ . If no constraints are imposed (or if the constraints are less binding) on the revenues used to purchase inputs for the production of other publicly-provided goods or on the expenditures on those inputs, then the decisive voter/household will choose not only to increase consumption of private goods  $C$  and purchase of household inputs  $E$  but will also choose to allocate more resources to the production of these other publicly-provided goods. The level of  $O_o$  will be increased both because these goods increase the well-being of the consumer directly and because these goods can compensate for reduced levels of inputs  $X$  in the production of publicly-provided education. Clearly, however, such a choice will not be possible if production of other publicly-provided goods is as

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4 Formally, comparative static analysis of the first-order conditions of the household's optimization problem indicates that the derivative of purchased inputs with respect to the publicly-provided level of education consists of two terms. The first of these terms will generally be negative as long as the utility function is strictly quasi-concave. Thus, this first term implies that a reduction in the publicly-provided level of education will result in an increase in purchased inputs. The second term will, however, be positive if the marginal productivity of purchased inputs is higher when the publicly-provided level of education is higher.

constrained as production of publicly-provided education.

Finally, as is apparent from (5), the budget constraint for the schools, the purchase of inputs to be used in the production of education will be affected by school finance reforms or by tax or expenditure limits only if total revenue available ( $\tau V_T + A_e$ ) is affected. In other words, if aid increases to compensate for reduced property tax revenue, the community would still be able to provide  $O_e^*$ , and household/voters would not choose to shift additional resources into either the purchase of additional inputs into home production or into provision of other publicly-provided goods.

### **School finance reform, tax and expenditure limits, and substitution - Evidence from national analyses**

The recent resurgence of state Supreme Court decisions (labeled by Koski (2003) and others as the "third wave" of such decisions) mandating changes in school finance systems to insure equity, adequacy, or both has further altered a school finance landscape that has changed dramatically since 1970. In addition, in several states, including Oregon, Illinois and Colorado, voter-approved tax limits have forced policy makers to rethink how public elementary and secondary education is financed. Not surprisingly, these policy changes have refocused attention not just on the financing of public education but also on the short- and long-term effects of these dramatic changes on the provision of other services that compete with public education for scarce dollars and that may complement or even substitute for the services provided by local schools. Yet, while there were numerous widely publicized equalization mandates during the late 1970s and early 1980s, most notably the *Serrano v. Priest* decision in California, and nearly as many high-profile tax limitations, like Proposition 13 in California and Proposition 2½ in



Massachusetts, to date there have been no academic attempts to gauge the extent to which these policy changes have resulted in changes in spending on services that could replace services that school districts, facing expenditure constraints, can no longer provide.

While no direct analyses of the extent of substitution exist, the existing literature on the effects of school finance reforms and tax limitations does provide results that can help in shaping expectations about the extent to which public or private sector spending has substituted for reductions in education spending. One lesson from this existing literature is that, at least in the case of school finance reforms, substitution may not occur simply because education spending does not decline in the aftermath of a finance reform.

A number of researchers have attempted to document the impact of finance reforms on the mean level of spending and distribution of spending in a state. For example, Silva and Sonstelie (1995), Manwaring and Sheffrin (1997), and Downes and Shah (2006) all took slightly different approaches to quantifying the effect of finance reforms on mean per pupil spending in a state. Given the nature of the data used in these studies, their results cannot, however, provide information on the within-state variation in the effects of reforms. Such information can only be provided by analyses, like those of Hoxby (2001), Evans, Murray, and Schwab (1997), and Murray, Evans, and Schwab (1998), which utilised district-level data. Unfortunately, because these studies generate contradictory predictions about the impact of court-mandated reforms, they provide little assistance in forming expectations about the likely extent of substitution. Hoxby's results would lead us to expect declines in K-12 education spending in the aftermath of most court-ordered finance reforms, since the norm in such cases is a new financing system that dramatically increases tax prices in towns with more property wealth. Hoxby's results thus imply

that, if the finance reform has no impact on the cost to local taxpayers of paying for public services that could substitute for education spending, court-ordered finance reforms, like those that followed the *Serrano* decisions, could stimulate substitution. On the other hand, Murray, Evans, and Schwab conclude that court-mandated reforms typically result in leveling up. If this latter result is right, no substitution would be seen because no substitution was necessary, since the reforms imposed no effective constraints on spending even in high wealth districts.<sup>5</sup> As a result, observing no substitution in states in which finance reforms have been implemented may provide no information about the extent of substitution that would occur in communities facing real constraints on education spending.

The best evidence on the impact of school finance reforms on local spending is provided by Baicker and Gordon (2006). They show that while state aid for K-12 education increases after a court-mandated school finance reform, state aid for other public services declines. Counties in which median family income is higher tend to benefit less from the increases in state education aid and tend to experience larger reductions in state aid for other services. The composition of spending appears to be unaffected, however. In particular, in counties located in states in which there had been a court-mandated school finance reform, per capita expenditures on education, on police and criminal justice, on public welfare, health, and hospitals, and on other services (such as parks and recreation and libraries) appear to be unaffected. Highway expenditures might decline, but that decline appears to be small quantitatively.

Baicker and Gordon's (2006) results confirms a conclusion hinted at by other research: increases in spending on services that might substitute for education spending would not be

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5 In fact, Murray, Evans, and Schwab (1998) show that, while per capita state expenditures on K-12 education increased after a court-mandated school finance reform, per capita state spending in other areas was unchanged in the aftermath of reform, all else equal.

expected in the aftermath of court-mandated school finance reforms. No substitution would be expected both because finance reforms impose, at most, minimal constraints and because state governments limit the impact of reforms on high-income communities by reducing state-level expenditures in other areas of spending. As a result, the need for and the ability for substitution are both limited.

The conclusion that we would expect little substitution after a court-mandated reform does not, however, translate into the conclusion that no substitution would be expected in a state like California. California is the canonical example of a state in which constraints on spending resulted not just from school finance reforms but also from limits on the ability of local governments to raise revenue. Several authors (Downes and Figlio, 2000; Blankenau and Skidmore, 2004) have shown that researchers can only generate accurate estimates of the impact of either school finance reforms or tax and expenditure limitations if the empirical model accounts for both of these potential policy changes. As a result, accurate expectations about the extent of substitution that might have occurred in California can only be developed if the implications of research on tax and expenditure limits are taken into account.

The literature provides considerable information on the fiscal responses to tax and expenditure limitations. McGuire (1999) and Downes and Figlio (1999) summarize much of the earliest literature on the fiscal effects of tax limitations. Recent research has confirmed the results of the earlier work and provided a richer picture of the fiscal effects. Two papers by Philip Joyce and Daniel Mullins (Joyce and Mullins (1991), Mullins and Joyce (1996)) and a paper by Mullins (2004) provide the richest picture of the impact of tax and expenditure limits on state and local fiscal structures. The first two of these papers used state-level data to document

the limited impact of tax and expenditure limits on the size of the state and local sectors. The limits did have an impact, however. Most notable of the effects of the limits were increasing centralization of revenue raising, growth in spending by state governments, growth in the local use of non-tax revenues, and reduction in revenue-raised through local broad-based taxes. The variation across localities in the extent to which the limits constrained local spending (Figlio, 1997) meant, however, that state-level data provided an imperfect picture of the extent of substitution, since spending data from constrained localities was averaged with spending data from localities unaffected by the constraints. As a result, the data used in these papers did not lend themselves to examining such questions as the extent to which localities substituted for education spending with non-education spending. What the results of the papers do make clear is that, if generating non-tax revenue for non-education spending is easier than generating such revenue for education spending, then substitution may be a natural outlet for localities constrained by tax and expenditure limits.

Because county-level fiscal data from the Census of Governments are used in Mullins (2004), this paper provides more direct information on the extent to which tax and expenditure limits have resulted in substitution. Mullins does not look at the impact of limits on specific expenditure categories; instead he concentrates on the extent to which limits have affected the within-county variation in general expenditures and education expenditures. Nonetheless, this analysis does provide useful information for framing our expectations about substitution since, if substitution had occurred, we would expect to see variation in general expenditures that increases or, at a minimum, remains unchanged, while variation in education expenditures is reduced. We would expect this pattern of change since the limits are likely to constrain education spending in

some localities, with these localities then responding by holding constant or increasing expenditures on services that could substitute for education. As noted above, maintaining or increasing expenditures on services that could substitute for elementary and secondary education spending would be possible if localities found it relatively easier to finance general expenditures with non-tax revenues.

Mullins' (2004) results are only partly consistent with this expectation. When data from all counties are used and limits are not distinguished by stringency, Mullins finds that within-county variation in both general and education expenditures increase after tax and expenditure limits. Further, more stringent limits, of which Proposition 13 is one, appear over time to increase variation in both general and education expenditures. In suburban fringe counties, however, the overall effect of a Proposition 13-style limit is to reduce variation in education expenditures and have no impact on general expenditures. If these are the counties in which access to non-tax revenues, like developer fees, are the greatest, then this latter result may be consistent with substitution. Only with empirical analysis designed to examine directly the substitution question, can that question be answered.

### **Evidence on scope for substitution in California**

While there are a number of states like California in which a court-mandated school finance reform and a limitation on the ability of local school districts to raise revenue co-exist, the stringency of both the *Serrano* and Proposition 13 has resulted in a context in California that is unique. Wassmer (2006) summarizes the evolution of the state and local fiscal situation in California. A combination of legislation and voter initiatives has resulted both in a reallocation of property tax revenues from cities and counties to school districts and in earmarking portions

of state revenues for school districts. This favored status of school districts, relative to cities and counties, has limited the flexibility of cities and counties and has accentuated the extent to which cities and counties rely on nontraditional revenue sources (Hoene, 2004; Wassmer and Anders, 1999). These trends in the fiscal status of cities and counties have apparently limited the extent to which expenditures by these governmental units could substitute for declines in inflation-adjusted education spending. Hoene (2004), for example, shows that the shares of total expenditures by California cities on libraries, parks and recreation, and social services have stayed constant or declined slightly since 1977. For California cities, housing and community development was the only spending category that might substitute for education for which the share of total expenditures increased. And for the period from 1990-91 to 1994-95 per capita expenditures by California counties were not higher in those counties in which a larger percentage of the population was non-adult (Wassmer and Anders, 1999), even though a larger percentage would have been expected if substitution had occurred. All of this evidence seems to indicate that the evolving fiscal structure of state and local governments in California has constrained the ability of cities and counties to increase spending in areas that might substitute for education spending.

Examining the evolution of the fiscal structure and the spending patterns of California cities and counties cannot, however, provide a definitive answer to the substitution question. By looking only within California, one cannot determine what would have happened to spending on education and on other services in the absence of the fiscal constraints that resulted from Proposition 13 and its progeny and from the state's response to the *Serrano* decision. Such an analysis requires comparing trends in California and states with circumstances like those in

California to trends in states in which substantive constraints on spending have not been imposed. Thus, while the literature leads me to expect that little if any substitution has occurred, in the empirical work that follows I will examine the impact of fiscal constraints on trends in spending on public education and on services that might substitute for public education.

### **Substitution of private for public resources**

In the face of constraints on education spending, substitution may come in the form of increased public spending on services that can substitute for services previously provided by the schools. Substitution may also come in the form of increased private spending on services that can replace what is lost when constraints are imposed on school spending. Among such services would be tutoring programs, distance education programs, academically-oriented after school programs, and even academically-oriented summer programs.

Existing research provides no systematic information on the extent to which private spending on such substitute services has been affected by the imposition of constraints on education spending. In fact, there is only limited research on the broad range of private responses to the imposition of constraints. Downes and Schoeman (1998) document the initial impact of the constraints resulting from the combination of *Serrano* and Proposition 13 on private school enrollment in California. They show that about 45 percent of the increase from 1970 to 1980 in the private school share in unified (K-12) districts could be attributable to the combined effect of Proposition 13 and *Serrano*.<sup>6</sup> Sonstelie, Brunner, and Ardon (2000) show that, while the long run shift to private schools in California is less than the shift that occurred in the immediate aftermath of the constraints, there was a permanent increase in the private school share.

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<sup>6</sup> The private school share in these districts increased from 9.53 percent in 1970 to 13.3 percent in 1980.

The other private response that has been studied extensively is the growth in private contributions to public schools that follows the imposition of constraints. Brunner and Sonstelie (2003) note that, while private contributions are a substantial portion of district revenues in a small number of school districts, the contributions have little impact on the post-*Serrano* distribution of education expenditures. Brunner and Imazeki (2005) confirm this finding using data from 2001. They show that 81.75 percent of students attended schools for which the combined contributions to the school and the district were less than \$50 per pupil. Further, only 1.2 percent of students attended schools for which combined contributions were at or above \$500 per pupil. Overall, contributions per pupil in California were only \$39 in 2001.

Downes and Steinman (2006) use data from Vermont to confirm this picture of the role of contributions. In that state, substantive fiscal constraints were imposed on some school districts as a result of a court-mandated finance reform enacted in 1997. The evolution of miscellaneous revenues, the bulk of which were contributions, provided a rough indication of the importance of private giving to public schools. In Vermont, the median of miscellaneous revenues as a fraction of total revenues reached its maximum of 0.00934 in fiscal year 1997, prior to the imposition of fiscal constraints. In the fiscal years from 1999 to 2003, the period in the data for which fiscal constraints were operative, this median never exceeding 0.00425. Only for a small subset of districts were contributions important. In fiscal year 1998, prior to the imposition of the fiscal constraints, the 95<sup>th</sup> percentile of miscellaneous revenues as a fraction of total revenues was 0.03547. In every fiscal year after 1999, the 95<sup>th</sup> percentile increased, rising to 0.07833 in 2000, 0.1637 in 2001, 0.2067 in 2002, and 0.2194 in 2003. For this small subset of districts, miscellaneous revenues had gone from being inconsequential to comprising over a fifth of



revenues. Nevertheless, while contributions may have muted slightly the impact of constraints, the overall effect of contributions on the distribution of spending in Vermont was limited.

The central lesson from the work on private schooling and private contributions seems to be that, while there are private responses to constraints, these responses tend to be small. The implication of this lesson could be that little substitution of private for public spending would be expected. Alternatively, the results on private contributions and private schooling could be a consequence of growing utilisation of supplementary services. Because such services are targeted to specific students, they are not subject diffusion across all students, as are contributions. And supplementary services may provide a more cost-effective route to a certain quality of education than does private schooling. Thus, the impact on private spending of constraints on public spending remains a question that can only be addressed empirically.

### **Data and methodology**

To address the question of whether public spending in areas other than education has substituted for constrained education spending, I start with county-level data from the 1972, 1977, 1982, 1987, 1992, 1997, and 2002 Censuses of Government. County-level data are used both to account for the fact supplementary spending could be done by overlying city or town governments or by overlying county governments. Thus, county-level data will reflect all spending that could be substituting for education spending. Within-county diversity in the extent to which the constraints resulting from school finance reforms and tax and expenditure limitations bind means that county-level data may not reflect the range of substitution responses. Nevertheless, because school district level data will never reflect the activities of overlying governments and because substitution may happen in the form of spending by an overlying

government that is not closest to being coterminous to the school district, county-level data make it possible to look for almost any substitution that may have occurred.

Variation in spending on education and on other publicly-provided services results from variation in income, in demographic factors that are likely to translate into variation in demand for the services, and in variation in factors that affect the cost of providing constant-quality services. To account for these sources of variation, data from the 1970, 1980, 1990, and 2000 Decennial Censuses were merged with the data from the Census of Governments. In addition, county-specific dummies were utilised to account for any temporally-stable sources of variation in spending.

Isolating the impact of spending constraints on substitution cannot be done using only data from California, since with such data the effects of the constraints cannot be isolated from the effects of other changes in the educational landscape in California that were contemporaneous with the constraints. For example, the population of students served by California schools changed more dramatically than the population of students in any other state in the nation. From 1986 to 1997, the percent of the California public school student population identified as minority increased from 46.3% to 61.2%. Nationally, the percent minority grew far more slowly, from 29.6% to 36.5%.<sup>7</sup>

For this reason, I combine the national data on spending with information on the imposition of state-level school finance reforms and tax and expenditure limitations that might have constrained spending in some or all of the districts in a state. The empirical strategy will then be

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<sup>7</sup> Generating comparable numbers for earlier years is difficult. Nevertheless, the best available data support the conclusion that these sharp differences in trends in the minority share pre-date the *Serrano*-inspired reforms. For example, calculations based on published information for California indicate the percent minority in 1977-78 was approximately 36.6%. Nationally, estimates based on the October 1977 Current Population Survey indicate the percent minority was 23.9%.

to determine if in states with finance reforms, tax limits, or expenditure limits, there has been more rapid growth in non-education spending that might substitute for education spending.

This strategy requires grouping heterogeneous policies into categories small enough to make isolating the effects of the policy changes feasible. For the school finance reforms, I utilize the grouping of reforms into court-ordered and legislative reforms discussed in Downes and Shah (2006). Legislative reforms are defined as major changes in the finance system that are not a direct result of a court decision. The starting point for the coding of finance reforms was tables in Bahl, Sjoquist, and Williams (1990) and Hickrod, et al (1992). I then checked and updated the information from these tables using Huang, Lukemeyer, and Yinger (2004) for the timing of court mandates and three editions of *Public School Finance Programs of the United States and Canada* (Gold, et al, 1992; Gold, et al, 1995; Sielke, et al, 2001) for the timing of legislative reforms.

For limits on the ability of localities to raise revenues or make expenditures, I start by adopting Figlio's (1997) approach for classifying limits. In particular, limits on the nominal tax rate are counted as limits only if they are accompanied by limits on assessment growth. Three types of limits were coded, limits on expenditures, limits on revenues, and combined limits on nominal tax rates and assessment growth. If any one of these three limits was present, a county was treated as having a limit on the ability of localities to raise revenues or make expenditures. The presence and timing of these limits is determined using the information in Mullins and Wallin (2004). In addition, Mullins and Wallin (2004) is the source for information on the presence of expenditure or revenue limits imposed on state, as opposed to local, governments.

To examine cross-sectional variation in substitution of private spending for public spending,

I use the restricted-use version of the 2003 Before- and After-School Programs and Activities (ASPA) survey that is part of the National Household Education Surveys Program conducted by the National Center for Education Statistics. The restricted-use version of the ASPA survey includes the state identifiers required to make it possible to merge with the data from the survey the data on state policies.

While substitution of private for public resources could take many forms, the data available in the ASPA forced me to limit the analysis to participation in after-school activities. In other words, the empirical work below is designed to determine if participation in after-school activities differs between states with constraints on local spending on education and states without such constraints. Also, since opting out of the public schools is, in effect, a form of substitution, differences in prevalence of public school choice are also considered.

Table 1 provides summary statistics for the county-level data on public expenditures. All dollar values in this table are in 1982-84 dollars using the CPI for urban consumers (CPI-U). Table 2 gives the percentage growth from 1982 to 2002 for each of the expenditure categories for counties in California, for counties in states in which there have been court-mandated school finance reforms and some form of tax or expenditure limitation, and for all counties.

The numbers in Table 2 indicate that, in California, percentage growth in current K-12 education expenditures was slower than percentage growth in all expenditure categories except for higher education and libraries. This result cannot be taken as evidence of substitution, however, since, for all counties in the country, the gap between the means of percentage growth in education and non-education spending was even larger than for California counties. What is also apparent from Table 2 is the tremendous variation, both across California and across the

nation, in percentage growth in all spending categories. The central lesson of this table seems to be that a simple examination of means will shed little light on the extent to which there was substitution of non-education for education spending in states in which localities faced fiscal constraints.

Table 3 contains information on participation in after-school activities, as well as other information on the students who are included in the ASPA survey. Because some subpopulations are oversampled for the ASPA survey, I utilized the weights provided with the ASPA data in generating the summary statistics provided in Table 3 and the estimates given below.

As is apparent from Table 3, the demographics of California's student population differ in several important ways from the demographics of the rest of the nation. Students in California are far more likely to be Hispanic or Asian-American and, as a result, are more likely to be limited English proficient. The birth parents of student in California tend to be less well educated than their counterparts elsewhere in the country, and students in California are more likely to live in households with relatively low income.

Differences in participation in after-school activities are also evident in Table 3. Students in California are less likely to participate in after-school activities. Participation rates in sports, religious activities, arts, and scouts are all notably less in California. Only the participation rate in California in academic activities is close to participation rate in the nation as a whole. This latter result could signal substitution, though the lower participation rates in sports and arts make the story told by these numbers unclear. Only by accounting for both variation in the fiscal landscape in which schools operate and variation in demographic factors that could result in

variation in participation rates can the impact of fiscal constraints on the utilization of after school activities be determined.

The distinct nature of each data set necessitated the use of distinct empirical strategies. First, to examine the impact of fiscal constraints on spending that could substitute for education spending, a natural strategy would have been to estimate a traditional expenditure function. Specifically, the expenditures function would be given by

$$(8) \quad Y_{it} = \alpha_i + \tau_t + Z_{it}\gamma + \eta V_{it} + \theta A_{it} + P_{it}\kappa + C_{it}\xi + L_{it}\delta + D_{it}\zeta + \varepsilon_{it} \quad ,$$

where the dependent variable  $Y_{it}$  is one of the measures of county-level per capita spending in county  $i$  in year  $t$ . The vector  $Z_{it}$  includes contemporaneous characteristics of the county and the population of the county such as income that influence demand for public expenditures, the vector  $C_{it}$  includes attributes of the community that influence its cost of providing schooling outcomes, the vector  $P_{it}$  includes the prices of inputs for community  $i$ ,  $V_{it}$  is a measure of the tax base of that community (which determines the community's tax price), and  $A_{it}$  is intergovernmental aid to the community. The vector  $L_{it}$  is a vector of dummy variables indicating the presence of local and state limits on revenue raising and expenditure, while the vector  $D_{it}$  is a vector of dummy variables indicating the presence of court-ordered or legislative school finance reforms. The county-specific fixed effect is denoted by  $\alpha_i$ , while the  $\tau_t$  denote year effects. As noted in Downes (2000), reduced-form expenditure functions of this kind have the advantage of being consistent, as a first-order approximation, with a wide variety of public choice processes.

Unfortunately, reasonable proxies for each county's tax base and for input prices facing governments in each county are not available in each from either the Census of Governments or the Census of Population and Housing. For that reason, I use a traditional impact analysis

strategy, controlling for many of the variables that would be included in the expenditure function. In this analysis, measurable county-level characteristics are utilised to absorb the effects of those characteristics for which we lack measures and to limit the extent to which cross-time changes in spending driven by changes in these unmeasured determinants of spending would be attributed to the contemporaneous imposition of fiscal constraints.

Specifically, the estimated specification took the form:

$$(9) \quad Y_{it} = \alpha_i + \tau_t + X_{it}\beta + L_{it}\delta + D_{it}\zeta + \varepsilon_{it} ,$$

where, as above, the dependent variable  $Y_{it}$  is one of the measures of county-level per capita spending in county  $i$  in year  $t$ . The vector  $X_{it}$  combines elements of  $Z_{it}$  and  $C_{it}$  in (8), including income, poverty and population. All financial variables in (9) are measured in real dollars.

In estimating the parameters of equation (9), the indicators of the presence of fiscal constraints are treated as exogenous, as has been the norm in the literature starting with the earliest work on California. While the arguments for assuming exogeneity in the California case are relatively strong,<sup>8</sup> in the case of other states, the exogeneity assumption is probably not tenable (Fischel, 1997; Figlio, 1997). Since, however, there is little evidence that the estimated coefficients on the indicators of fiscal constraints are sensitive to treating the policies as exogenous (Figlio, 1997; Downes and Figlio, 2000), I have chosen to simplify the analysis by following the norm in the literature and treating the policy indicators as exogenous.

The event analysis approach will also provide an imperfect understanding of the direct impact on public expenditures of the imposition of tax and expenditure limits and of finance reforms because the estimated coefficients on the elements of the dummy variable vectors  $L_{it}$  and  $D_{it}$  measure the total effect of these fiscal constraints, including those effects that work through

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<sup>8</sup> See Downes and Greenstein (1996) for further discussion of these issues.

changes in local tax prices and intergovernmental aid. Given the data limitations, this problem cannot be avoided. The implication of this fact is that, if sufficient substitution occurred in counties where localities faced fiscal constraints to overcome any mitigating changes in such determinants of expenditure as intergovernmental aid and the local tax price, then the coefficients would be positive on some or all of the elements of the dummy variable vectors  $L_{it}$  and  $D_{it}$ . Further, coefficients of zero on these policy indicators could indicate that household/voters responded little to the imposition of constraints or that there were sufficiently large mitigating changes in such expenditure determinants as intergovernmental aid and the local tax price to leave households/voters feeling that no other responses were necessary.

Decisions about participation in after-school activities is assumed to be based on the household's evaluation of the benefits and costs of participation in that activity. If

$$(10) \quad V_{ij} = \alpha + W_{ij}\beta + L_i\delta + D_i\zeta + \varepsilon_{ij} \quad ,$$

gives the net benefit to the household of student  $i$  ( $i=1, 2, \dots, n$ ) if that student participates in activity  $j$ , then that student will participate if  $V_{ij} > 0$ . The vector  $W_{ij}$  contains attributes of the student and her household that affect the household's tastes for participation and that directly contribute to the costs or the benefits of participating. For example,  $W_{ij}$  should include measures of household size and composition, since these will affect costs of participating, as well as measures of parental education, since these may well correlate with tastes for participation. The vector  $L_i$  is a vector of dummy variables indicating the presence of local and state limits on revenue raising and expenditure in the state in which student  $i$  lives, while the vector  $D_i$  is a vector of dummy variables indicating the presence of court-ordered or legislative school finance reforms in that state. If private substitution in the form of increased use of after-school activities



occurs, the coefficients on these dummy variables will be positive.

If

$$(11) \quad \delta_{ij} = \begin{cases} 1 & \text{if } V_{ij} > 0 \\ 0 & \text{otherwise} \end{cases}$$

and  $p_{ij} = P(\delta_{ij} = 1)$  is the probability student  $i$  participates in after-school activity  $j$ , then the log of the likelihood function for activity  $j$  is

$$(12) \quad \ln L_j = \sum_{i=1}^n \ln(p_{ij})$$

Minimizing  $\ln L_j$  provides estimates of parameters of the net benefit function (10) for activity  $j$ .

### **Results - The Impact on Public Expenditures**

Table 4 presents estimates of the mean impact of school finance reforms and revenue and expenditure limits on county-level education and non-education spending. Results for current per capita K-12 education expenditures are included in the first column. In states in which court-ordered or legislative school finance reforms have been implemented, per capita K-12 expenditures are higher, relative to those same expenditures in non-reform states. The results for court-ordered reform are consistent with those of Murray, Evans, and Schwab (1998) and Baicker and Gordon (2006), but the results for legislative reforms differ from those of Evans, Murray, and Schwab (1997). This latter discrepancy may well be due to the richer set of covariates included in the model estimated here, particularly the controls for state and local revenue and expenditure limits (Blankenau and Skidmore, 2004).

Limits on the ability of localities to spend or to raise revenues do not appear to constrain spending. Spending does decline in counties located in states in which limits on state-level revenue-raising or expenditure abilities exist. Taken together, these results duplicate those of Figlio (1997), who found evidence of declines in K-12 education spending primarily in those

states where there was little scope for state response. In states where state governments had flexibility, state aid has generally compensated for reductions in local property tax revenues (Downes and Figlio, 1999).<sup>9</sup>

California is a state in which limits were imposed on the ability of both the state and local governments to spend or to raise revenues. The results in Table 4 indicate that the net effect of such combined limits may be a reduction in per capita spending. Such declines may lead to pressure for substitution, though, as noted above, the scope for substitution may be limited because of the favored status of K-12 education. The remaining columns of Table 4 generally confirm that K-12 education is different from every other spending category, indicating that, if anything, there is shifting of resources away from other spending towards education. In states with a limit on the ability of localities to spend or to raise revenues, per capita county area expenditures on parks, hospitals, housing, and libraries are all lower, relative to county area expenditures in states without such limits. County area expenditures on income transfers are relatively higher in states with limits on the ability of localities to spend or to raise revenues. Nevertheless, the main implication of Table 4 seems to be that, on average, revenue or expenditure limits do not generally result in a substitution of other spending for education spending.

School finance reforms do appear to result in a change in the composition of local spending, resulting in a shift of resources towards K-12 education. This shift is particularly apparent in states, like California, with a court-mandated finance reform, a finding that duplicates that of Baicker and Gordon (2006).

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<sup>9</sup> Localities also make up for constraints on their ability to generate property tax revenues by making increased use of other taxes. In results not presented here but available from the author, per capita revenues from taxes other than the property tax increase on net in states with limits on both localities and on the state.

While there is little evidence of substitution on average, the results in Table 4 may obscure the fact that there is substitution in counties in which the constraints are most binding. For example, school finance reforms tend to impose fiscal constraints on school districts with the highest levels of spending but may have little, if any, impact on the ability of the average district to provide education. Table 5 presents estimates of a crude attempt to account for such potential heterogeneity in the impact of the fiscal constraints. The results in this table were generated by adding to the basic specification in equation (9) interactions between per capita current education expenditures in 1982 and the dummy variables indicating the presence of fiscal constraints.<sup>10</sup> These estimates must be interpreted with caution because of the inclusion of a potentially endogenous variable, per capita current education expenditures in 1982, as an explanatory variable. Nevertheless, these estimates do provide a rough indication of the extent to which there existed heterogeneity in the impact of the fiscal constraints.

Because the impact of the fiscal constraints on the county with mean characteristics can be determined from the estimates of Table 5 only by adding the coefficient on the policy dummy to coefficient on the corresponding interaction term multiplied by mean per capita current education expenditures in 1982,<sup>11</sup> the estimates in Table 5 are not directly comparable to those in Table 4. Thus, the discussion here will focus on the coefficients on the interactions which are given in the final four rows of Table 5. A positive interaction indicates that there is stronger evidence of substitution in counties with higher per capita current education expenditures in 1982. Given the nature of the fiscal constraints imposed, positive interactions are what we would expect.

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<sup>10</sup> Per capita current K-12 education expenditures in 1982 were used in this specification because 1982 was the first year in which there were not significant numbers of missing values for the education expenditures variable.

<sup>11</sup> For example, the results for per capita K-12 education expenditures in the first column of Table 5 imply that, all else equal, in a county with the mean per capita current education expenditures in 1982 located in a state with a local limit on revenues or expenditures, per capita current education expenditures would have \$182.2983 higher. This differs little from the estimated mean impact of \$161.8179 given in Table 4.

A few of the interactions match expectations. For example, in states in which there have been legislative finance reforms, per capita parks expenditures appear to have increased in counties with higher per capita current education expenditures in 1982. Similarly, in states in which there have been court-ordered finance reforms, per capita library expenditures appear to have increased in counties with higher per capita current education expenditures in 1982. Both of these results are consistent with substitution of non-education expenditures for education expenditures in counties in which local school districts were likely to be most affected by fiscal constraints.

The problem, however, is that while there are some results in Table 5 that are consistent with substitution occurring in the most constrained communities, there are other results that run counter to expectation. For example, the negative coefficient in the library expenditure specification on the interaction between the indicator of the presence of a local revenue or expenditure limit and per capita current education expenditures in 1982 runs counter to expectation, as does the insignificant coefficient in the parks expenditure specification on the interaction between the indicator of a court-ordered finance reform and per capita current education expenditures in 1982. No consistent picture of the nature of the heterogeneity in the effects of the fiscal constraints emerges from Table 5.

Nevertheless, the estimates in Table 5 do mitigate to some extent the conclusion that there was no real substitution of other spending for education spending. The results in Table 5 indicate that, in some counties, there may have been increases in spending in other expenditure areas, though even for the counties with the highest per capita education expenditures in 1982, the implied increases in non-education spending were relatively small.<sup>12</sup> As importantly, the

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<sup>12</sup> For example, the estimates in Table 5 imply that, if the county with the maximum per capita education

results in Table 5 suggest that further exploration of the heterogeneity of the response to fiscal constraints is warranted.

### **Results - The Impact on Participation in After-School Activities**

The main lesson of the results in Tables 4 and 5 is that there is limited evidence of substitution of public non-education spending for education spending, even in those localities in states in which the combination of state and local limits may have resulted in a decline in K-12 education spending. If substitution occurred in these localities, that substitution would have had to have been in the form of private spending. The results in Table 6 represent my attempt to use the data from the ASPA survey to look for evidence of such private substitution. Because these estimates are generated using a single cross-section, we cannot use these results to determine the extent to which constraints on school spending led to cross-state differences in participation in after-school activities. All the estimates can reveal is whether school children in states in which the fiscal constraints differ in their participation rates, possibly because of the constraints or possibly because of some other factor that is correlated with the presence of the constraints.

With this caveat in mind, we can look to Table 6 to see if the estimates are consistent with substitution in the form of increased utilization of after-school activities in states with fiscal constraints. If such substitution had occurred, we would expect to see a positive coefficient on the policy dummies. Of the 36 policy dummy coefficients given in this table, only two, the coefficient on court-ordered reform in the religious activities specification and the coefficient on local tax and expenditure limits in the other activities specification, are positive and significant. While other activities could substitute for schooling services, the fact that the activities included

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expenditures in 1982 was located in a state with a court-ordered finance reform, that county would have per capita library expenditures \$2.60 higher than if that same county was located in a state without a court-ordered finance reform.

in this catch-all category are not academic, art-related, or sports-related reduces the likelihood that these activities provide households with a mechanism for replacing schooling services. Thus, since religious activities are also not likely to substitute for schooling services, the results in this table support the argument that there was no substitution of after-school activities for school services in states in which localities faced fiscal constraints.

In separate regressions not reported here, estimates were generated of the strength of the relationships between the presence of fiscal constraints and participation in after-school activities that were school-sponsored and the strength of the relationships between the presence of fiscal constraints and participation in after-school activities that were not school-sponsored.<sup>13</sup> Because these results generally confirmed the conclusions implied by Table 6, in the interest of clarity they were not reported. Nonetheless, one notable result was that participation in school-sponsored after-school arts and academic activities was significantly lower in states in which local tax or expenditure limits were present. A possible implication of these results is that the limits do constrain what the public schools can do. And, since there is no evidence of increased likelihood of participation in non-school-sponsored after-school arts and academic activities, these results also tend to confirm the conclusion that there was no substitution of after-school activities for school services in states in which localities faced fiscal constraints.

### **Concluding remarks**

When fiscal constraints are imposed on local school districts either because of changes in the manner in which elementary and secondary education is financed or because of limits on the ability of localities to spend or to raise revenues, one avenue around the constraints is increased

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<sup>13</sup> Because for only private school students was the question about participation in a school-sponsored after-school religious activity asked, these separate regressions were not estimated for after-school religious activities.

spending on services or activities that could substitute for education spending. The results of this paper indicate that this avenue appears not to have been traveled. Public spending on services that could substitute for education has not increased relatively in counties in which localities are subject to fiscal constraints. Participation in after-school activities that could substitute for schooling services also is no different in localities facing constraints relative to localities in which no such constraints are present.

While at first blush the absence of substitution may seem surprising, these results are consistent with the growing literatures on the impact of school finance reforms and of revenue and expenditure limitations. First, elementary and secondary education spending tends to be less affected by constraints than do other spending categories. As a result, the scope for substitution of public non-education spending is limited. Second, while private responses to fiscal constraints exist and, in areas where the constraints are particularly binding, are large (Downes and Steinman, 2006), the mean response tends to be small (Sonstelie, Brunner, and Ardon, 2000). This small magnitude of the mean is attributable not just to the fact that the fiscal constraints do not affect some individuals, but also to the fact that even those individuals residing in school districts limited by the fiscal constraints change their behavior little, if at all.

## References

- Bahl, R., Sjoquist, D., & Williams, W.L. "School Finance Reform and Impact on Property Taxes." *Proceedings of the Eighty-Third Annual Congress of the National Tax Association - Tax Institute of America* (Columbus, OH: National Tax Association, 1990): 163-171.
- Baicker, Katherine and Gordon, Nora. "The Effect of State Education Finance Reform on Total Local Resources," *Journal of Public Economics* 90 (2006): 1519– 1535.
- Blankenau, William F. and Skidmore, Mark L. "School Finance Litigation, Tax and Expenditure Limitations, and Education Spending." *Contemporary Education Policy* 22 (January 2004): 127-143.
- Brunner, Eric and Imazeki, Jennifer. "Fiscal Stress and Voluntary Contributions to Public Schools." In William C. Fowler, (Ed.), *Developments in School Finance: 2004* (Washington, D.C.: National Center for Education Statistics, 2005): 39-54.
- Brunner, Eric and Sonstelie, Jon. "School finance reform and voluntary fiscal federalism." *Journal of Public Economics* 87 (Issues 9-10, 2003): 2157-2185.
- Downes, Thomas A. and Figlio, David N. "Do Tax and Expenditure Limits Provide a Free Lunch? Evidence on the Link Between Limits and Public Sector Service Quality." *National Tax Journal* 52 (March 1999): 113-128.
- \_\_\_\_\_. "School Finance Reforms, Tax Limits, and Student Performance: Do Reforms Level-Up or Dumb Down?" Medford, MA: Tufts University, 2000. Mimeo.
- Downes, Thomas A. and Greenstein, Shane M. "Understanding the Supply of Non-Profits: Modeling the Location of Private Schools." *RAND Journal of Economics* 27 (Summer 1996): 365-390.
- Downes, Thomas A. and Schoeman, David. "School Financing Reform and Private School Enrollment: Evidence from California." *Journal of Urban Economics* 43 (1998): 418-443.
- Downes, Thomas A. and Shah, Mona. "The Effect of School Finance Reform on the Level and Growth of Per Pupil Expenditures." *Peabody Journal of Education* 81 (Issue 3, 2006): 1-38.
- Downes, Thomas A. and Steinman, Jason. "Alternative Revenue Generation in Vermont Public Schools: Raising funds outside the tax base to support public education." Medford, MA: Tufts University, 2006. Mimeo.
- Evans, William N., Murray, Sheila, and Schwab, Robert M. "Schoolhouses, Courthouses, and Statehouses after *Serrano*." *Journal of Policy Analysis and Management* 16 (Winter 1997): 10-31.



Figlio, David N. "Did the 'Tax Revolt' Reduce School Performance?" *Journal of Public Economics* 65 (1997): 245-269.

Fischel, William A. "Serrano After 25 Years: Are America's Schools Better and Property Taxes Fairer?" *Proceedings of the Eighty-Ninth Annual Congress of the National Tax Association - Tax Institute of America* (Washington: National Tax Association, 1997): 327-335.

Gold, Steven D., Smith, David M., Lawton, Stephen B., and Hyary, A. C., editors, *Public School Finance Programs of the United States and Canada, 1990-91*. (Albany: Center for the Study of the States, 1992).

Gold, Steven D., Smith, David M., and Lawton, Stephen B. editors, *Public School Finance Programs of the United States and Canada, 1993-94* (Albany: The Nelson Rockefeller Institute of Government, State University of New York, 1995).

Hickrod, G. A., Hines, E.R., Anthony, G. P., Dively, J. A., and Pruyne, G. B. "The Effect of Constitutional Litigation on Educational Finance: A Preliminary Analysis." Normal, IL: Center for the Study of Educational Finance, September 1992. Mimeo.

Hoene, Christopher. "Fiscal Structure and the Post-Proposition 13 Fiscal Regime in California's Cities." *Public Budgeting and Finance* 24 (Winter 2004): 51-72.

Houtenville, Andrew J. and Conway, Karen Smith. "Parental Effort, School Resources and Student Achievement: Why Money May Not 'Matter'." Durham, NH: University of New Hampshire, June 2005. Mimeo.

Hoxby, Caroline M. "All School Finance Equalizations Are Not Created Equal: Marginal Tax Rates Matter." *The Quarterly Journal of Economics* 116 (November 2001): 1189-1231.

Huang, Yao; Lukemeyer, Anna; and Yinger, John. "A Guide to State Court Decisions on Education Finance" in John Yinger, editor, *Helping Children Left Behind* (Cambridge, MA: MIT Press, 2004).

Joyce, Philip G., and Mullins, Daniel R. "The Changing Fiscal Structure of the State and Local Public Sector: The Impact of Tax and Expenditure Limitations." *Public Administration Review* 51 (May-June 1991): 240-253.

Koski, William S. "Of Fuzzy Standards and Institutional Constraints: A Re-Examination of the Jurisprudential History of Educational Finance Reform Litigation," *Santa Clara Law Review* 43 (2003): 1185-1298.

Manwaring, Robert L. and Steven M. Sheffrin, Steven M. "Litigation, School Finance Reform, and Aggregate Educational Spending." *International Tax and Public Finance* 4 (May 1997):

107-27.

McGuire, Therese J. "Proposition 13 and Its Offspring: For Good or for Evil?" *National Tax Journal* 52 (March 1999): 129-138.

Mullins, Daniel R. "Tax and Expenditure Limitations and the Fiscal Response of Local Government: Asymmetric Intra-Local Fiscal Effects." *Public Budgeting and Finance* 24 (Winter 2004): 111-147.

Mullins, Daniel R. and Joyce, Philip G. "Tax and Expenditure Limitations and State and Local Fiscal Structure: An Empirical Assessment." *Public Budgeting and Finance* 16 (Spring 1996): 75-101.

Mullins, Daniel R. and Wallin, Bruce A. "Tax and Expenditure Limitations: Introduction and Overview." *Public Budgeting and Finance* 24 (Winter 2004): 2-15.

Murray, Sheila.E., Evans, William N., and Schwab, Robert M. "Education Finance Reform and the Distribution of Education Resources." *American Economic Review* 88(September 1998): 789-812.

Sielke, Catherine C.; Dayton, John; Holmes, C. Thomas; and Jefferson, Anne L., editors, *Public School Finance Programs of the U.S. and Canada: 1998-99* (Washington: National Center for Education Statistics, 2001).

Silva, Fabio and Sonstelie, Jon. "Did Serrano Cause a Decline in School Spending?" *National Tax Journal* 48 (June 1995): 199-215.

Sonstelie, Jon; Brunner, Eric; and Ardon, Kenneth. *For Better or Worse? School Finance Reform in California* (San Francisco, Public Policy Institute of California, 2000).

Wassmer, Robert W. "The 'Roller Coaster' of California State Budgeting after Proposition 13." Atlanta: Fiscal Research Center, Andrew Young School of Policy Studies, Georgia State University. FRC Report Number 131. July 2006.

Wassmer, Robert W. and Anders, Charles. "County Fiscal Stress: Cause and Consequence in California after Proposition 13." Sacramento, CA: Graduate Program in Public Policy and Administration, California State University, Sacramento, January 1999. Mimeo.

**Table 1**  
**Descriptive Statistics for County-Level Finance Data**

	<b>Observations</b>	<b>Mean</b>	<b>Standard Deviation</b>	<b>Minimum</b>	<b>Maximum</b>
<b>Per capita K-12 educ. expend.<sup>1</sup></b>	20060	532.0502	483.8059	0.0058	7916.3370
<b>Per capita higher educ. expend.</b>	21658	15.4340	74.8203	0	3008.8480
<b>Per capita parks expend.</b>	21658	11.4288	18.5721	0	601.1724
<b>Per capita health expend.</b>	21658	20.1656	36.4524	0	1644.6380
<b>Per capita hospitals expend.</b>	21658	77.9287	158.2793	0	2304.8600
<b>Per capita housing expend.</b>	21658	10.3169	22.3086	0	922.1845
<b>Per capita libraries expend.</b>	21658	5.4155	8.3532	0	244.4358
<b>Per capita income transfer expend.</b>	21658	31.7511	60.7086	0	2202.3550
<b>Fraction minority</b>	21656	0.1498	0.1771	0	0.9840
<b>Fraction in poverty</b>	21657	0.1633	0.0822	0	0.6700
<b>Fraction high school graduate</b>	21657	0.5245	0.1156	0.0800	0.8108
<b>Fraction college graduate</b>	21657	0.1287	0.0700	0	0.6375
<b>Median family income<sup>2</sup></b>	21657	22105.13	5345.978	128.8660	56460.51
<b>Fraction under age 5</b>	21657	0.0717	0.0137	0	0.1690
<b>Fraction from 5 to 17</b>	21657	0.2120	0.0368	0.0665	0.4196
<b>Fraction over 65</b>	21657	0.1443	0.0441	0	0.3715
<b>Population</b>	21658	75876.58	272191.2	67	9519338

Notes: 1) Counties with reported education spending of 0 were dropped from the analysis of K-12 education spending.

2) Median family income was not reported in 1970. For 1970, mean family income was used.

**Table 2**  
**Percentage Change in Per Capita Current Expenditures, 1982-2002**

<b>Spending Category</b>	<b>California counties</b>		<b>All counties</b>	
	<b>Mean</b>	<b>Standard Deviation</b>	<b>Mean</b>	<b>Standard Deviation</b>
<b>Per capita K-12 educ. expend.</b>	50.4851	132.3933	56.6291	45.5557
<b>Per capita higher educ. expend.</b>	26.3216	88.1873	71.5902	72.8164
<b>Per capita parks expend.</b>	42.3003	65.7917	296.0018	1481.455
<b>Per capita health expend.</b>	225.2726	132.3933	654.3698	6648.045
<b>Per capita hospitals expend.</b>	-3.8632	88.1873	657.3458	12249.15
<b>Per capita housing expend.</b>	346.3125	654.8875	657.2121	3016.784
<b>Per capita libraries expend.</b>	44.1370	111.9093	362.3353	1841.994
<b>Per capita income transfer expend.</b>	25.1673	42.5242	866.5913	8595.389

**Table 3**  
**Descriptive Statistics for 2001 Before- and After-School Programs and Activities Survey<sup>1</sup>**  
**(Weighted using Taylor series methods that account for complex survey design<sup>2</sup>)**

Variable	California only		Full sample	
	Mean	Linearized Standard Error	Mean	Linearized Standard Error
Participates in after school activity	0.4569	0.0203	0.5381	0.0079
Participates in arts after school	0.1794	0.0152	0.2143	0.0064
Participates in sports after school	0.3385	0.0189	0.3868	0.0077
Participates in club after school	0.0448	0.0071	0.0595	0.0034
Participates in academic activity after school	0.0695	0.0092	0.0700	0.0036
Participates in religious activity after school	0.1789	0.0156	0.2573	0.0069
Participates in volunteer activity after school	0.0890	0.0112	0.0920	0.0041
Participates in other activity after school	0.0340	0.0071	0.0374	0.0027
Participates in scouts after school	0.0954	0.0121	0.1300	0.0054
Attends public school	0.8863	0.0124	0.8784	0.0053
Dad is high school graduate	0.5011	0.0216	0.5724	0.0083
Dad is college graduate	0.2998	0.0198	0.3166	0.0077
Mom is high school graduate	0.5553	0.0215	0.6062	0.0082
Mom is college graduate	0.2404	0.0182	0.2969	0.0076
Household size	4.7707	0.0481	4.7034	0.0219
Income under \$20000	0.1733	0.0173	0.1171	0.0062
Income from \$20000 to \$40000	0.2500	0.0173	0.2281	0.0070
Income from \$40000 to \$60000	0.1851	0.0169	0.2253	0.0070
Income from \$60000	0.2222	0.0174	0.2860	0.0074

Variable	California only		Full sample	
	Mean	Linearized Standard Error	Mean	Linearized Standard Error
to \$100000				
Student is White	0.4203	0.0205	0.7016	0.0070
Student is Asian-American	0.0859	0.0124	0.0344	0.0033
Student is African-American	0.0375	0.0084	0.0805	0.0043
Student is Hispanic	0.4190	0.0195	0.1548	0.0052
Age of student	9.1504	0.0957	9.3194	0.0370
Student is limited English proficient	0.2042	0.0165	0.0670	0.0038
Dad not present	0.1274	0.0164	0.1299	0.0059
Mom not present	0.0371	0.0079	0.0296	0.0027
Age of mom	36.7544	0.2554	37.2436	0.0965
Mom is limited English proficient	0.3092	0.0182	0.1113	0.0049
Number of children under 5	0.5607	0.0311	0.4937	0.0127
Number of children 5 to 17	1.9813	0.0439	2.0236	0.0194
Rural	0.0704	0.0141	0.2610	0.0077
Local limit	----	----	0.6635	0.0078
State limit	----	----	0.6267	0.0081
Court-ordered reform	----	----	0.6395	0.0082
Legislative reform	----	----	0.3247	0.0080

Notes: 1) Includes only those children for whom data on participation in after-school activities are available. Of the 9583 students in the sample, data on after-school activities are missing for 195.

2) The weights are designed to account for oversampling and nonresponse, and raked over several dimensions, including urban/rural status, census region, and home tenure. As a result, the weighted sample approximates a national sample.

**Table 4**  
**Estimates of Impact of Fiscal Constraints by Expenditure Category<sup>1</sup>, No Controls for Heterogeneity in Impact**  
**Dependent variable: Current per capita expenditures in the category (1982-84 dollars)**  
**(Standards error that are robust to heteroskedasticity in parentheses)**

<b>Variable</b>	<b>Per capita K-12 educ. expend.</b>	<b>Per capita higher educ. expend.</b>	<b>Per capita parks expend.</b>	<b>Per capita health expend.</b>	<b>Per capita hospitals expend.</b>	<b>Per capita housing expend.</b>	<b>Per capita libraries expend.</b>	<b>Per capita inc. transfer expend.</b>
<b>Local limit</b>	161.8179*** (11.5565)	0.2968 (1.2552)	-1.1224*** (0.3922)	-0.3696 (0.5853)	-5.2528** (2.6147)	-1.4312*** (0.5076)	-0.3593** (0.1684)	5.4726*** (0.9078)
<b>State limit</b>	-186.6113*** (15.0362)	1.8898 (1.2510)	-0.9598** (0.3936)	3.7448*** (0.6612)	3.9140 (2.7284)	-1.0366** (0.5126)	-0.0304 (0.1527)	0.0101 (0.8537)
<b>Court-ordered reform</b>	81.1123*** (10.7402)	-2.1518 (1.3650)	-2.5545*** (0.5604)	-2.6686*** (0.9585)	3.7487 (3.5075)	-1.6347*** (0.5153)	-0.2894 (0.1801)	-4.5325*** (1.0832)
<b>Legislative reform</b>	110.7682*** (10.7450)	-4.9840*** (1.3514)	0.1629 (0.3825)	-5.2957*** (0.6522)	1.3837 (2.8506)	-0.5030 (0.6496)	-0.6074*** (0.1607)	0.6351 (0.8783)
<b>Within R<sup>2</sup></b>	0.2088	0.0478	0.2237	0.1754	0.1254	0.1794	0.2301	0.1354

Notes: 1) All specifications include year effects, county-specific effects, fraction minority, fraction in poverty, fraction of adults who have completed high school but not college, fraction of adults who have completed college, fraction of population under age 5, fraction of population age 5 to 17, fraction of population over age 65, median (mean in 1972) family income (in 1982-84 dollars), and population of the county.

\*-Significant at 10 percent level, \*\*-Significant at 5 percent level, \*\*\*-Significant at 1 percent level

**Table 5**  
**Estimates of Impact of Fiscal Constraints by Expenditure Category<sup>1</sup>, Controls for Heterogeneity in Impact**  
**Dependent variable: Current per capita expenditures in the category (1982-84 dollars)**  
**(Standards error that are robust to heteroskedasticity in parentheses)**

Variable	Per capita K-12 educ. expend.	Per capita higher educ. expend.	Per capita parks expend.	Per capita health expend.	Per capita hospitals expend.	Per capita housing expend.	Per capita libraries expend.	Per capita inc. transfer expend.
<b>Local limit</b>	372.9555*** (36.3485)	7.9152* (4.6422)	-4.0711*** (1.3450)	2.4376 (1.8095)	-4.1752 (8.4055)	0.0722 (1.7311)	1.3087** (0.6305)	-12.5061*** (3.5052)
<b>State limit</b>	-804.4557*** (47.0608)	-1.7315 (3.6492)	-0.2417 (1.1730)	-2.7317 (1.8637)	-12.1834 (8.5441)	-0.1317 (1.4961)	-0.6758 (0.9519)	-4.5122 (2.9227)
<b>Court-ordered reform</b>	-110.8388*** (28.5110)	-3.9800 (3.4645)	-3.6812*** (1.2738)	-3.5680* (2.0080)	-19.1105* (10.5856)	-3.6270* (2.1146)	-1.3163** (0.5703)	5.4092 (3.4933)
<b>Legislative reform</b>	-78.3296*** (32.0404)	-13.0481** (5.4008)	-4.9989*** (1.2371)	-5.2716*** (1.7840)	25.2731*** (9.5665)	0.6124 (1.8658)	-1.3744 (0.9465)	-4.3583 (4.2343)
<b>Interaction of per capita K-12 current education expenditures in 1982 with:</b>								
<b>Local limit</b>	-0.4190*** (0.0721)	-0.0167 (0.0102)	0.0060** (0.0031)	-0.0061 (0.0040)	-0.0016 (0.0177)	-0.0031 (0.0038)	-0.0036** (0.0014)	0.0380*** (0.0083)
<b>State limit</b>	1.3733*** (0.0914)	0.0081 (0.0086)	-0.0017 (0.0026)	0.0141*** (0.0039)	0.0347* (0.0180)	-0.0019** (0.0035)	0.0015 (0.0021)	0.0091 (0.0068)
<b>Court-ordered reform</b>	0.4870*** (0.0614)	0.0041 (0.0077)	0.0025 (0.0027)	0.0020 (0.0039)	0.0507** (0.0224)	0.0044 (0.0046)	0.0023* (0.0013)	-0.0222*** (0.0082)
<b>Legislative reform</b>	0.3843*** (0.0690)	0.0178 (0.0127)	0.0112*** (0.0026)	-0.0000 (0.0038)	-0.0521*** (0.0204)	-0.0024 (0.0044)	0.0017 (0.0021)	0.0101 (0.0098)
<b>Within R<sup>2</sup></b>	0.2310	0.0484	0.2257	0.1760	0.1270	0.1796	0.2311	0.1405

Notes: 1) All specifications include year effects, county-specific effects, fraction minority, fraction in poverty, fraction of adults who have completed high school but not college, fraction of adults who have completed college, fraction of population under age 5, fraction of population age 5 to 17, fraction of population over age 65, median (mean in 1972) family income (in 1982-84 dollars), and population of the county.

\*-Significant at 10 percent level, \*\*-Significant at 5 percent level, \*\*\*-Significant at 1 percent level



**Table 6**  
**Logit models of participation in after-school activities<sup>1</sup>**  
**(Standard errors in parentheses - Weighted using Taylor series methods that account for complex survey design<sup>2</sup>)**

<b>Variable</b>	Participates in after school activity	Participates in arts after school	Participates in sports after school	Participates in club after school	Participates in academic activity after school	Participates in religious activity after school	Participates in volunteer activity after school	Participates in other activity after school	Participates in scouts after school
<b>Local limit</b>	-0.1200 (0.0886)	-0.1681* (0.1020)	0.0254 (0.0891)	-0.2296 (0.1613)	-0.2055 (0.1371)	-0.0394 (0.0937)	-0.0742 (0.1269)	0.3891** (0.1961)	-0.1033 (0.1294)
<b>State limit</b>	0.0128 (0.0946)	0.0700 (0.1070)	-0.0512 (0.0920)	0.0729 (0.1669)	-0.0043 (0.1485)	0.0752 (0.1007)	0.1384 (0.1385)	-0.1458 (0.1903)	0.1183 (0.1332)
<b>Court-ordered reform</b>	0.1644 (0.2113)	0.2645 (0.2392)	-0.0437 (0.2078)	-0.0840 (0.3932)	0.5416 (0.4020)	0.4423* (0.2304)	-0.1417 (0.2966)	-0.6424 (0.4470)	0.0453 (0.2820)
<b>Legislative reform</b>	0.0389 (0.2197)	0.1111 (0.2487)	-0.2068 (0.2150)	-0.2205 (0.3998)	0.1747 (0.4166)	0.3887 (0.2394)	-0.3128 (0.3076)	-0.4954 (0.4588)	-0.1659 (0.2933)
<b>Northeast</b>	-0.1959 (0.1201)	-0.1940 (0.1291)	-0.0123 (0.1171)	-0.2219 (0.2012)	0.1763 (0.1891)	-0.2746** (0.1237)	-0.0657 (0.1693)	0.5141** (0.2556)	-0.0958 (0.1629)
<b>South</b>	-0.0095 (0.1180)	-0.2754** (0.1312)	0.1581 (0.1179)	-0.0542 (0.1940)	0.4309** (0.1899)	-0.2085* (0.1234)	0.1701 (0.1697)	0.3264 (0.2294)	0.0341 (0.1684)
<b>West</b>	-0.0390 (0.1304)	-0.0094 (0.1462)	0.2747** (0.1279)	-0.4118* (0.2328)	0.2880 (0.2025)	-0.4066*** (0.1386)	0.0985 (0.1793)	0.2712 (0.2620)	-0.0118 (0.1766)
<b>F-statistic</b>	24.54	15.70	20.85	8.41	5.91	11.94	11.99	2.72	6.59

Notes: 1) All specifications include household size, number of children under 5, number of children 5 to 17, age of the student, age of the mother, indicators of the student's race/ethnicity, indicators of the range containing the household's income, an indicator of whether the student is limited English proficient, an indicator of whether the mom is limited English proficient, indicators of the dad's educational attainment, indicators of the mom's educational attainment, an indicator of whether the mom is present, an indicator of whether the dad is present, indicators of the range of the poverty status of the zip code of residence, indicators of the range of the percent African-American and Hispanic of the zip code of residence, and an indicator of whether the zip code of residence is rural.

2) The weights are designed to account for oversampling and nonresponse, and raked over several dimensions, including urban/rural status, census region, and home tenure. As a result, the weighted sample approximates a national sample.

\*-Significant at 10 percent level, \*\*-Significant at 5 percent level, \*\*\*-Significant at 1 percent level