Property Tax Responses to State Aid Cuts in the Recent Fiscal Crisis

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Abstract

Many states experienced fiscal crises at the beginning of this decade. Some responded by cutting state aid to local governments. This paper explores the extent to which local governments responded to these aid cuts by raising property taxes. The authors hypothesize that changes in aid help explain the observed differences in per capita property tax revenue changes across states. They find that on average school districts increased property taxes by 23 cents for each dollar cut in state aid. These results highlight the important role that the property tax plays in maintaining the stability of the state and local sector.

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Table of Contents

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Property Tax Responses to State Aid Cuts in the Recent Fiscal Crisis

Introduction

Starting in 2001 and continuing for several years, most states faced very severe fiscal crises characterized by large and repeated budget gaps between available revenues and the resources needed to maintain government programs. Unlike prior fiscal crises, state governments responded to these budgetary gaps with more spending cuts rather than tax increases. In a majority of states, declines in grants to their local governments played an important role in filling these budget gaps (Reschovsky, 2004; Kalambokidis and Reschovsky, 2005). One way local governments could respond to reduced state fiscal assistance is by increasing locally-raised revenues, which in most states means the property tax. The objective of this paper is to explore in a systematic manner the extent to which local governments responded to these cuts in state aid by raising property taxes.

According to data collected by the U.S. Census Bureau, there was a tremendous amount of variation among the states in the rate of change of property tax revenue between 2000 and 2004. While real per capita property tax revenue actually fell in five states over this period, real per capita revenue grew by more than 20 percent in four other states. After providing some descriptive data which suggests that cuts in state aid to local governments were offset by increases in local property taxes, we estimate a regression model designed to explain changes in per capita property tax revenue between 2002 and 2004. We are particularly interested in determining the extent to which reductions in state intergovernmental grants to local governments explain property tax increases by these governments. In effect, we examine whether the property tax played an important countercyclical role in maintaining the stability of the state-local sector.

State Government Fiscal Crises

By historical standards, the recession that started in 2001 was very mild. After a brief dip, real GDP continued to grow. As in most recessions, real state government tax revenues declined in many states. Thus, it is not surprising that real per capita state tax revenue was lower in 2002 than it was in 2000 in 44 states.[1] What distinguished this recession from previous ones, and led scholars to conclude that the fiscal crises faced by most states were probably the worst since the Great Depression, was the magnitude of the decline in state revenue and the fact that revenue continued to stagnate for a longer than normal period after the overall economy started to recover (Knight, Kusko, and Rubin, 2003). Between 2000 and 2002, state government tax revenue declined by 7.3 percent in real per capita terms. While over the following two years real per capita tax revenue grew in all but eight states, the rate of growth was slow enough so that between 2000 and 2004 real per capita state government tax revenue actually declined in 32 states, with total revenue declining by 3.8 percent over this four year period.

[1] This calculation is based on tax revenue data from the U.S. Bureau of the Census (various years) and Consumer Price Index data from the U.S. Bureau of Labor Statistics (2007). The six states in which real per capita tax revenue grew during this period were Arkansas, New Hampshire, Louisiana, South Dakota, West Virginia, and Wyoming.

One way to illustrate the severity of the fiscal crises faced by many states over the past few years is to compare real GDP growth with real growth in state tax revenue after netting out the revenue impact of any legislated changes in taxes since the first quarter of 2001. Figure 1 demonstrates the impact on state tax revenue of the slow economic recovery and highlights the structural problems that characterize many state tax systems, in particular their revenue inelasticity.[2] The data show that about two years after the recession, adjusted real state tax revenues had dropped by about 12 percent from their level in early 2001. Furthermore, as recently as the end of the third quarter of 2006, real adjusted state tax revenue has not regained its pre-recession level.

How State Governments Responded to Fiscal Crises

In fiscal years 2002 through 2004 most state governments faced a series of large budget gaps. Given the balanced budget requirements that nearly all states face, state governments had to either raise revenues through legislated increases in taxes or fees, cut expenditures, or exploit various one-time funding measures. Although a number of states did resort to tax increases, Maag and Merriman (2003) demonstrate that in general states increased taxes by much less than they had after the 1990-91 recession. As a consequence, many state governments were forced to limit the growth of state government spending. In fact, measured in 2004 dollars, between fiscal years 2003 and 2004 per capita expenditures of state governments in the U.S. declined 0.2 percent (U.S. Census Bureau, 2006).

These governments then faced the problem of deciding whether to limit or reduce spending on state operated programs or to reduce their state's commitment to provide fiscal assistance to local governments, including counties, municipalities, and school districts. Census data indicates that between fiscal years 2002 and 2004, state government direct spending on its programs grew faster (or declined more slowly) than state spending on transfers to its local governments in 35 states.[3]

State intergovernmental expenditures go to all types of local governments—counties, municipalities, townships, special districts, and school districts. Although the largest amount of intergovernmental transfers goes towards public elementary and secondary education, state governments play a major role in funding the transportation, public health, and social services spending of local governments. Although very little research on these intergovernmental grants has been conducted, it is reasonable to assume that in tight fiscal periods, state governments will cut unconditional grants to local governments before they consider reducing categorical grants for road maintenance, health care, or social services. For example, the fact that road and highway grants are usually funded from earmarked gasoline taxes or motor vehicle license fees, makes it less likely that these grants will be reduced. In a survey of state budget officials in each state, Reschovsky (2004) identified 16 states that provided their county and/or municipal governments with unconditional grants. His survey found that between fiscal years 2003 and 2004, most of these states chose to cut the amount of these grants. Kansas completely eliminated its local gov-

[2] See Fox (2003) for a discussion of the role that the structure of state tax systems played in the fiscal crises of the past few years.

[3] This calculation was made by comparing percentage changes in "direct general expenditures" by state governments with percentage changes in the "intergovernmental expenditures" of state governments.

ernment grant program, and California, Massachusetts, Minnesota, and Nebraska each reduced these grants by over 10 percent.

Despite frequent statements by governors and legislators about the importance of public education, during the recent fiscal crisis a number of states reduced their financial support for K-12 education. In 15 states, nominal state aid per capita to local school districts was lower in fiscal year 2004 than it had been in 2002 (U.S. Census Bureau, various years). In a number of additional states, state education aid grew over this two-year period, but at a rate below the rate of inflation as measured by the Consumer Price Index. Thus, between fiscal years 2002 and 2004, 29 states reduced constant dollar state education aid per capita. In 2004, these 29 states enrolled two-thirds of the nation's public school students.[4] These data on reductions in state aid undoubtedly understate the fiscal pressures placed on local school districts. Fowler and Monk (2001) criticize the Consumer Price Index (CPI) as a measure of the change in the costs of public education over time, and demonstrates that costs generally rise a rate that is greater than the CPI. Not only were local school districts under pressure to maintain the current level of public education in light of cuts in state aid and rising costs, but over exactly this period of time the implementation of *No Child Left Behind* required that school districts take steps to improve the academic performance of all their students. Recent research conducted in Texas (Imazeki and Reschovsky, 2006) and in California, Kansas, Missouri, and New York (Duncombe, Lukemeyer, Yinger, 2007) estimated that the additional costs of meeting the accountability standards imposed by new federal statutes were substantially greater than the increases in Title I federal funding during the post-2001 period.

The observed cuts in intergovernmental transfers by state governments combined with the pressure on local governments, and in particular school districts, to maintain the level and quality of public services, raises the question of how local governments and school districts have responded to these cuts in grants. Although there exists a considerable theoretical and empirical literature on the responses of recipient governments to increased grants, the literature on how these governments react when grants are cut is quite slim, with much of the debate centered on the question of whether there is a *reverse* "flypaper effect." The few studies on the response of state and local governments to cuts in grants all concern cuts in federal grants. The results, which are summarized in Gamkhar (2002) are mixed, with some studies suggesting that local governments will respond to cuts in aid by reducing spending, while other studies find that local governments respond to reduced aid by raising local taxes sufficiently to make up for most of the loss in grant funding. It is also not clear how relevant this literature on responses to cuts in federal aid is to reductions in state intergovernmental transfers. Most federal grants are categorical in nature, designed for quite specific uses and often to achieve national goals, while most state fiscal assistance to municipal governments and school districts is in the form of unconditional aid designed to support the core functions of these local governments, such as elementary and secondary education.

In this paper, we test the hypothesis that local governments will respond to cuts in state grants by raising local property taxes. We focus on the property tax because it is the single most important source of local government tax revenue. In the case of local school districts, the type of local government that bore the brunt of most of the aid cuts, property taxes (in fiscal year 2004) ac-

[4] The enrollment data comes from the National Center for Education Statistics (2007).

counted for 91.1 percent of total tax revenue raised.[5]

Property Tax Increases by Local Government: A Response to the Fiscal Crisis?

Figure 2 shows nation-level data for state and local property taxes as a percent of personal income. There is a clear countercyclical pattern in this data. Note the surge in property tax collections relative to income beginning in 2000, contemporaneous with the decline in state-source income and sales taxes that precipitated the fiscal crisis. Figure 3 illustrates the annual growth rates (or rates of decline) in property tax revenue and in revenue from the three major state taxes: the general sales tax, the individual income tax, and the corporate income tax. The post-2000 state government fiscal crisis can be seen very clearly, with nominal revenue from the three state taxes actually declining between 2001 and 2002. In contrast, revenue from the property tax has grown steadily since 2000 at an annual rate of at least six percent.

The data in Figures 2 and 3 show that property tax revenues were increasing over the past few years. But as the property tax is for the most part a local tax, it is important to start looking at changes in property tax revenue at the individual state level. As our basic hypothesis is that property taxes were increased in response to reductions in state intergovernmental aid to local governments, we start by exploring some state-level data on recent changes in both property tax revenues and state aid.

Descriptive Statistics

Table 1* shows real per capita local government property collections and state aid by state for the pre-crisis fiscal year of 2000 and the two crisis fiscal years of 2002 and 2004. (Hawaii is included in this table, but is excluded from the later analysis because they have a statewide school system). All the numbers in the table have been expressed in real per capita terms using annual state population estimates from the Census Bureau and the Consumer Price Index (for all urban consumers). The data indicate that, with the exception of a few states, property tax revenue per capita grew faster than the rate of inflation over this four year period. States with relatively rapid property tax growth include Kansas, New Hampshire, Rhode Island, and South Carolina. Real state aid per capita fell in twelve states from 2000 to 2002 and in twenty-two states from 2002 to 2004. In three states, Alabama, Alaska, and North Carolina, real per capita state aid was cut in both two-year time periods. In eight additional states, the cuts in one of the periods were large enough so that real per capita aid was lower in 2004 than it had been in 2000.

Because both state legislatures and local government decision makers need some time to react to economic changes within their state, Table 2 focuses on fiscal changes during the 2002 to 2004 period. In the first column of Table 2, we calculate the percentage change in real property taxes per capita over this two-year period, and in the second column, we calculate the percentage change in total intergovernmental aid from the state government to its local governments (including school districts). The response by local governments to any percentage change in state aid is likely to depend in part on the importance of intergovernmental revenue in the overall financing

[5] This percentage figure was calculated using data from the National Center of Education Statistics' *National Public Education Financial Survey*. This survey includes tax data for both independent and dependent school districts.
*See all figures and tables at the end of the appendix.

of their budget. Thus, the impact of, say, a five percent reduction in state aid in Michigan, where intergovernmental transfers account for over half of local government revenue, is likely to be greater than the impact of a five percent cut in Texas, where state aid only accounts for about a quarter of local government revenue. To adjust for differences across states in the importance of various sources of revenue, in the third column of Table 2 we calculate the change in state aid as a percentage of 2002 *property tax* collections. This means that columns 1 and 3 have the same denominator. See the appendix for a discussion of the reasons why we chose to measure changes in aid in this way.

Of the twenty-two states with decreases in state aid from 2002 to 2004, nineteen have increases in property tax collections; the three exceptions are Alaska, South Dakota, and Tennessee. Of the thirteen states with decreases in state aid larger than five percent of property tax collections (in column 3 in Table 2), eight—Alabama, Arkansas, California, Georgia, Kansas, Massachusetts, South Carolina, and Utah—have corresponding increases in property tax collections also greater than five percent.

The evidence of Tables 1 and 2 is, for a significant minority of states, consistent with the hypothesis that state aid cuts in the recent crisis were buffered by local property tax increases. Before pursuing multivariate analysis to test the hypothesis of a negative relationship between state aid and property taxes in the recent crisis period, we look at these two sources of local government revenue over a longer time period. Doing so allows us to observe non-crisis periods and to offer alternative hypotheses for the relationship between aid changes and tax changes. We calculate year-to-year percentage changes in real per capita state aid and property tax collections for 1978 to 2000, and in Table 3 summarize the results as the simple correlation coefficient between the two variables over the 22-year time period.

A priori, the correlation between aid change and property tax change can be either positive or negative. In periods of normal growth when there is some positive real growth of local government spending, we might expect to see trend increases in both revenue sources and thus a positive correlation between state aid and property tax revenues. For several different reasons, the correlation could also be negative. One source of a negative correlation is the hypothesis of this paper—that in a recession, state revenue and thus state aid goes down (or grows less) while property tax collections are more stable (or even countercyclical). An alternative source of a negative correlation would be state policies that result in an explicit or implicit swap of increased state aid for a smaller reliance on local property taxes. These revenue swaps have most frequently involved the funding of public elementary and secondary education. In response to political pressure or judicial mandates, many states have increased state aid to schools more than trend, allowing, or sometimes even requiring, a decrease (or below trend increase) in property tax collections. A recent example comes from Texas, where in response to a state supreme court ruling that declared the state's school finance system unconstitutional, the legislature required all school districts to substantially reduce their property tax rates.[6] At the same time, the legislature increased state aid appropriations to school districts, funded primarily by new taxes on businesses and an increase in the cigarette excise tax.

[6] The Texas Supreme Court ruling was in the case *Neeley et al. v. West Orange-Cove et al.* (No. 04-144, Nov. 22, 2005).

The three largest negative correlation coefficients in Table 3 can be interpreted as artifacts of major state-for-local tax swaps—in 1995 in Michigan, 2000 in New Hampshire, and 1999 in Vermont.[7] Of the remaining states, twenty-one show a negative correlation between changes in state aid and changes in property taxes. Detailed state-by-state case studies are beyond the scope of this paper so we cannot distinguish between the two reasons for a negative association—disproportionate increases in state aid in policy shift years and disproportionate increases in property taxes in state revenue crisis years. Note that these can be reinforcing and not competing explanations. A state legislature that increased aid and its share above trend in the "good" years might find it easier to justify decreasing aid and allowing the property tax share to increase in the "bad" years. Consistent with this possibility, of the 24 states with a negative correlation between aid and property taxes in the 1978 to 2000 period, eleven—Arkansas, California, Georgia, Kansas, Massachusetts, Missouri, Nebraska, Oklahoma, Oregon, South Carolina, and Washington—showed a decrease in state aid and an increase in local property taxes in the post 2000 period.

In the next two tables, we turn our attention to school districts and explore the recent changes in their property tax revenues and their receipt of state aid. The state aid data come from the Census Bureau's *Public Education Finances* and the property tax data from the *National Public Education Financial Survey Data* conducted by the National Center for Education Statistics (various years). In most states, school districts are independent units of government with their own access to property taxes. In a minority of states, however, some or all school districts are dependent on appropriations from a parent government for their local government share of funding. These parent governments are general purpose governments—municipalities, counties, or in the case of Hawaii, the state. An advantage of the NCES survey is that it includes information on property tax revenues of both independent and dependent school districts. Financial data from the Census Bureau include total state aid to all public schools, but only include property tax revenue from independent school districts.

Table 4 has the same format as Table 1 except that Hawaii is excluded. The first three columns show that with the exception of Arkansas, Minnesota, and Montana, real per capita school district property taxes were higher in 2004 than in 2000. The last three columns indicate that after adjusting for inflation using the CPI, per capita state aid to school districts was lower in 2004 relative to 2000 in 22 states.

Table 5, which is identical in format to Table 2, presents the percentage changes between fiscal years 2002 and 2004 in school property taxes and school aid. As in the earlier table, column 2 measures the change in aid as a percent of the initial amount of aid, while column 3 measures the change in aid as a percent of property taxes so that the changes can be more easily compared to the change in property taxes in column 1. The data show that with the exception of three states, real per capita property taxes grew between 2002 and 2004. In twenty-nine of the forty-nine states in the table, real per capita state aid to education fell between 2002 and 2004. Expressed as a percent of property taxes, fourteen states cut real aid per capita by more than 10 percent. In all of the twenty-nine states that cut real per capita aid, school property taxes increased over the two-year period.

[7] Indeed, in all three of these states when the calculation is cut off at the year before the swap, the correlation coefficient between aid changes and property tax changes is positive.

Regression Analysis

The descriptive statistics of Tables 1 to 5 suggest a substitution, with increased local property taxes replacing decreased state aid, at least in some states. To pursue the hypothesis in a multivariate context, we seek to explain cross-state variation in changes in property taxes with a measure of change in state aid and other controls. We do this both for the entire local government sector and separately for school districts. Estimates for the 2002 to 2004 period are presented in Table 6.[8]

The Variables

The dependent variable is the *percentage change in total per capita local government property tax collections* from 2002 to 2004. In the school district regressions, the variable is defined as the percentage change in school district property tax revenues. The independent variable representing the hypothesis of property tax for aid substitution is the *change in per capita state aid to local governments* (or to local schools) expressed, as in column 3 of Table 3, *as a percent of property taxes per capita*. Scaled in this way, the coefficient can be interpreted as the change in property taxes per dollar of change in aid and the extreme case of a dollar-for-dollar substitution would have a coefficient of negative 1.00 (see Appendix).

Per capita local government property tax revenue may change over time for a number of reasons. In choosing a set of control variables for our regression, we identified variables that the existing local public finance literature indicated were related to property tax growth. There is not a well developed literature explaining *changes* in property tax *revenues*, at least not one with an underlying theory. There is however a long established literature explaining the *level* of local government *spending* (starting with Borcherding and Deacon, 1972) which relies on income and demographic determinants of the taste for government services. A recent application to *changes* in government spending (Anderson, 2006a) also relies on income and demographic determinants. Because the spending and revenue sides of the local government budget are linked by balanced budget requirements, (and because much of local government own-source revenues come from the property tax), we assert that the income and demographic taste variables used to explain *spending* changes are also appropriate for explaining changes in property tax *revenues*.

Data for the past 25 years indicates that both local government property tax revenue and expenditures have grown at approximately the rate of growth of personal income. This suggests that cross state differences in income growth may influence the growth in expenditure demands and consequently in property tax revenues. We measure income growth by the *percentage change in per capita personal income* over the 2002 to 2004 time period.

The pressure on local governments to raise property taxes may well depend on the severity of the fiscal crisis in each state. As emphasized by Elaine Maag and David Merriman (2007), there are both conceptual and empirical problems inherent in measuring the severity of the fiscal crisis in each state. We have chosen to define a *fiscal crisis severity* variable as actual state tax revenue per capita in 2004 as a percentage of 2004 predicted state tax revenue per capita, where the pre-

[8] Estimates for the change over the entire 2000 to 2004 period were attempted but had no explanatory power.

diction comes from a trend regression of per capita state tax revenue for the 1977 to 2000 time period.[9] The smaller the value of this variable, the greater the severity of the fiscal crisis.

Political support for raising the property tax is probably influenced by the socio-economic and demographic composition of local communities. The exact nature of these relationships is not very well understood. For example, there is a quite common perception that as individuals age and move into retirement, they are increasingly less willing to support the funding of local public services through the property tax. The literature on this topic is limited, and the results are mixed.[10] We entertain the possibility that states with a higher proportion of elderly will be less willing to support increases in property taxation by including as a control variable, the *percentage of a state's population that was age 65 and older* in 2000.

There is some limited evidence that local communities that are more socio-economically heterogeneous are less likely to support higher property taxes (to finance higher spending). We don't have state-level data on local government population heterogeneity, so as a proxy we include as a variable the state average *poverty rate* in 2000.

Renters and homeowners may be expected to perceive property tax increases differently or have different political power to resist property tax increases. A substantial literature suggests that renters suffer from *fiscal illusion*, i.e. they fail to recognize the full burden they face from the property tax, and thus they are less resistant to property tax increases.[11] To capture this effect we have a control variable for the percent of housing units statewide that were owner occupied in 2000.

Also, we include as a control variable a measure of the relative reliance on the local property tax in the state, *property taxes as a share of local government tax revenue in 2000*. Our hypothesis is that states that rely very heavily on the property tax will be less likely to increase their reliance on the property tax.

In some states, legislatively or constitutionally imposed limits on property taxation may restrict the ability of local governments to raise property tax revenue. In a number of states, these restrictions take the form of limitations on the allowable annual increase in property tax levies. A considerable amount of research has explored the question of how effective these limits have been in reducing the level of taxation and spending.[12] Research has provided a substantial body of evidence that the imposition of tax and expenditure limits has not only reduced spending on education, but has resulted in long-run reductions in the academic performance of public school students.[13] Based on this research it is reasonable to assume that the existence of binding prop-

[9] During the 1977 to 2000 period, three states, Michigan, New Hampshire, and Vermont, underwent major school finance reforms that resulted in a substantial shift in school funding from the local property tax to state taxes. In constructing our fiscal crisis variable for those states, we continued the trend in state tax revenue growth as if the one-time local to state revenue switch had not occurred.

[10] See for example, Poterba (1997, 1998), Ladd and Murray (2001), and Harris, Evans, and Schwab (2001) and Balsdon and Brunner (2004).

[11] For a review of the empirical literature on renter fiscal illusion, see Blom-Hansen (2005).

[12] For a recent example of this research see Dye, McGuire, and McMillen (2005).

[13] For a comprehensive review of the literature on the impact of tax and expenditure limitation on public education, see Downes and Figlio (2008).

erty tax limitations in a state will reduce the probability that cuts in state aid will result in property tax increases. As a measure of whether a state has binding property tax limitations, we construct a dummy variable based on Anderson (2006b) and more detailed descriptions of tax limitation policies generously provided to us by the author. We classify a state as having a *binding property tax limitation* if it imposes a limitation on property tax levies or limitation on both property tax rates and property assessments.

The conventional wisdom appears to be that local government officials find it easier to increase property tax revenues when they can do so without raising property tax rates. To the extent that this is true one would expect that property tax revenues will increase faster in states where the value of taxable property grows more rapidly. It is well known that during the period between 2000 and 2004, property values grew exceedingly rapidly in certain parts of the country, particularly in the Northeast and on the West Coast. Although we have been unable to identify any literature that has explicitly tested the relationship between the rate of growth of the property tax base and the rate of growth of property tax revenue, we believe that it is important to control for variation in the growth of the tax base across states. As the Census Bureau has not collected data on the assessed value of property since the mid-1980s, we have had to obtain these data from sources within each state.[14] We collected data on statewide aggregate assessed property values and calculated the percentage change in the property tax base per capita in each state. Because some states use prior year assessed values to calculate tax levies, in calculating our measure of the change in property tax base, we used whichever two-year period was in fact used to calculate taxes for the 2002 to 2004 period. Thus, for states where tax collections are based on current year assessments, we used assessments from the 2002 to 2004 period; and for those states which used prior year assessments, we used assessments from the 2001 to 2003 period.

Results for the Entire Local Government Sector

The first column of Table 6 shows the results for all local governments combined in each state. The variable representing the hypothesized substitution between property taxes and state aid is insignificantly different from zero in the all local governments case. Our fiscal crisis measure is significant (with a t-statistic of 1.93 representing significance at the 6 percent level) and has the expected negative coefficient—the lower the fraction that actual state revenue is of trend-predicted state revenue, the higher is the percentage increase in property tax revenue.

The homeownership percentage has a significantly negative effect on increases in property taxes. This is consistent with the hypothesis that homeowners are more likely to perceive and resist property tax increases than renters, who may suffer from fiscal illusion.

None of the other control variables—change in income, percent old, percent poor, property tax share of revenue, or tax limitation—has a significant coefficient. We explored specifications with alternative control variables, but none had significant own coefficients nor a noticeable ef-

[14] In most states this information was available on the website of the department of revenue or a similar agency. In a number of cases, the information was obtained by calling state officials. In the one state where aggregate assessment data could not be obtained, we used the predicted value from a regression on the percentage change in residential housing prices using the housing price index constructed by the Office of Federal Housing Enterprise Oversight (2007).

fect on the state aid coefficient; we tried the level of personal income, the change in the level of personal income, a Gini-coefficient for income dispersion in the state (U.S. Census, 2005), several different measures of the severity of the fiscal crisis in the state, measures of racial composition, and additional age-distribution variables. We also explored specifications with fewer controls, and none other than the fiscal crisis measure become significant if combinations of the other variables are omitted.

Results for School Districts

With all the cross-state variation in fiscal institutions and in the timing of the crisis, and with all the differences seen in Table 2 in the bivariate relationship between property taxes and state aid, looking for an overall negative effect in all-state regressions is an ambitious undertaking. Restricting the search to just school districts increases the probability of a significant result. State aid to non-school local governments takes a variety of forms, many of which are formula-linked to population or income and not easily changed in the annual appropriation process. The state school aid appropriation is, on the other hand, one of the biggest single appropriations most state legislatures make each year. As school aid formulas generally operate on a "sum-sufficient" basis, the school aid appropriation is a likely candidate for cuts in periods of state budgetary shortfalls.

The second column of Table 6 shows regression estimates with the dependent variable the percentage change in school district property taxes. The aid-change measure and property tax share control variable are correspondingly calculated for school districts. As previously explained, the state aid variable includes grants for K-12 education services that are provided by municipal or county governments and there is a corresponding assignment of property taxes to these "dependent school districts." The other statewide control variables are the same as before.

In the school district regression there is a significantly negative coefficient on the state aid variable (significant at the 7 percent level of confidence). This is consistent with the basic hypothesis of this paper, that there was a substitution of local property tax increases to offset cuts in aid to local governments that states made when their own revenues fell sharply at the beginning of this decade. The point estimate of the coefficient on the change in per capita state aid as a percent of property taxes suggests that school districts were able to offset about 23 cents of each dollar of aid cut with increases in property taxes (with a standard error of 12 cents). None of the control variables in the school district regression is significant in the specification shown or any of the alternatives attempted, but the fiscal crisis variable comes close.

Conclusion

There is little debate that by historical standards most states endured a serious fiscal crisis at the beginning of this decade caused in large part by big declines in state tax revenues. The response in many states to the resulting large budgetary shortfalls was to cut state financial aid to local governments in general and to school districts in particular. The objective of this paper is to explore in a systematic manner the extent to which local governments responded to these cuts in state aid by raising property taxes. We ask whether the property tax played an important coun-

tercyclical role that enabled local governments to maintain their existing levels of public service provision throughout the state fiscal crisis.

The descriptive data presented in this paper indicates that indeed, in a number of states, increases in local property tax revenues in the period between fiscal years 2000 to 2004 largely offset decreases in state aid to local governments. This pattern of changes in state aid and in property tax revenue is apparent in data for the entire local government sector and in the largest single subsector, public school districts.

Between fiscal years 2000 and 2004, per capita real local property tax revenue in the United States grew by 12.8 percent. The changes in property tax revenue, however, varied tremendously across states, with absolute declines in five states and with increases in excess of 20 percent in four states. These changes in per capita property tax revenues undoubtedly occur for a number of reasons. Although the immense variation in political history and fiscal institutions across states always makes it difficult to explain fiscal differences among the 50 states using multivariate statistical techniques, in this paper, we make such an attempt using a fairly simple regression model to explain changes in per capita property tax revenues. Our goal is to explore whether we can find a systematic relationship between reductions in state intergovernmental aid and increases in property tax revenues, while controlling for other factors that might explain property tax changes.

When we look at the local government sector as a whole—combining municipalities, counties, school districts, special districts, and all other types—we do not find a significant relationship between changes in per capita state aid and changes in per capita property tax revenues across the states. Among the other explanatory variables, there is a negative effect of homeownership on property tax growth and positive impact of a measure of the severity of the fiscal crisis in each state.

When we restrict our analysis to school districts, however, we find a statistically significantly negative relationship between changes in property taxes and changes in state aid. We find that on average local school districts increased property taxes on the order of 20 to 25 cents for each one dollar cut in state aid. None of the other explanatory variables were statistically significant.

One interpretation of our school district regression results is that it provides strong evidence of the strength and resiliency of the property tax. Economists, in general, trumpet the benefits of the property tax (McGuire, 2001). They point out that as a source of revenue for local governments, it is generally superior to alternative taxes, especially in terms of allocative efficiency. Our results highlight the fact that the property tax plays an important role in maintaining the stability of the state and local sector. Not only is the local property tax base much more stable with respect to cyclical influences than the bases of the state income or sales tax, but local property tax rates appear to be, in most states, sufficiently flexible so that local property tax revenues can be varied so as to provide a counter-cyclical buffer to changes in state aid. In essence, our results seem to reinforce that conclusion that the local property tax plays a critical role in our federal system.

A related interpretation of our results focuses on the responses to the real increases in per capita property tax revenue over the past few years. It is no secret that the property tax is a very unpopular tax among the public. Although there is a long history of efforts to reduce reliance on the property tax, the recent increases in property tax revenue appear to have ignited efforts in a number of states to further restrict use of the property tax. A number of states have either adopted or are considering limits to increases in property tax assessments (see, for example, Dye, McMillen and Merriman, 2006). Aside from their distributional impacts, these assessment limits destroy one of the cornerstones of the property tax, namely the fact that one's property tax liability should bear a direct relationship to the value of one's property wealth.

Our empirical results provide some evidence that the fiscal crisis-induced cuts in state school aid resulted in higher property taxes. If these property tax increases lead to a new round of property tax limits around the country, the counter-cyclical role played by the property tax that we have attempted to highlight in this paper may well be seriously diminished the next time state governments face fiscal crises. The consequences for public education could be severe.

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APPENDIX

Measuring Changes in Aid Relative to Property Taxes

There is wide variation across states in fiscal institutions and in particular the relative importance of property taxes and aid from the state in local government budgets.

Let, $R = P + A + E$.

Where, R = total local revenue;
P = property tax revenue;
A = intergovernmental aid revenue from state; and
E = everything else
(with all variables measured per capita).

From Table 1, we observe that the ratio of state aid to property taxes (A/P) in 2000 ranges from about 5 to 1 in Arkansas and New Mexico to ½ to 1 in Rhode Island, New Jersey, and Maine. To scale for these differences and to make it easier to interpret the aid coefficients of our regressions, we measure the change in aid as a percent of beginning-of-period property tax revenue ($\Delta A/P$) rather than the more obvious alternative of using beginning of period state aid in the denominator ($\Delta A/A$).

Suppose that the strongest version of the "substitution of increased taxes for decreased aid" hypothesis is correct and the *absolute* amount of the change in state-source A is exactly offset by a change in local-source P (i.e., $\Delta A = -\Delta P$) after appropriate controls. Let's examine the difference between two specifications of the aid change variable:

(1) $\Delta P/P = a + b\,\Delta A/A + c\,\text{Controls} + e$ versus,

(2) $\Delta P/P = f + g\,\Delta A/P + h\,\text{Controls} + i$.

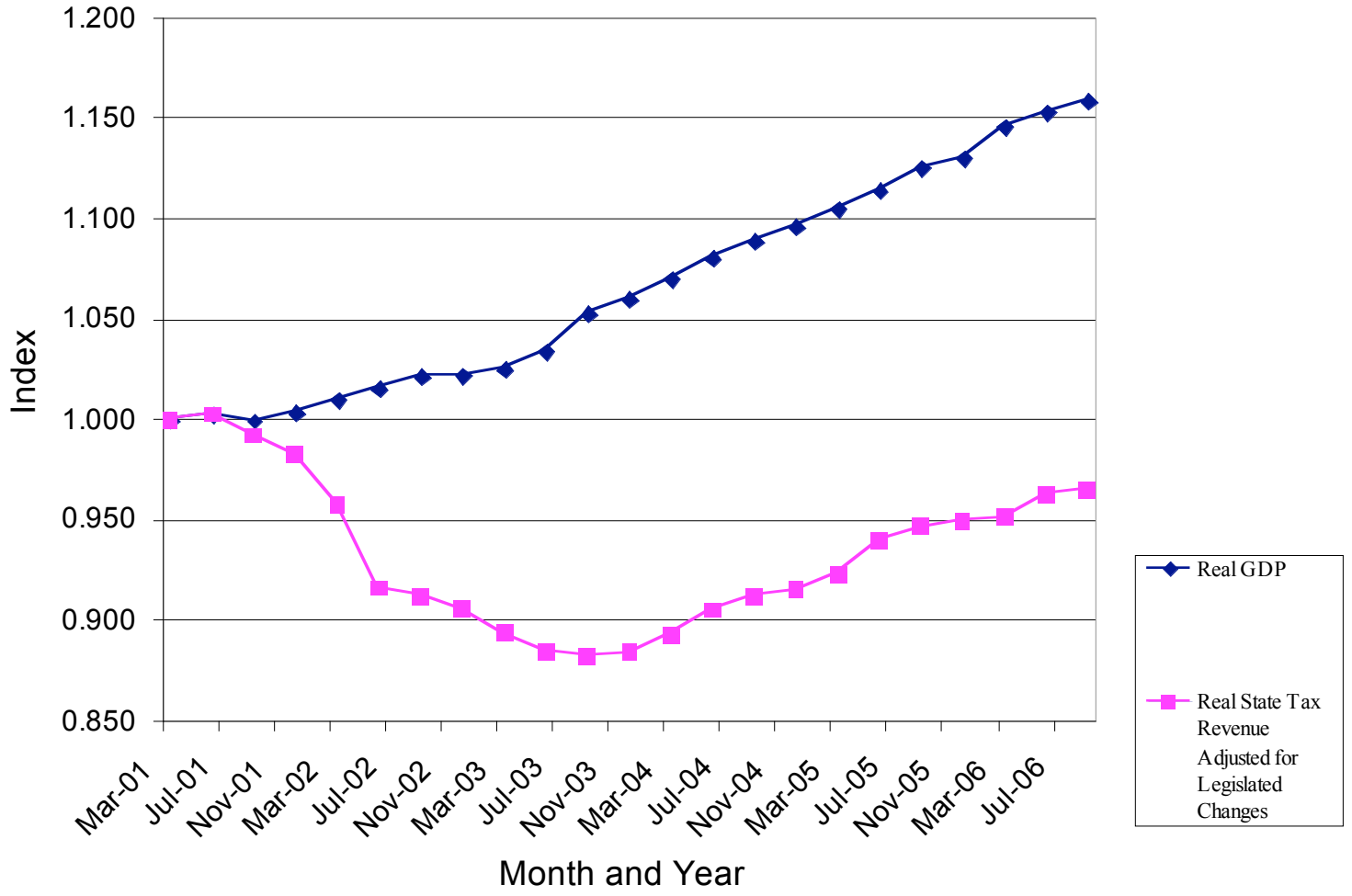
Assume for convenience that there are no other revenue sources (E=0), that the controls perfectly capture all other sources of variation, and look at the following numerical example:

	State H (high property tax)	State L (low property tax)
Initial P	70	30
Initial A	30	70
New P’	75	35
New A’	25	65
ΔP	+5	+5
ΔA	–5	–5
ΔP/P	5/70 = .071	5/30 = .167
ΔA/A	–5/30 = –.167	–5/70 = –.071
ΔA/P (≡ (ΔA/A)*(A/P))	–5/70 = –.071	–5/30 = –.167
Slope “b” in equation 1	.071/–.167 = –.425	.167/–.071 = –2.35
Slope “g” in equation 2	.071/–.071 = –1.00	.167/–.167 = –1.00

The two states have identical and offsetting absolute changes in aid (–5) and property taxes (+5), but different initial shares of aid (30 versus 70). In the problematic specification 1, this results in very different contributions to the estimated coefficient “b”. In our preferred specification 2, the re-weighting of the aid-change measure results in the same coefficient “g” of –1.00 in both states.

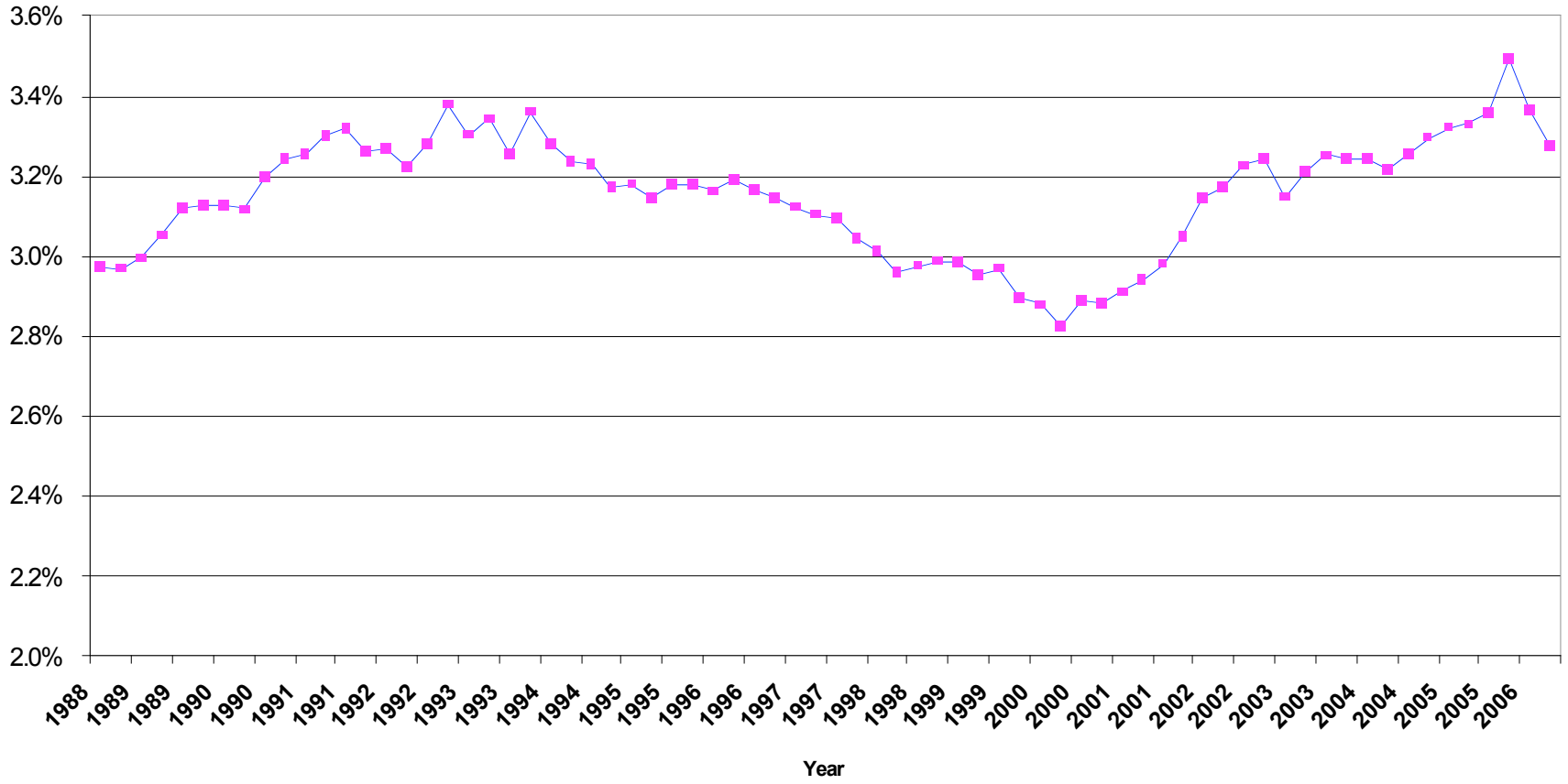
By using ΔA/P we have, in effect, multiplied ΔA/A times A/P to adjust for cross-state differences in the relative importance of A and P. The result is an easier to interpret coefficient: absolutely offsetting changes have a coefficient of –1.00, negative coefficients between zero and one represent the fraction of aid changes offset by property tax changes.

Figure 1
Real GDP and State Tax Revenue Adjusted for Legislated Changes



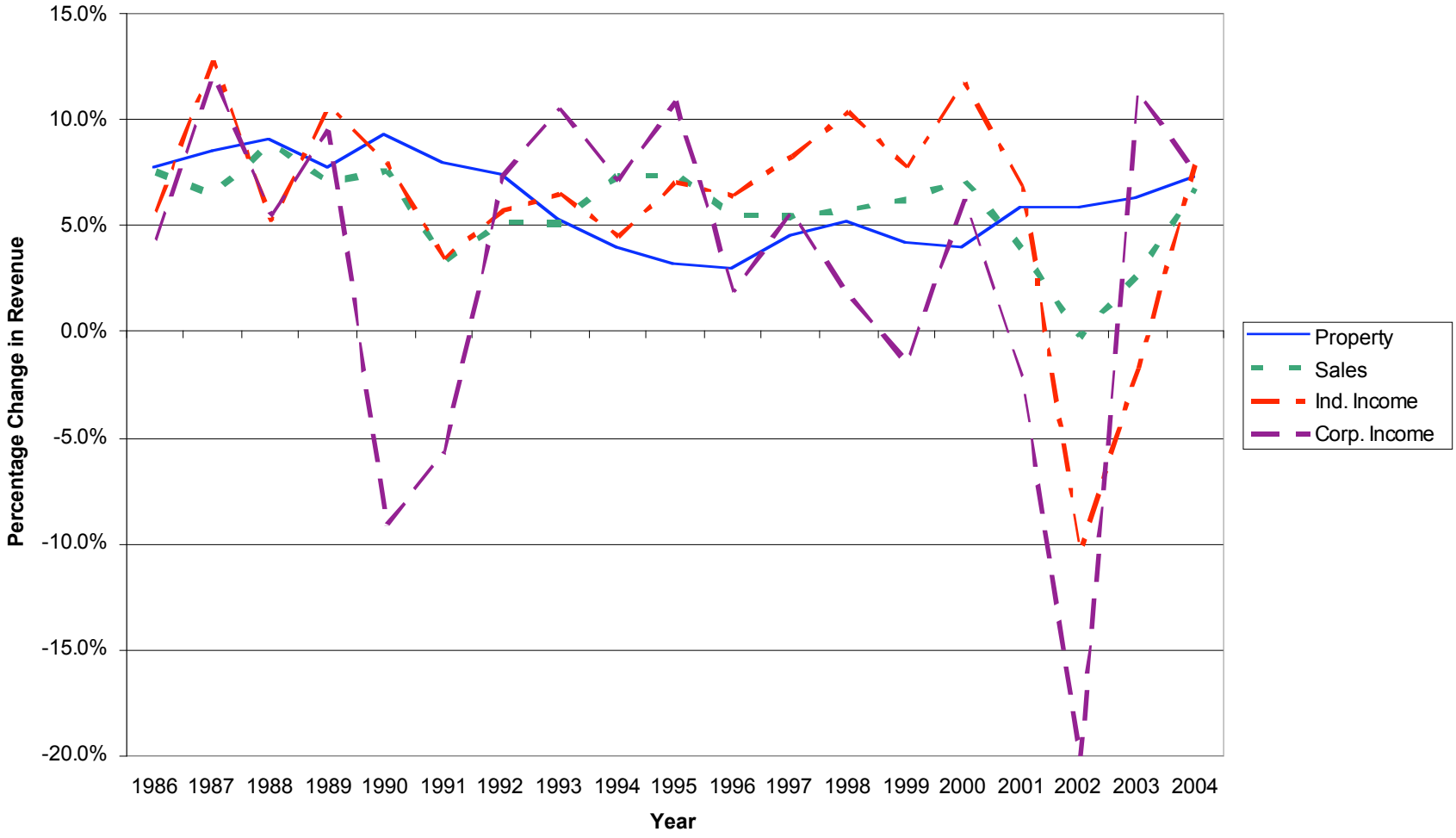
Source: Authors' calculations using revenue data from Stenson and Kuo (2006) and GDP data from the Bureau of Economic Analysis (2007).

Figure 2
Property Taxes as a Pecentage of Personal Income



Source: U.S. Census (2007) and Bureau of Economic Analysis (2007).

Figure 3
Annual Percentage Change in Revenue from Major State and Local Taxes



Source: U.S. Census Bureau (various years).

Table 1: Local Government Property Taxes and State Aid by State and Fiscal Year in Real $2004 per Capita

State	Property Tax Collections			Intergovernmental Aid from State		
	2000	2002	2004	2000	2002	2004
Alabama	286	300	318	1021	996	969
Alaska	1254	1278	1234	1556	1452	1307
Arizona	772	758	788	1202	1237	1269
Arkansas	199	201	211	1086	1142	1129
California	742	849	905	1945	2150	1996
Colorado	939	972	1026	822	917	989
Connecticut	1742	1821	1944	1083	963	1010
Delaware	535	521	546	1148	1161	1175
Florida	915	968	1048	985	940	995
Georgia	788	806	872	979	1051	1004
Hawaii	545	523	571	137	131	140
Idaho	735	749	777	1082	1131	1093
Illinois	1277	1319	1403	1072	1063	1109
Indiana	1001	1018	974	1015	1031	1134
Iowa	975	1030	1080	1152	1126	1128
Kansas	867	956	1166	1154	1156	1089
Kentucky	362	395	406	801	845	889
Louisiana	422	447	493	927	987	995
Maine	1349	1509	1562	798	843	851
Maryland	943	992	996	858	975	903
Massachusetts	1320	1428	1532	1204	1313	1222
Michigan	861	829	979	1723	1772	1758
Minnesota	1016	1026	846	1625	1734	1883
Mississippi	563	603	627	1076	1094	1177
Missouri	664	713	743	836	859	849
Montana	838	774	836	820	935	946
Nebraska	990	1059	1147	887	921	914
Nevada	738	770	864	1347	1303	1469
New Hampshire	1379	1374	1560	965	1009	1011
New Jersey	1883	1965	2099	1135	1215	1220
New Mexico	353	398	414	1480	1516	1608
New York	1457	1470	1677	1818	2019	2061
North Carolina	628	685	713	1287	1221	1176
North Dakota	896	879	917	961	889	978
Ohio	920	978	977	1194	1346	1356
Oklahoma	414	446	465	888	927	925
Oregon	894	929	959	1313	1405	1311
Pennsylvania	889	925	1005	1104	1111	1220
Rhode Island	1422	1435	1627	602	809	917
South Carolina	729	789	880	854	958	906
South Dakota	919	923	915	628	685	673
Tennessee	557	626	608	765	767	759
Texas	1043	1185	1254	872	832	844
Utah	640	638	689	931	957	908
Vermont	680	738	809	1462	1426	1490
Virginia	922	964	1029	969	1066	1093
Washington	706	750	783	1275	1309	1289
West Virginia	517	524	538	951	973	953
Wisconsin	1146	1231	1331	1667	1681	1644
Wyoming	914	1154	1075	1708	1830	1920
U.S.	928	983	1047	1236	1297	1291

Source: U.S. Census, *State and Local Government Finances*.

Table 2: Percent Change from 2002 to 2004 in Real per Capita Local Government Property Taxes and State Aid

State	Property Taxes	State Aid	State Aid (as % of 2002 Property Taxes)
Alabama	6.0%	-2.7%	-9.0%
Alaska	-3.4%	-10.0%	-11.3%
Arizona	4.0%	2.6%	4.2%
Arkansas	5.0%	-1.1%	-6.5%
California	6.6%	-7.2%	-18.1%
Colorado	5.6%	7.9%	7.4%
Connecticut	6.8%	4.9%	2.6%
Delaware	4.8%	1.2%	2.7%
Florida	8.3%	5.9%	5.7%
Georgia	8.2%	-4.5%	-5.8%
Hawaii	9.2%	6.9%	1.7%
Idaho	3.7%	-3.4%	-5.1%
Illinois	6.4%	4.3%	3.5%
Indiana	-4.3%	10.0%	10.1%
Iowa	4.9%	0.2%	0.2%
Kansas	22.0%	-5.8%	-7.0%
Kentucky	2.8%	5.2%	11.1%
Louisiana	10.3%	0.8%	1.8%
Maine	3.5%	0.9%	0.5%
Maryland	0.4%	-7.4%	-7.3%
Massachusetts	7.3%	-6.9%	-6.4%
Michigan	18.1%	-0.8%	-1.7%
Minnesota	-17.5%	8.6%	14.5%
Mississippi	4.0%	7.6%	13.8%
Missouri	4.2%	-1.2%	-1.4%
Montana	8.0%	1.2%	1.4%
Nebraska	8.3%	-0.8%	-0.7%
Nevada	12.2%	12.7%	21.6%
New Hampshire	13.5%	0.2%	0.1%
New Jersey	6.8%	0.4%	0.3%
New Mexico	4.0%	6.1%	23.1%
New York	14.1%	2.1%	2.9%
North Carolina	4.1%	-3.7%	-6.6%
North Dakota	4.3%	10.0%	10.1%
Ohio	-0.1%	0.7%	1.0%
Oklahoma	4.3%	-0.2%	-0.4%
Oregon	3.2%	-6.7%	-10.1%
Pennsylvania	8.6%	9.8%	11.8%
Rhode Island	13.4%	13.3%	7.5%
South Carolina	11.5%	-5.4%	-6.6%
South Dakota	-0.9%	-1.8%	-1.3%
Tennessee	-2.9%	-1.0%	-1.3%
Texas	5.8%	1.4%	1.0%
Utah	8.0%	-5.1%	-7.7%
Vermont	9.6%	4.5%	8.7%
Virginia	6.7%	2.5%	2.8%
Washington	4.4%	-1.5%	-2.7%
West Virginia	2.7%	-2.1%	-3.8%
Wisconsin	8.1%	-2.2%	-3.0%
Wyoming	-6.8%	4.9%	7.8%
U.S.	6.5%	-0.5%	-0.6%

Source: U.S. Census, *State and Local Government Finances*.

Table 3: Within State Correlation of Year-to-Year Changes in Real per Capita Local Government Property Taxes and State Aid 1978 to 2000

State	Correlation Coefficient
Alabama	0.378
Alaska	-0.134
Arizona	-0.139
Arkansas	-0.563
California	-0.563
Colorado	0.036
Connecticut	0.484
Delaware	0.127
Florida	0.212
Georgia	-0.011
Hawaii	0.331
Idaho	0.239
Illinois	0.052
Indiana	0.184
Iowa	-0.297
Kansas	-0.240
Kentucky	-0.249
Louisiana	0.226
Maine	0.134
Maryland	0.209
Massachusetts	-0.013
Michigan	-0.877
Minnesota	-0.335
Mississippi	0.366
Missouri	-0.490
Montana	-0.263
Nebraska	-0.134
Nevada	-0.639
New Hampshire	-0.841
New Jersey	0.213
New Mexico	-0.219
New York	0.574
North Carolina	0.613
North Dakota	0.022
Ohio	0.367
Oklahoma	-0.193
Oregon	-0.552
Pennsylvania	-0.041
Rhode Island	0.244
South Carolina	-0.203
South Dakota	-0.403
Tennessee	0.278
Texas	0.261
Utah	0.184
Vermont	-0.837
Virginia	0.247
Washington	-0.173
West Virginia	0.035
Wisconsin	0.069
Wyoming	0.321

Source: U.S. Census, *State and Local Government Finances*.

Table 4: School District Property Taxes and State Aid by State and Fiscal Year in Real $2004 per Capita

State	Property Tax Collections			Intergovernmental Aid from State		
	2000	2002	2004	2000	2002	2004
Alabama	138	150	164	741	706	657
Alaska	289	317	232	1355	1267	1231
Arizona	396	405	413	530	545	554
Arkansas	294	323	328	873	906	884
California	349	386	427	870	930	886
Colorado	480	499	562	531	574	616
Connecticut	1030	1039	1194	740	756	720
Delaware	329	320	352	1002	996	997
Florida	400	419	455	604	537	552
Georgia	447	470	499	725	782	710
Idaho	320	326	343	753	773	723
Illinois	741	772	827	560	568	572
Indiana	473	464	511	776	758	810
Iowa	450	473	495	705	698	662
Kansas	317	375	533	899	884	823
Kentucky	219	235	255	709	704	717
Louisiana	164	176	190	580	595	608
Maine	687	744	770	655	692	662
Maryland	388	426	420	581	604	618
Massachusetts	763	864	896	678	765	738
Michigan	379	418	450	1097	1171	1101
Minnesota	380	368	261	951	997	1181
Mississippi	243	263	284	580	601	658
Missouri	532	571	588	607	620	601
Montana	315	308	340	592	640	605
Nebraska	670	721	771	521	535	500
Nevada	324	333	360	757	767	793
New Hampshire	494	600	734	768	778	745
New Jersey	990	1047	1150	794	898	1011
New Mexico	129	140	149	947	1039	1045
New York	840	807	933	796	951	918
North Carolina	232	244	237	804	750	716
North Dakota	462	491	510	518	502	529
Ohio	622	646	655	621	719	711
Oklahoma	252	270	282	687	706	670
Oregon	363	391	413	788	794	740
Pennsylvania	578	613	670	551	565	581
Rhode Island	768	799	852	640	665	685
South Carolina	411	451	481	662	731	653
South Dakota	547	525	554	439	478	445
Tennessee	198	233	238	469	461	466
Texas	601	686	717	656	625	587
Utah	305	322	324	741	761	683
Vermont	220	293	347	1281	1306	1290
Virginia	415	442	361	583	577	567
Washington	310	320	332	896	899	873
West Virginia	348	356	364	828	844	853
Wisconsin	576	597	616	878	904	860
Wyoming	497	583	516	907	933	1002
U.S. (49 states)	488	516	550	726	755	741

Sources: U.S. Census, *Public Education Finances* for intergovernmental aid. NCES, *National Public Education Financial Survey Data* for property tax revenues.

Table 5: Percent Change from 2002 to 2004 in Real per Capita School District Property Taxes and State Aid

State	Property Taxes	State Aid	State Aid (as % of 2002 Property Taxes)
Alabama	9.0%	-7.0%	-32.8%
Alaska	-26.7%	-2.9%	-11.4%
Arizona	1.8%	1.6%	2.2%
Arkansas	1.3%	-2.4%	-6.8%
California	10.8%	-4.7%	-11.4%
Colorado	12.7%	7.3%	8.4%
Connecticut	14.9%	-4.7%	-3.4%
Delaware	9.7%	0.1%	0.2%
Florida	8.4%	2.7%	3.4%
Georgia	6.0%	-9.2%	-15.2%
Idaho	5.5%	-6.5%	-15.4%
Illinois	7.1%	0.6%	0.5%
Indiana	10.0%	6.8%	11.1%
Iowa	4.6%	-5.2%	-7.7%
Kansas	42.2%	-6.9%	-16.1%
Kentucky	8.5%	1.7%	5.2%
Louisiana	8.0%	2.2%	7.5%
Maine	3.5%	-4.4%	-4.1%
Maryland	-1.4%	2.4%	3.4%
Massachusetts	3.8%	-3.6%	-3.2%
Michigan	7.7%	-6.0%	-16.7%
Minnesota	-29.1%	18.5%	50.0%
Mississippi	8.0%	9.5%	21.6%
Missouri	3.0%	-3.1%	-3.4%
Montana	10.6%	-5.5%	-11.4%
Nebraska	6.8%	-6.4%	-4.7%
Nevada	8.1%	3.4%	7.9%
New Hampshire	22.4%	-4.2%	-5.4%
New Jersey	9.8%	12.5%	10.7%
New Mexico	6.4%	0.6%	4.7%
New York	15.6%	-3.5%	-4.1%
North Carolina	-3.1%	-4.5%	-13.7%
North Dakota	3.9%	5.4%	5.5%
Ohio	1.5%	-1.1%	-1.2%
Oklahoma	4.5%	-5.1%	-13.3%
Oregon	5.4%	-6.8%	-13.8%
Pennsylvania	9.3%	2.7%	2.5%
Rhode Island	6.7%	3.0%	2.5%
South Carolina	6.7%	-10.7%	-17.3%
South Dakota	5.6%	-6.9%	-6.3%
Tennessee	2.4%	0.9%	1.8%
Texas	4.5%	-6.0%	-5.4%
Utah	0.8%	-10.2%	-24.2%
Vermont	18.2%	-1.2%	-5.4%
Virginia	-18.3%	-1.7%	-2.2%
Washington	3.7%	-2.9%	-8.3%
West Virginia	2.1%	1.1%	2.6%
Wisconsin	3.2%	-4.9%	-7.4%
Wyoming	-11.6%	7.4%	11.8%
U.S. (49 states)	6.6%	-1.8%	-2.7%

Sources: U.S. Census, *Public Education Finances* for intergovernmental aid. NCES, *National Public Education Financial Survey Data* for property tax revenues.

Table 6: Regression Estimates of Statewide Percentage Change in Property Taxes Per Capita between Fiscal Years 2002 and 2004 by Type of Local Government

	All Local	School Districts
Change in State Aid per capita as percent of Property Taxes per capita	–0.0182	–0.2281
	(0.17)	(1.87)
Percentage Change in Personal Income per capita	–0.5262	–0.0007
	(1.01)	(0.00)
Fiscal Crisis Severity: Actual State Revenue in 2004 as percent of State Revenue Predicted from 1977 to 2000 Trend	–0.1802	–0.2681
	(1.93)	(1.63)
Percent of Population Age 65 or Older in 2000	0.9457	1.7640
	(1.55)	(1.59)
Percent of Individuals in Population Below Poverty Line in 2000	0.1697	0.3174
	(0.44)	(0.56)
Percent of Housing Units Owner-Occupied in 2000	–0.5435	–0.3099
	(2.43)	(0.79)
Property Tax Share of Local Government Revenue in 2000	0.0569	–0.0079
	(0.67)	(0.06)
Property Tax Limitation is Binding	–0.0167	0.0005
	(0.79)	(0.01)
Percent Change in Aggregate Assessed Property Tax Base 2001-2003	–0.1169	0.1030
	(1.16)	(0.60)
Constant	0.5539	0.3274
	(2.89)	(0.97)
Adjusted-R^2	0.1271	0.1353

Notes: N = 49 states, excluding Hawaii. School district data for property taxes include allocations for states with dependent school districts. Numbers in parentheses are t-statistics.