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# Structural / Institutional Determinants of Variations in Household Property Tax Burdens Within and Across Local Governments: The Effect of the Great Recession and Beyond

John L. Mikesell
Indiana University
And
Daniel R. Mullins
American University

Abstract

Approximately 13 million household observations from the Public Use Micro Samples of the 1990 and 2000 Census of Population and Housing and Annual Community Surveys from 2005 through 2011 are combined with Census Summary File Tables and spatial demographic / economic measures to evaluate the distribution of residential property tax burdens between communities and population groups across time and through the period of the Great Recession in all fifty states. Household property tax data are combined with institutional data on property tax administration and individual unit data on government revenues and expenditures from the Annual Surveys and Census of Governments and socioeconomic and demographic characteristics from a variety of sources to map individual household data to Public Use Microdata Areas in each state and summary file tables to counties. These data are then used to identify how property tax burdens have shifted across household income classes from 1990 through 2011, how burdens have shifted in states across those years, and how household, economic, and fiscal structures impact those burdens. Particular attention is given to changes with the Great Recession. Policy recommendation emerge to restructure this most durable of local tax instruments to improve both equity and efficiency effects, while maintaining the need for steady, robust yield.

## Introduction

The American public holds the real property tax in low regard as a means of financing local government, much in contrast to the view of many tax scholars who see the tax as being particularly appropriate for local use. The tax always received a high rank for unfairness in the opinion surveys that the now-defunct U. S. Advisory Commission on Intergovernmental Relations conducted each year from 1972 through 1992 (ACIR). That status continued with the similar surveys more recently conducted by the Tax Foundation. Its 2007 survey reported the local property tax as the least fair of broad-based state and local taxes, with fully half of all respondents rating it as somewhat unfair or not at all fair (Chamberlain 2007). Many states have embarked on property tax relief programs – substitution of state revenues for the property tax in local budgets, limits on property tax levy growth, statutory rate constraints of many varieties, specialized property assessment programs, and other mechanisms designed to limit local use of the tax base. Through 2009, 47 states had adopted limitations on the property tax and, in fact, Georgia, Florida, and North Dakota had formal consideration of programs to totally eliminate the tax. (Mullins, 2010; Sokolow, 1998; Gravelle and Wallace, 2007). Other states likely would have developed elimination programs if they could have figured out a feasible mechanism that would not completely hamstring the ability of local governments to provide services. It is fair to say that state lawmakers find programs to limit, constrain, control, or eliminate local property taxes an attractive political option.

The result of this aversion to the tax shows up in changes in the historic shares of local revenue coming from the tax. The property tax share of local government general revenue was 0.484 in1961; by 2011, that share had fallen to 0.294. Most of that decline occurred by 1981, when the share had fallen to 0.280. The share has remained relatively constant since then, although rising a bit in recent years. The period of greatest decline was in the twenty years from 1961 to 1981, the era of California's Proposition 13 (in 1978) and other limitation programs in other states. Much of the decline, indeed, occurred before the middle of the 1970s. Overall, states and localities have responded to the low public regard for the property tax with a variety of mechanisms to reduce local reliance on the source. Some of the decline in share reflects the constraints on property taxation previously noted, but some results from state assumption of local

financing obligations (one example being state assumption of local school operating costs in Indiana), increased state transfer payments to localities, and provision of greater authority to levy non-property taxes to localities. All of these actions have contributed to the reduced property tax share of local government general revenue.

In spite of unpopularity of the tax, the property tax continues as an important revenue source of local governments, affording them a degree of fiscal autonomy and fiscal stability not found with either other local sources and certainly not from transfers received from other levels of government. In the twelve months ending in the first quarter of 2013, local governments collected $464,616 million, the highest twelve month property tax yield in nominal terms in American history, surpassing the previous record of $464,033 in the year ending in the third quarter 2010. The next largest tax source, the local general sales and gross receipts taxes, yielded $51,155 million in the year ended in the first quarter of 2013, so the local property tax remains dominant by far, even with its general public unpopularity. Other local taxes are not generally capable of the production of the property tax. A few larger cities do raise more revenue from general sales or individual income taxes, but they are notable mostly because they represent the extreme exception.

The relative stability of the property tax saved localities from some of the huge fiscal shocks governments felt in the Great Recession period. Figure 1 contrasts the tax yield dynamics of local income, general sales, and property taxes from the end of 1988 through the first quarter 2013 by reporting the twelve month yields ending at each quarter relative to their 1988: IV level, measuring the yields on a relative basis so that the considerably different size of yields can be contrasted. (Census data show that in fiscal year 2011, property tax collections were 6.5 times as large as general sales tax collections and 16.7 times as large as individual income tax collections.) The figure shows dramatic Great Recession impacts on individual income and general sales tax revenues – sharp declines for both taxes – but no immediate impact on property tax revenue. The property tax impact comes much later and, even when it hits, shows no dramatic decline of the sort shown with the other taxes. Property tax yield has now generally recovered from the recession impact, but general sales tax collections have not. The comparisons also show the three taxes to have behaved differently in other recession periods –

periods of general property tax stability, even growth, through the recessions and declines for the other two major taxes. Given the importance of maintaining the services for which local governments have primary responsibility and their somewhat constrained ability to cover deficits by borrowing, local reliance on the more stable property tax is fiscally useful. Diversifying tax revenue sources beyond the property tax would have made local tax revenues more sensitive to the recession declines.

More insights into the performance of the local property tax during the Great Recession appear in Figure 2, a figure that reports the annualized real local property tax yield in real terms for each quarter from 1988:IV through 2013:I. Over the years, the inflation adjusted property tax yield has been increasing at a relentless pace. The initial reaction when the recession hit in 2007: IV was a modest decline in revenue, followed by a steep yield increase, an increase dramatically greater than even the historic growth path of revenue from the tax. This would suggest an adjustment upward of local property tax rates to recover revenues lost from other revenue sources that lacked the flexible rate adjustment potential of the property tax.[1] Shortly after the end of the recession, however, real property tax yield began to decline. By 2013: I, yield had returned to roughly the level it would have been, had its growth since the start of the recession had followed its historic trend of around 3 percent: the yield at that point was 91.2 percent of its extrapolation from 2007: IV at its growth rate from 1988: IV to 2007: IV. This suggests that the property tax system has managed to return to its normal configuration through changes in property tax assessed values and rates after the Great Recession shock.

Figure 3 shows the considerable impact of the Great Recession on the local property tax share of total local tax collections. The recession period brought a considerable spike in property tax yield as a share of local tax revenue, from 75.6 percent in 2007: IV to 78.6 percent in 2009: II. Reliance continued to increase, reaching 80.6 percent in 2011: III, its highest level in the twenty-five years examined, until it began to decline back toward its historic average (average around 76 percent versus 77.5 percent in 2013: I). As noted earlier, while property tax yields were influenced by the recession, the impact was considerably less than felt by individual income and general sales tax yields. As yields from the other major local taxes recovered, the share of total

[1] The adjustment response is described in detail in Mikesell and Liu.

tax revenue from the property tax declined again. The reliance patterns seen in the figure are a direct result of the differential recession impacts on these three major tax sources. It is noteworthy that, in the other two recessions that occurred in the period of analysis, the property tax share increased as well. The property tax represents a base for revenue stability in the face of economic recession.

Figure 4 traces the Great Recession impact to property tax burdens as a share of personal income. From the early 1990s onward, the secular path of property tax to personal income had been downward by the recession of 2001. From 2001 to the start of the Great Recession, local property tax as portion of personal income increased substantially, from around 0.029 to around 0.0315. With the start of the Great Recession, this burden ratio fell significantly only to spike to 0.0379 in 2009:IV, higher than at any time in the last quarter century. From that high, the ratio has fallen consistently to 0.0336 in 2013: I. That is just above the 21$^{st}$ century average of 0.0321. An increase in the burden ratio appears in each of the three recessions covered by the data series. However, the fall in burden after the end of the Great Recession is generally consistent with the pattern in the 1990-91 recession, but it is not like the pattern for the 2001 recession, in which burdens increased after its end. It is likely that, given the general hostility to property taxation in the nation, that the burden ratio will continue to fall in the next several years because it is considerably above its recent historic average.

## The Research Problem, Data, and Burden Patterns

The secular increase of property tax revenues and unpopularity of that tax have created a political push for state and local programs for property tax control and relief. It is important to understand both the patterns of property tax burdens and the impact of institutional control and constraint programs on these burdens for the development of local fiscal policies, as well as how other local economic characteristics influence the burdens. The focus of the current research is the relationship between the income of the household and the property tax bill paid by that household. While the property tax bill is not driven by household income, the bill most generally must be paid from that income and, hence, this represents an important indicator of the economic burden that the property tax will make on households. Because the property tax bill is based on a

stock value (the assessed value of the property parcel) and household purchases are made on the basis of expected lifetime income status, the property tax burden relative to current annual income can be a difficult problem for households whose income has fallen below its typical value because of economic fluctuations, unemployment, or retirement. Indeed, the disconnect between the property tax bill and annual household income is a topic of frequent concern in formulation of property tax policy. In this investigation, the variable of interest is total property tax paid by the household relative to household income, not property tax paid to any single local jurisdiction, effective property tax rate on property value, or the statutory tax rate established by local governments. For both the public and lawmakers, the burden measure examined here has considerable legislative resonance and shapes views about the property tax as a local revenue source. The focus is on the total property tax paid, an important concern for the homeowner, who is not likely to be deeply concerned as to whether the tax goes to a school district, a city, a county, or whatever. Furthermore, the homeowner is likely to think about the bill to be paid from its current income, not about the relationship between bill and value of the property parcel. Hence, the focus here is likely to have considerable practical policy significance.

Data for this effective household property tax burden come from the millions of household observations from the Public Use Micro Samples of the 1990 and 2000 Census of Population and Housing and subsequent Annual Community Surveys done by the Bureau of Census from 2000 through 2011. The data displayed in Tables 1 through 4 provide a general overview of the distribution of burdens shown in these data.

Table 1 presents the average absolute dollar values of residential property tax burden by household income deciles in the years from 2000 to 2011 (plus 1990).[2] The data show expected patterns: payments rise as income is higher and payments increase across the years. The burdens did not, however, all increase at the same pace. For instance, from 2000 to 2011, the increase for the bottom six deciles all exceeded 65 percent while the increase for the highest was

[2] The research here assumes that the household owning and occupying the residential property bears the economic burden of the property tax on that property. While other incidence assumptions are possible, this is the presumption that drives the political objections to the residential property tax and it is certainly a plausible assumption. There are other elements of the property tax – the taxes on vacant land, agricultural property, commercial and industrial property, and personal property – that ultimately rest on individuals but they are not part of the present examination.

57 percent. While the increases may be entirely consistent with the laws applicable to property assessment and levy, such a pattern does nothing to convince the general public of the overall fairness of the tax.

Table 2 examines residential property tax burden as a percent of household income by income deciles and across the years. For all years, this burden measure is highest for the lowest income decile, likely the result of housing purchased on the basis of lifetime income prospects and not adjusted for transitory changes in income from cyclical unemployment or retirement. Across the other deciles, the property tax to income ratio falls as income is higher. For years after 2001, the ratio increases with each year in each decile. With these data, it is not a surprise that the public is upset with property taxes: in spite of every political indication that the property tax is regarded as an unfair tax for support of local government, the effective burden of the tax as a percent of household income increases as income declines and over time. And the increase is for low, middle, and high income households.

Table 3 presents average property tax burdens per household for each state for 2000 through 2011 (plus 1990). Burdens for 2011 are lowest in the South (Alabama and West Virginia are below $7000 and other southern states are not far behind) and highest in the North East (New Jersey, Connecticut, and New York are all above $5,000) and those rankings are the same as they were in 2000. The average annual rate of increase across the states from 2000 to 2011 was 4.5 percent but there is considerable variation from one state to another. Indiana, Idaho, and South Dakota showed increased below 3 percent while Wyoming, Alabama, District of Columbia, and Louisiana showed increases above 6 percent. Property tax yields vary significantly across the states, driven by both economic situations in the states and property tax structures and choices about role of the tax in government finances.

Table 4 extends the analysis across states by presenting average property tax burden relative to household income for each state from 2000 to 2011 (plus 1990). This measure also shows great variation across the states. The average across all states in 2011 was 4.6 percent with a range from Alabama and West Virginia with ratios below 2 percent and New Hampshire, New York, Connecticut, and New Jersey all above 8 percent. The rate has increased from 2000 in all states

except Indiana, where the rate is the same. In a few states (California, Connecticut, Illinois, and New Jersey), the increase is by 2 or more percentage points.

## The Model

What forces explain the wide variation in property tax burdens reported in the prior section? Our model, tested with individual household data from the Community Survey, seeks to identify the economic and structural influences on the burden faced by the individual property occupant. While income does not directly determine property tax to be paid, certainly not in the way that it shapes individual income tax obligations, it is a vital policy variable because it is often an important beginning for criticisms of the property tax ("the property tax bill bears no relationship to the owners's income out of which the bill must be paid") and is a focus for some property tax restructuring programs that seek property tax reduction. Therefore, this dependent variable is important for many policy discussions by state and local governments.

Household observations from the Public Use Micro Samples of the 1990 and 2000 Census of Population and Housing and Annual Community Surveys for 2005 -- 20011 are used to evaluate residential property tax burdens across sub-state areas and time in all fifty states. The census and surveys provide data on respondent reported income, property market value, and property tax payments along with a variety of other personal and housing characteristics. These data are combined with individual unit data on government revenues and expenditures from the Annual Surveys and Census of Governments and socioeconomic and demographic characteristics from a variety of sources to map individual household data to Public Use Microdata Areas (PUMA) in each state. These data provide the ability to link individual household / housing characteristics and effective property tax rates to approximately 2000 substate areas in the U.S. with populations of 100,000 or greater.[3]

[3]Sources for measures related to state fiscal structures as follows: for Dillon's rule see Richardson (2003); for circuit breakers, see Lyons, Farkas and Johnson (2007), Baer (2008) and authors; for deferrals, see National Conference of State Legislatures (2002); for classification, see Minnesota Taxpayers Association (2005); for overlapping governments, see Census Bureau (2002); and for education mandates, see Atkins (2007). Truth-in-taxation and tax and expenditure limitations were compiled by authors.

An array of measures aggregated to county areas have been mapped to PUMAs in each state. Because PUMAs frequently include more than a single county, PUMA values on county specific measures were calculated by averaging the weighted values of counties included within the PUMA. Each county's contribution to the average was based on its value weighted by the percent of the PUMA population contributed by the portion of a county lying within it. For counties containing more than one PUMA, and for which the PUMA was located entirely within a single country, PUMA values for the county specific measures were set to that of the single county.

The model estimated takes the form of a nested, unbalanced panel.[4] The panel period covers 1990 through 2011 and includes more than 13 million complete observation on households. Individual survey observations are nested within the PUMA areas. The panel is unbalanced because of variation in PUMA designation between the 1990 Census and later periods. Demographic and fiscal measures have been matched to the period (years) of the micro data panels. The model estimated is still being refined and preliminary in nature and is in the form of a pooled cross-sectional time-series with fixed effects employing robust standard error estimation clustered at the state level. This effectively results in estimates reflecting comparisons within states.

The model seeks to identify the factors that influence the burden of the residential property tax relative to the income of the household, a focal point for restructuring programs aimed at property tax burden reduction. Three types of variables are examined as determinants of effective rates and burdens. These include the following: (i) characteristics of the individual household or property parcel, (ii) relative state / county economic and demographic conditions, and (iii) elements of the state fiscal / structural features, relief mechanisms and tax and expenditure limitations.

Individual Household or Property Parcel Characteristics. Several features of a particular property or the household living in it may influence the tax rate and ratio of the property tax bill

[4]Observations are nested within PUMAs and PUMAs are nested within states.

to household income. These variables are specific to the household and come from the Censuses and Community Surveys.

(i) Ratio of household income to median household income in PUMA. The relative propensity of a household to spend on housing is likely to vary with the relative income of the household. Thus, household income would influence the ratio of property tax to household income. Because property taxes on an individual housing structure are driven by the relative value of other property in a community, we use this ratio to establish the relative capacity of individual households. The way the model is specified (simultaneously including measures of property value) means that this measure is not a summary measure of the relationship between resulting property tax burden and relative income of property owners in the taxing jurisdiction.

(ii) Ratio of residential property value to median residential property value in PUMA. Higher value properties will have higher property tax bills, other influence held constant. However, in a perfectly functioning market based property tax structure, effective tax rates would be unaffected. Property tax systems, however, do not consistently establish tax value based on real (or market) values of property. Inclusion of this variable allows a direct assessment of variations associated with factors other than a property's market value.

(iii) Presence of a householder age 65 or over in the household. Older people are more likely to have larger properties than younger people, other influences held constant, because their properties were acquired while they had families growing up and they have not adjusted to smaller properties. Hence, this variable would be positively related to the dependent variable and allows an assessment of the relative burden of the property tax associated with age (holding household income constant). However, relief mechanisms often target elderly residents and assessment/reassessment process often reward longevity. Simultaneously controlling for relative household income and relative property value allows an assessment of the burden implications which might follow age.

(iv) Home on large lots (1 acre or more). Property tax systems also variously incorporate the value of land and structures. Land area is a basic measure of the value of land and when incorporated with measure of local economic activity will provide a control for the contribution of land to value.

(v) Rooms in structure. Rooms in structure is a proxy for structure size. Assessment systems often rely on size-related characteristics, including number of rooms to estimate value. Simultaneously controlling for relative value of the structure, this allows an assessment of the degree to which physical property features might be incorporated in property tax assessment beyond their contribution to market value.

(vi) Years since the structure was built. Property assessment systems often undervalue older properties. Therefore, it is expected that property value will decline with structure age.

(vii) Tenure of Residents in Structure. Property assessment systems in a number of states, including California, Michigan, and Florida, require revaluation of residential property when the property is sold, with no meaningful rebalancing of values at other times. Some other states informally have similar adjustments. That means that properties that are occupied by newly arrived residents are likely to face higher property valuations (and higher property tax bills), other things being equal, than will people who have lived in their properties longer. Therefore, the longer the tenancy, the lower the property tax burden. We combine this measure with a direct assessment of the impact of acquisition assessments to determine the degree to which this affect is more widespread.

(viii) Years since structure was built multiplied by tenure in residence. This interaction term was uesd in preliminary tests of the model and measures the combined affect of structure age and tenure in influencing property tax burdens. Persons whom have lived in older structures for longer periods of time are expected to benefit from assessment systems failures to keep pace with market values. The expected relationship was found. The final model, however, interacts tenure with acquisition value assessment and it, combined with controls for tenure and year of construction, allows an estimate of the effect of the acquisition assessment system separate from general tenure and structure age factors.

(ix) Business located on the property. The existence of commercial activity on premises may affect property valuation.

Relative state / county economic and demographic conditions. Some influences on tax rates and burdens are likely driven by fiscal, demographic and economic characteristics of the state or PUMA within which property and taxpayers reside. These factors determine certain underlying influences on the tax or market situations for the individual parcel. It is important to indicate that the intent of including these factors is to provide statistical controls for the test of the effect of institutional / structural factors.

(i) Ratio of per capita local direct general expenditure in the state to state per capita income. States with high service expectations placed on their local governments place greater fiscal demands on these governments. States where relative spending is high are likely to have localities with high tax rates and, therefore, higher property tax burdens. Spending relative to income should have specific relevance in influencing local tax burdens.

(ii) Ratio of per capita direct general expenditures of local governments in a PUMA to per capita direct local expenditures across the entire state. Property taxes on an individual parcel of property are likely to be influenced substantially by the demand for local public services within a PUMA. This measure controls for relative local spending preferences with individual sub-state areas in assessing factors influencing effective tax rates and burden.

(iii) Ratio of median value of residential property in PUMA to median value of residential property in state. This measure controls for the relative scale of the property tax base between PUMAs within the state. Median home values vary significantly across PUMAs in the analysis. A larger tax base allows a government to finance its spending with lower statutory tax rates. That will translate into lower tax burdens for any particular property. The effects of a larger relative residential tax base are indeterminate though without consideration of demand elasticities. However, while controlling for relative local spending and relative income, a higher tax base might well result in lower effective tax rates and higher burdens. The desire is to control for factors that might influence burdens and rates apart from structural factors, not directly test the variation in burden associated with relative property values.

(iv) Ratio of PUMA median income to state median income. PUMA relative median income along with relative median property value frames expected property tax burdens within the PUMA within the context of state burdens, allowing the individual contributions of property, household and community characteristic to be more specifically isolated. Particularly controlling for relative spending and property value, higher relative PUMA income would be expected to result in lower burdens; however, higher median income in the PUMA, controlling for relative parcel income and value, may result in the reverse effect.

(v) Percent of population in PUMA less than 18. Population less that 18 reflect the added pressures for education spending and the revenue implications of that pressure. Education is, by far, the single most resource intensive local government function.

(vi) PUMA Poverty rate in percent. Populations in poverty place additional demands on local public services and increase service costs. Controlling for median income and residential property value, a greater poverty population suggests lower relative revenue capacity via an accentuated lower tale of the income distribution.

(vii) Ratio of PUMA County Employment to Total PUMA County Residents. When this ratio is high, the county will have a higher level of economic activity generating non-residential property value. Revenue needs will also be greater due to service requirements of employers as well as an inward commuting labor force. The outcome for the individual homeowner is not a priori clear (given the simultaneous controls). A positive net fiscal residual would likely reduce the portion of the tax burden born by the housing stock while a negative would have the revers effect. There is also the possibility for a significant net positive residual to produce a stimulative price effect.

(viii) Population per square mile. Population density affects the costs and demand for local government services, with higher cost in each of the extremes. Density and its polynomial can be used to capture population scaling effects on revenue requirements, tax rates and burdens.

State fiscal / structural features, relief mechanisms and tax and expenditure limitations. Several state policies will influence property tax burdens, including those directly related to constraint or control of the property tax and others that work indirectly to provide options beyond the property tax. Examining these impacts is particularly useful because these reflect policy options available to states responding to a public desire to "do something" about property taxes. If they are to do something, it ought to be known to have the desired effect.

(i) Existence of Dillon's Rule. States operating under the constraint of Dillon's Rule allow their localities only those powers, including fiscal, that have been explicitly delegated them by their state. Localities lack free choice and, while typically given the power to levy property taxes, do not have the ability to seek out other fiscal alternatives, in terms of either taxing or spending alternatives. Hence, states in which Dillon's Rule strictly applies are likely to host households bearing higher property tax burdens – their local governments have few options for fiscal creativity. Because the properties of Dillon's Rule are not easily scalable and because they are quite constant over time, it is included in the models with as an interaction with a year counting variable and can its coefficient can be interpreted as indicating the degree to which it hav an increasing or decreasing effect.

(ii) Ratio of total state fiscal assistance to local governments to total general revenue of local government in the state. States differ widely in the extent to which they provide fiscal assistance, measured here by the ratio of state transfers to total local revenue, to their local governments. Those with higher ratios are likely to have households with lower property tax burdens.

(iii) Ratio of local taxes other than property (sales and income) to total general revenue of local governments in the state. Alternative tax revenue options provide a fiscal alternative to the property tax. Households in states with a considerable role for alternative local taxes, such as income and sales taxes, are likely to face lower property tax burdens. The effects of this measure are likely to be co-mingled with the direct assessment of Dillon's Rule, as the availability of alternative revenue options is a major element of its effect.

(iv) Acquisition value assessment. Arizona, Arkansas, California, Florida, Georgia, Iowa, Michigan, Florida, New Mexico, Oklahoma, Oregon, and South Carolina limit assessment increases or require acquisition value assessment for owner-occupied residential properties and have annual adjustment factors on individual property at or below 5 percent, thus creating a considerable constraint on value adjustments.[5] In other words, the basic assessed value for properties included in this study will be the most

[5]Mark Haveman and Terri A. Sexton, *Property Tax Assessment Limits: Lessons from Thirty Years of Experience*, Cambridge, Massachusetts: Lincoln Institute for Land Policy, 2008, p. 11. Updated by authors.

recent transaction value for the parcel.[6] With such a system legally installed, it is likely that the combined effective tax rate will be lower than would otherwise be anticipated when this assessment system is interacted with (multiplied by) the tenure of the resident. No matter how the market value of a home might be changing, the assessed value of the property would not be subject to significant re-adjustment until the property sells again.

(v) Homestead exemptions. Thirty-two states provide homestead exemptions to all resident households. While the exemptions vary in value, they reduce the absolute and relative base of homesteads for property tax purposes. Widespread homestead exemptions are expected to reduce property tax burdens and effective tax rates, although particularly generous exemptions may so narrow the property base that there is a rate impact on properties remaining taxed.

(vi) Property tax circuit breaker rebates. Circuit breaker programs establish a link between the property tax paid by a household and the income of that household, providing rebates when that relationship is high enough to indicate an overload. The expectation is that circuit breaker relief for a deserving segment of the population would allow higher property tax levies to be applied. A circuit breaker accommodates higher (gross) property tax burdens. Thirty-nine states provided circuit breaker relief for older homeowners during this period and eighteen also provide it for low-income home owners regardless of age.

(vii) Presence of a property tax deferral program States that allow deferral of a portion of property tax bills prevent the property tax in any year from imposing an excessive burden on certain taxpayers, usually senior citizens or farmers. That gives governments greater flexibility in application of the tax and, hence, would allow higher tax burdens on the rest of the population. The deferral program variable is interacted with time to determine whether any affect it might have is growing or declining over time.

(viii) Property tax rate classification. Rate classification systems typically operate by applying higher statutory rates to commercial and industrial properties than to residential properties. The idea is to put greater burden on properties that are not residential. The presence of a classification system – measured here by the ratio of the effective property tax rate on industrial property to the effective property tax rate on residential housing with a median value of $150,000 – would be expected to provide a lower tax burden on households. However, as the value of commercial and industrial property in a community grows, the classification systems also produce a relative price reduction for local resident services financed vial property taxes. This could ultimately stimulate higher spending and greater burdens.

(ix) Judicial mandate on education. More than half the states have been required by court action to increase their spending on primary and secondary education -- by requiring higher capital or recurring expenditures or by requiring equalization across districts. States under such a mandate are expected to have higher property tax burdens to deal with the requirements.

[6]Flat adjustment percentages may be allowed, but there is no presumption in these states that assessed value will keep pace with the market value of the property. Some other states use versions of acquisition value, but allow annual individual property adjustments that are large enough to mitigate the impact of the valuation constraint.

(x) Tax and expenditure limitations. Forty-seven states have some form of local tax or expenditure limitation imposed upon local government within their boundaries. However, in 8 states that have imposed these, they are either remnants of earlier (pre-1960's) provisions, apply to only a limited category or number of jurisdiction, do not include any provision other than non-disclosure or have been enacted to recently to have had an impact. For this analysis, 39 states are considered to have active limitation provisions. This analysis classifies local limitations along two dimensions. The first relates to the expected strength of the constraint distinguishing between: (i) those 6 states only imposing either an overall or specific property tax or assessment limit (weak), or (ii) those 33 states imposing a levy limit, general revenue limit, expenditure limit, or a combination of both rate limits and assessment limits (strong). Specific or overall rate limitations can be easily circumvented through assessment increases and assessment increases can be easily circumvented through rate increase and are, therefore, expected to have a lesser effect. However, property tax levy, general revenue and expenditure limits (and rate limits combined with an assessment limit) are expected to have more pronounced effects. Our second dimension distinguishes between limits on general purpose government and those on school districts and code states for the existence of rate limits, levy limits, revenue limits or expenditure limits applied to (i) counties or municipalities (35 states), and (ii) limits applied to school districts (32 states). We expect that these constraints will lead to lower property tax burdens as local discretion is limited. The estimated model includes binary (0/1) variables to represent the existence of either of these weak/strong or general purpose vs. school district constraints in a state at the time of the census or survey. In addition, a measure of existence of the "strong" form of limitation is included, identifying the years that have elapsed since its introduction.

(xi) Truth-in-Taxation (Full Disclosure) Law. Eighteen states require local governments to report when there has been a general revaluation of properties and to adjust rates downward accordingly, unless they disclose that the localities intend to increase their levies by not adjusting those rates. Public hearings are normally required – so that revaluation does not bring stealth tax increases. If the laws work as intended, jurisdictions with such requirements would have lower property tax burdens.

## Results

Results of *four* model estimations are presented in table 5.[7] The *first two* burden models ([1] and [2]) are estimated in log-linear from with the dependent variable represented as the natural log of property tax payments as a percent of household income. These estimate effects on absolute effective tax rates. The first of these uses year and BEA region fixed effects and all others use year and state fixed effects. All estimate clustered standard errors at the state level. Model one

[7]Results for fixed cross-section (state) and temporal (year) effects are omitted.

allows for between state effects within BEA regions (or within region effects), model two through four estimates only within state effects. The *third* model [3] is estimated in simple linear form with the dependent variable expressed as property tax burden as a portion of the mean property tax burden in the PUMA of residence. In the *fourth* model [4], the dependent variable is the absolute (unsigned) magnitude of a household's property tax burden as a deviation from the mean household burden within a PUMA. It estimates the effect on burden variation within the PUMA. These estimates focus on relative tax rates. Models were estimated on census and survey records for single family houses (detached or attached).[8]

**Household / Property Characteristics**

The estimated model focuses on determinants of burden and effective tax rates within and across PUMAs for similarly situated properties and households driven by institutional and structural features of the revenue system within and across states. To do so it includes (and thus controls for) characteristics of households and properties both individually and relative to median/average characteristic within individual PUMAs and within states. The affects of these characteristics are themselves interesting from a policy perspective.

Our previous investigation has shown property tax burden to be a declining function of income.[9] In this paper, we have made no effort to repeat this result and have not included estimates for this purpose.[10] Measures of relative property value simultaneously included in the model with a measure of household income results in a coefficient for household income that is of little

[8]Models were estimated with the census household weight applied to improve representativeness, however, results were consistent with or without weights. Top coding of records truncates the value of households in the highest reporting bracket. To avoid underestimating the burden for highest valued category, the extreme category was eliminated. Also, only household reporting minimal income of at least $500 during the calendar year were included in the analysis. Thus, while truncated, the analysis includes the vast majority of households (at over 97 percent). Standard errors were clustered by state.

[9]See Mikesell and Mullins (2008) op cit.

[10]To evaluate burden relative to income, our previous models were estimated with property value and property characteristics which are proxies for value removed to assess the relationship between property tax burden and household income absent controls for property value. Those results showed property tax burden across the United States to be a declining function of income. On average, burdens decline 6 percent for each $10,000 increase in household income. This suggests that either property tax rates or property valuation methods (or both) and/or the ratio of property value to household income varies across and within states and PUMAs in a manner that levies higher relative taxes on the incomes of lower income households.

interest as a measure of burden distribution across income classes. For example, interpretations of the coefficients for household income and housing value (models 1 and 2) would suggest that households with incomes double the PUMA median face 46 percent lower tax burdens (holding the median housing value relative to the PUMA median at its mean) or that property with a value twice the median in a PUMA results in a 32 percent higher tax burden (holding the ratio of household income to PUMA median household income at its mean). This is the same as concluding that persons with higher income living in housing of average value (or vice versa) have lower (or higher) tax burdens, this is not an unexpected results. *However, including household income and property value characteristic simultaneously provides better isolation of differential household burdens associated with community and state fiscal and institutional characteristics.*

Interpretation of the estimates of the divergence of effective tax rates from the PUMA average effective tax rates are similar (model 3). Effective tax rates on property for households with incomes double the PUMA median (controlling for relative housing value) are 53 percent lower than the PUMA average, while 38 percent higher for property valued at twice the PUMA median (controlling for the household income of the occupants). The Absolute magnitude of variations from the mean tax rate within PUMAs (model 4) also declines by 23 percent as household income as a percent of the PUMA median increases and increases by +18 percent as housing value increases. As for the above, this is expected. Persons of a given income living in a higher valued home will pay a higher than average effective tax rates in the PUMA and persons living in a home of a given value with higher incomes will pay a lower than average effective tax rate.

Results for determinants of property tax burdens and relative effective tax rates for the other characteristics of households and property provide additional insight into property tax administration. Age matters for the householder and also for the property. State/local property tax structures impose 11.4 percent higher absolute burdens on households with occupants 65 years of age or older. Alternatively, householders living in older structures experience somewhat lower relative burdens, with burdens declining approximately 2/10th percent per year. Age also matters for relative effective tax rates within the PUMA. Relative effective tax rates increase by 13% for households with older occupants and decline by .11 percent per year with the age of the

structure. The overall variation in tax rates from average are also slightly greater for older resident households and for households occupying older structures. These latter results may reflect affects of fixed income with age and assessment bias.

Tenure also matters. Initial model estimations (not reported) showed a significant annual decline in tax burden with increasing tenure. In addition, a term interacting tenure with age of structure showed a reinforcing effect. This outcome is suggestive of the potential affects of specific reassessment processes that favor tenure, such as reassessment on sale practices. With a parameter indicating the existence acquisition value assessment included in the model and an interaction between it and structure age (see below), the generic effects of tenure are altered. After controlling for assessment practices which favor tenure (discussed below), the absolute tax burden is not significantly affected by the period of time living in a residence. For the relative property tax burden model and the absolute deviation model, tenure is measures as a ratio to the average occupancy tenure in the PUMA. The relative burden (compared to the PUMA average burden) associate with tenure is positive, but only to the extent that tenure double that of the average resident increases relative tax burdens by 3.8 percent. Tenure is, however, also associated with significantly greater variations in burdens across the PUMA. As tenure increases, variation in tax burdens also increase (again by about 4.2 percent for households with double the average length of residency).

Characteristics of structures also seem to matter somewhat. Absolute burdens are approximately 9 to 11 percent lower for housing on larger tracts of land (more than one acre) and in less urbanized areas (models 1 and 2). Larger land tracts do not affect the relative PUMA burden, but the variance in tax burdens is greater for households on larger tracts of land. Households that mix income earning activities from hybrid business/residential uses of homes have slightly higher absolute and relative tax burdens, at +3 percent and +8 percent and the variation in burdens is also 5 percent greater for mixed use properties. Irrespective of reported market value, households occupying structures with more rooms and bedrooms experience higher absolute burdens and higher relative burdens within the PUMA. For each additional room (above the mean), absolute burdens increase by approximately 4 percent and relative PUMA tax burdens increase by 2.3 percent. Interestingly, more rooms are associated with slightly greater

consistency (less variation) in property tax burdens. This likely reflects the effects of valuation systems reliant on construction, square footage and design characteristics in addition to market value.

**Relative state / PUMA economic and demographic conditions**

We have controlled for PUMA/state context through several measure that are assumed to affect housing property tax burdens. Per capita local government spending as a portion of state per capita income (as an indicator of the magnitude of the local role statewide) has significant affects on absolute property tax burdens across states within BEA regions (increasing by 6 percent for each 1 percentage increment), but when state fixed effects are employed with standard errors clustered by state the within-state effects declines precipitously.[11] Holding constant other structural characteristics of the local revenue system and focusing on within-state effects, a one percentage point increase in the level of state per capita income devoted to local government spending results in a statistically insignificant .9 percent increase in absolute property tax burdens and .5 percent increase in relative differences in PUMA burdens. This positive relative effect is likely more reflective of increased variance in relative burdens and our absolute deviation model suggests that higher local government spending within the state is associated with a statistically significant .8 percent increase in PUMA internal tax rate variation. The relative level of per capita local spending within the PUMA has no systematic affect on within-state absolute or relative tax burdens. In general, PUMA's with local government's spending more relative to the average for the state also have higher property tax burdens but this effect is substantially diminished within states controlling for other PUMA/state characteristics (including relative property tax base).

Community tax base also affects burden, although the inclusion of other control measures complicates interpretation. Our previous findings show that greater median residential property values in a PUMA compared to the state median (with relative spending held constant) is

[11] The more we allow between state comparisons, such as using fixed effects by the four census regions rather than eight BEA regions, the greater the magnitude of these effects.

associated with significantly lower effective tax rates as a portion of the value of the property.[12] The absolute tax burden model, however, shows increasing tax burdens (by approximately .5 percent) with higher median values, within states and allowing for between-state variation in BEA regions. Relative within-PUMA tax burdens also increases by .1 percent as does relative variation as relative housing value within the PUMA increases. This is a function of the existence of controls for household and median incomes being simultaneously included in the model. As relative PUMA income increases by 1 percent between-state burdens decline, relative within-state burdens move .15 percent higher than the PUMA average and variation compared to the PUMA mean increases by .12 percent. It is not surprising that greater income produces greater burden variation.

Increases in levels of dependent populations are also associated with higher property tax burdens and higher effective tax rates. A one percentage point increase in the population under 18 (school aged) results in a 1.4 percent within-state increase in absolute tax burdens and a slight $2/10^{th}$ percent increase in burden variation. Higher area poverty rates also affect absolute household burdens. Average household burdens increase by 0.7 percent for each percentage point increase in the population in poverty. Higher poverty also increases average relative burdens (between- and within-states) and burden variations by approximately ½ percent. Higher levels of employment (and with it the need to service commuting populations and employer property) increases burden by $1/3^{rd}$ percent for each percentage point increase in employment relative to population.

**State fiscal / structural features, relief mechanisms and tax and expenditure limitations**.

The focus of this paper is the effect of institutional/structural aspects of the state/local fiscal environment on property taxes and their administration. The intent of the controls introduced in the previous sections of these models is to isolate the effects of these institutional/structural factors.

[12] Mikesell and Mullins (2008) op cit.

Constraints on the availability of alternative fiscal instruments produce the need for an increased reliance on property taxes and increased property tax burdens across states. Our previous findings show that households in states classified as employing Dillion's Rule, experienced slightly higher property tax burdens. However, the effect of Dillion's Rule has been declining. Given the absence of within-state variability in Dillon's rule, it can only be included in a model incorporating state fixed effects as an interaction with a time counter. The coefficient on this Dillion's Rule time counting variable (within-states) is negative, indicating that the effect of these somewhat blunt provisions has waned over the period of study by an average ½ percent reduction in absolute property tax burdens per year and a ¼ percent reduction in the scale of variation within PUMAs. Property tax burdens on households in states which allow local jurisdictions access to alternative tax instruments, such as income and sales taxes, are substantially lower. A percentage point increase in local relative reliance on non-property tax revenue (i.e., sales or income taxes) within a state is associated with 1.1 percent lower absolute household property tax burden; the between-state (within BEA region effect) is nearly 3 times as large. Tax burdens are also similarly lower for households in states which provide more relative fiscal support to local jurisdictions. Each percentage point increase in state transfers (as a portion of local revenue) is associated with a nearly equal corresponding 1.1 percent decline in property tax burdens within states (with the between-state/within-region effect again nearly double). Within-Puma differences in relative burdens are unaffected.

Property tax valuation processes and residential relief measures appear to also have significant ramifications for tax burdens. Our previous findings show that, across states, acquisition value assessment is associated with an overall 33 percent increase in regional tax burdens. We attributed that result to the effect of suppressing tax values on a subset of the housing tax base necessitating the imposition of higher tax rates across the remainder of properties. When the existence of acquisition value assessment was interacted with resident household tenure, tax burdens decline by 1.4 percent per year of residency. The implication was significant differentials in burdens and effective tax rates for the longest tenure properties and higher relative burdens for those with the shortest tenure. Our within-region (with BEA region fixed effects) and within-state results (using state fixed effects) are similar. Except that the introduction of acquisition value assessment is not associated with significantly higher overall

absolute effective tax rates on households in PUMAs. It is associated with an approximate 1 percent decline in absolute burdens per year of tenure in a residence (within-state or within-region). Acquisition value assessment results in significant burden differentials between otherwise like households. Acquisition value assessment is also associated with an 11 percent increased burden differentials and increased absolute variation relative to the PUMA mean burden. The relative tax burden of households within PUMAs declines by 1.1 percent per year of residency and the variation in tax burdens between these households from the PUMA average also declines. The implication is that newer or moving residents incur higher relative tax burdens and experience greater variation in these tax burdens from the community mean. The overall scale of and variation in relative burdens increases with acquisition value assessment.

Residential property tax relief in the form of a homestead exemption available to all homeowners reduces regional tax burdens across states 10 percent (previous findings), however, it has no statistically significant effect on aggregate burdens within states or between states within BEA regions. Providing wide-spread relief to all home owners results in greater relative relief to owners of lower valued property and may shift some of the aggregate property tax burden to non-homestead classifications and require higher homestead property tax rates to compensate for revenue loses. Similarly, classification itself, though not generally considered a traditional relief mechanism, shifts property tax burdens to non-residential (non-single family homestead) property. Our previous findings comparing states regionally (across broader census regions) indicates that increased relative tax burdens on industrial property were associated with significant declines in household absolute burdens. These findings, however, do not transfer to within-state or within BEA region burdens. Shifting additional burden to or from industrial classes of property over-time within a state do not diminish residential property tax burdens nor does it impact differences in burdens. Circuit breaker relief and deferral programs were also previously shown to be related to household property tax burdens. It is expected that targeted relief would allow general property tax burdens to grow as the excess burden on economically at risk households is relieved. The existence of circuit breaker programs directed a relieving excess burdens on the elderly and property tax deferral programs are, in fact, associated with higher household tax burdens across states within BEA regions. Circuit breakers programs for the elderly are linked to 15 percent higher tax burdens, while programs available to all low income

homeowners have little discernible effect. Deferral programs are associated with annually increasing burdens of 1 percent per year. However, these programs appear to have no systematic effects on burdens within states or within PUMAs.

External constraints on property taxation or other mechanisms of finance were previously found to have significant implication for property tax burdens and effective tax rates. Much of these effects dissipate when comparing tax burdens on properties within the same state. One major exception to this is court intervention in mandating elements of education finance. Education mandates are associated with substantial (26 percent) reductions in absolute property tax burdens within states and a 5.4 percent increase relative differential burdens within PUMAs and an 8.6 percent increase in overall burden variation within PUMAs . Alternatively, these court mandates occur in states which have 28 percent higher relative burdens among states within BEA regions. Constraints in the form of either local tax or expenditure limitations were previously found to reduce tax burdens and effective tax rates across states within census regions. However, their affect on within-state burdens appears substantially weaker. Tax rate, revenue or expenditure limitations on general purpose (county or municipal) governments are associated with a marginally significant, 13 percent increase in tax burdens between states within BEA regions. The within-state affect appear to significantly reduce tax absolute burdens, and to do so by 17 percent. These general purpose government limitations do not alter relative burdens or burden variation within PUMAs. Limitations of school districts and the period of years since the enactment of a "strong" limitation appear somewhat inconsequential; a result inconsistent with past findings.[13] Lastly, while states that have full disclosure provisions have been previously shown to have higher effective tax rates, this effect does not reach statistical significance in the within BEA region model. Further, full disclosure provisions do little to affect tax rates within states or relative burdens within PUMAs. The effect of annual public hearings (specifically directed at setting property tax rates) may have normalized the process and created public (and lawmaker) expectations of continuous legislative reconsideration of the intensity of property tax use. If public hearings are to be held annually and local legislative bodies are going to be labeled as raising tax rates (even in situations where levy rates might hold constant or possibly even

[13] There are many ways that tax and expenditure limitation can be represented and categorized. These results are preliminary. Models are currently being estimated with more detailed mappings of the characteristics of these limitations, including provisions which may have tightened or loosened limitations in individual states.

decline), the political cost of raising rates to a level beyond the base increase may be reduced compared to an environment in which levy increases occur without legislative action. The fact that "truth-in-taxation" forces annual action (and possibly sets too low a base point for consideration) might very well increase the likelihood of a levy increase above the increment in the base. In this regard, the dogs are no-longer sleeping so they might as well bark.

**The Great Recession Effect**

Our graphical and tabular analysis shows that property tax revenue continued to increase during the great recession, at a time when incomes were suppressed. That would be expected to have a more than inconsequential effect on absolute property tax burdens as a portion of income. Simultaneously controlling for all other factor in the models, the years of the great recession coincided with increasing tax burdens. While within-state tax burdens declined slightly between 2007 and 2008 by less than 1 percent, compared to 2007 levels, average burdens increased by 2 percent by 2009, by 6 percent by 2010 and were up by 7 percent by 2011. The great recession did little to abate a continuing trend.[14]

The more interesting comparisons may be the effects on PUMAs with different characteristics. That is the affects across PUMAs in states rather than within. The within-state fixed effect models washout between state differences. However, they allow the isolation of differences in burdens among household and PUMAs within states. Models are presently being estimate to assess these differential effects between populations within states.

## Conclusion

Structural, administrative, "relief" mechanisms and external constraints matter significantly in determining property tax burdens between states and are generally significant factors in absolute and relative burden levels within-states and between political subdivisions. Burdens and rates are driven by, in addition to characteristics of the property and community, (i) the availability of

[14] Between within region effects were greater at +3.4, +0.07, +6.17, +3.78 for 2008 – 2011, resulting in an increase of 13.4 percent.

alternative local financing sources and general levels of local autonomy and discretion, (ii) the method of valuing property between households, (iii) how the housing tax base is taxed relative to commercial and industrial properties (for between state effects), and (iv) the breadth of the availability of homestead exemptions, the existence of deferral programs, and the generosity of circuit breakers (also only for between state effects). Burdens and effective tax rates are also shaped by (v) the imposition of external constraints in the form of judicial mandates, local property tax and expenditure limitations, and (vi) process of transparency(between states). Between states, selective, targeted relief appears linked to greater relative viability and acceptability of the property tax. However, it has little effect on absolute or relative burdens within states and it is not clear that the array of policy overlays are providing consistent progress toward maintaining or improving the tax's veracity. More need to be done to understand the driving factors in within-state variations in burdens. While not specifically addressed here, the tax, in practice, varies substantially in its burden distribution. However, greater uniformity in residential burdens (the implications of targeted relief withstanding) is associated with greater reliance. Non-uniformity appears to becomes less acceptable as aggregate burden increases. Interest in provisions for targeted burden relief has increased with the escalation in base valuations. It is not likely that this interest will decline. However the need of local governments for this robust revenue source will also not decline and reliance on the property tax as the "go-to" source for local revenue actually increased substantially during the great recession, irrespective of it linkage to a housing/financial crisis. As a myriad "reforms" to the property tax are proposed in states across the nations, a better understanding of the determinants of burdens and rates and within-state burden variation is needed.

## Figures / Tables / Model Results

**Figure 1. Local Property, Individual Income and General Sales Tax Yield Relative to 4th Qtr 1988, Annualized by Quarter**

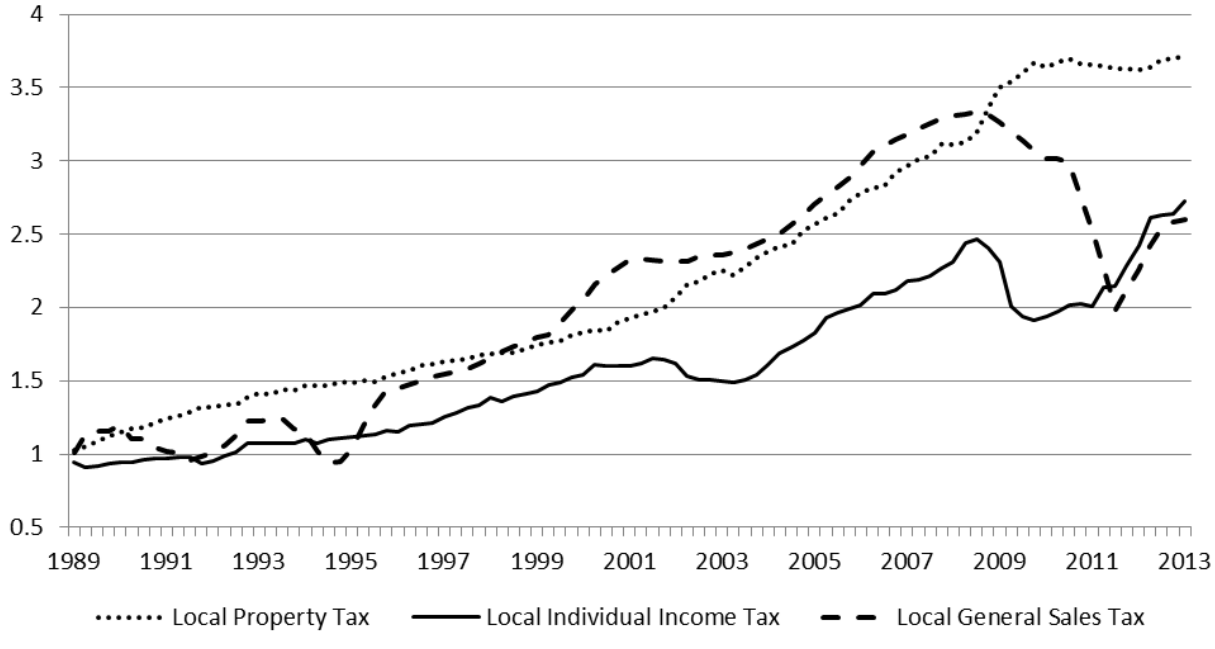


**Figure 2. Real Local Property Tax Yield, Annualized by Quarter (1989-2013, 2009 dollars)**

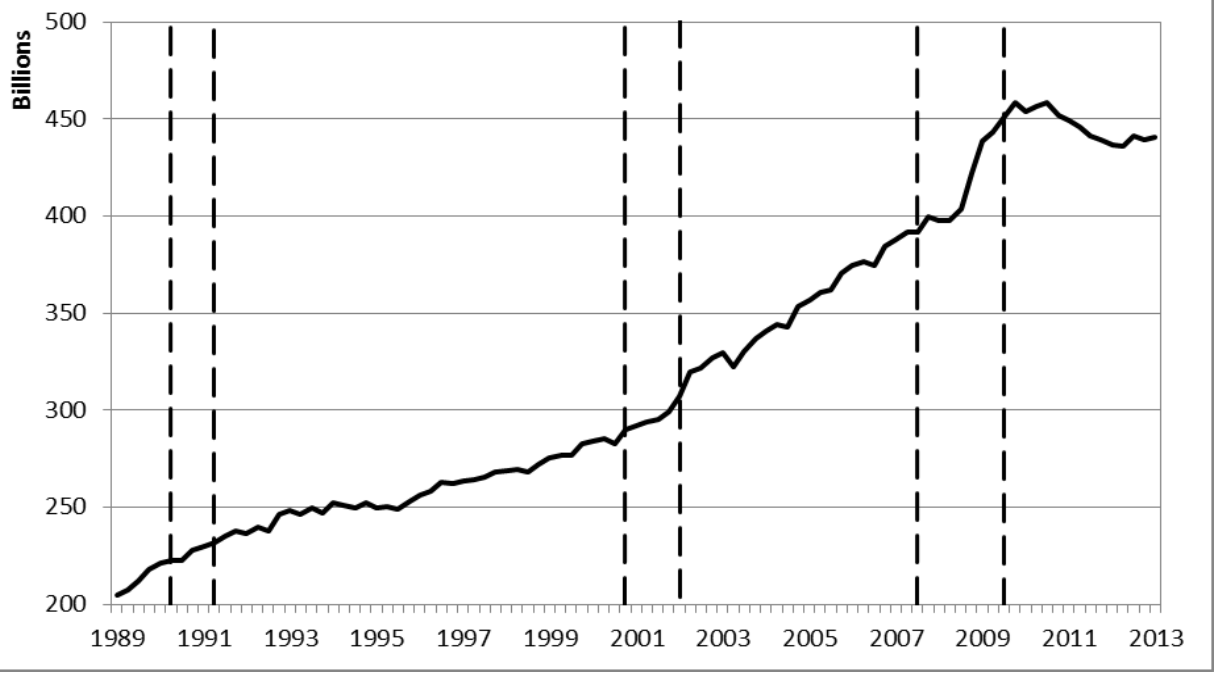

**Figure 3. Local Property Tax Yield, as a Percent of Total Local Tax Revenue, Annualized by Quarter (1989-2013)**

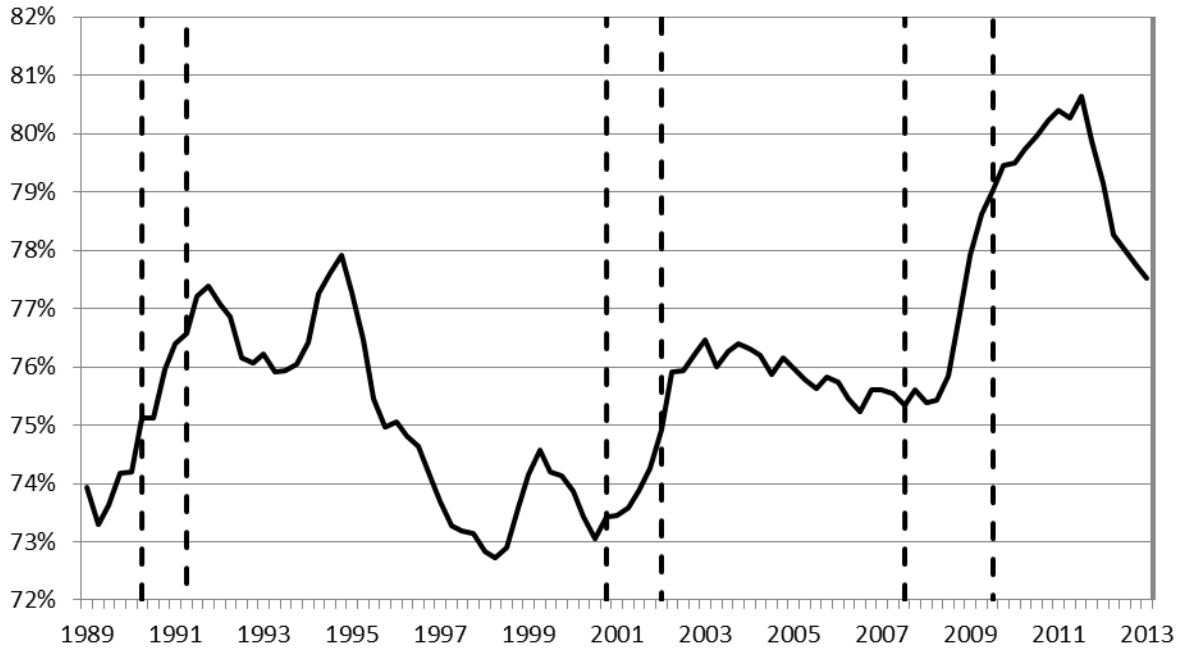


**Figure 4. Local Property Tax as a Portion of Personal Income, Annualized by Quarter (1989-2013)**

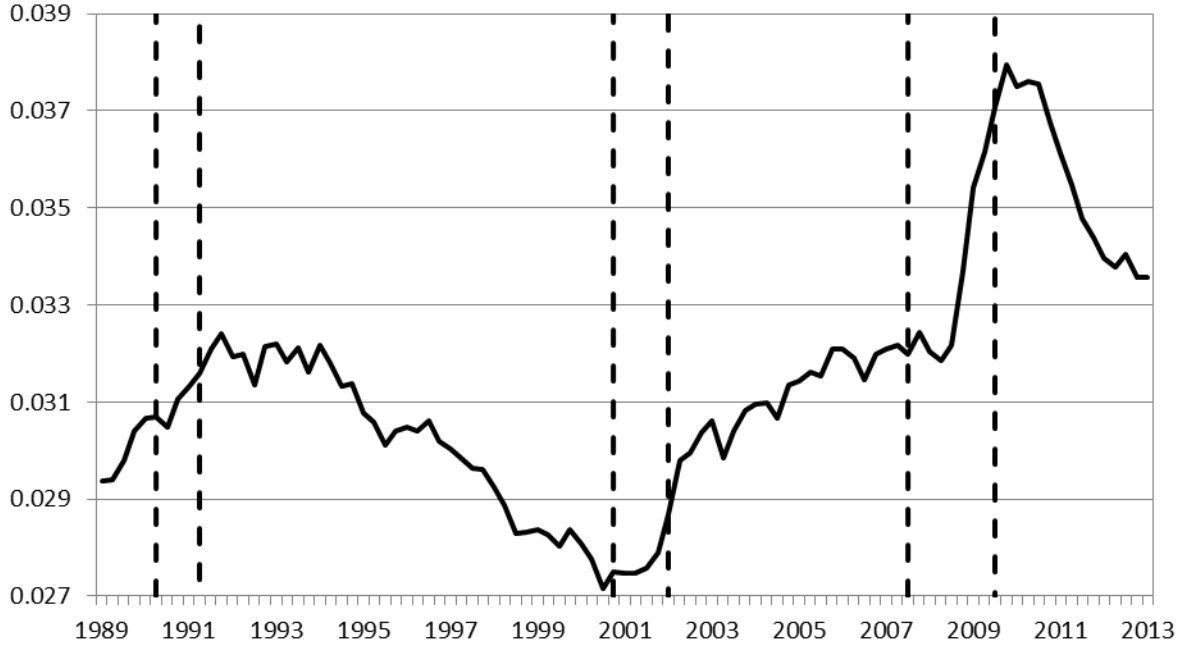

*Table 1*

**Absolute Dollar Value of Residential Property Tax Burden by Income Decile and Coefficient of Variation Across States, 1990 & 2000-2011**

| | *1990* | | *2000* | | *2001* | | *2002* | | *2003* | | *2004* | | *2005* | | *2006* | | *2007* | | *2008* | | *2009* | | *2010* | | *2011* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Decile* | *$Ave.* | *C.V.* | *$Ave.* | *C.V.* | *$Ave.* | *C.V.* | *$Ave.* | *C.V.* | *$Ave.* | *C.V.* | *$Ave.* | *C.V.* | *$Ave.* | *C.V.* | *$Ave.* | *C.V.* | *$Ave.* | *C.V.* | *$Ave.* | *C.V.* | *$Ave.* | *C.V.* | *$Ave.* | *C.V.* | *$Ave.* | *C.V.* |
| 1 | 675 | 68.0 | 1075 | 62.5 | 1173 | 65.6 | 1240 | 63.5 | 1303 | 64.7 | 1393 | 62.7 | 1463 | 64.0 | 1558 | 64.1 | 1639 | 63.0 | 1666 | 63.4 | 1733 | 64.7 | 1778 | 64.4 | 1813 | 64.0 |
| 2 | 732 | 66.9 | 1143 | 60.6 | 1200 | 62.7 | 1280 | 63.0 | 1366 | 62.3 | 1445 | 63.3 | 1530 | 63.7 | 1633 | 62.9 | 1729 | 64.1 | 1770 | 62.7 | 1800 | 63.0 | 1876 | 62.8 | 1884 | 63.1 |
| 3 | 795 | 65.2 | 1223 | 59.9 | 1288 | 61.0 | 1364 | 62.0 | 1454 | 62.3 | 1542 | 61.0 | 1653 | 60.9 | 1757 | 61.6 | 1863 | 60.6 | 1928 | 61.8 | 1948 | 61.3 | 2013 | 60.2 | 2021 | 62.4 |
| 4 | 858 | 63.1 | 1308 | 58.1 | 1391 | 59.6 | 1470 | 60.2 | 1574 | 60.5 | 1687 | 59.8 | 1778 | 60.7 | 1894 | 59.2 | 2003 | 59.3 | 2071 | 59.1 | 2101 | 59.1 | 2136 | 59.7 | 2156 | 60.7 |
| 5 | 919 | 62.2 | 1395 | 57.4 | 1495 | 59.7 | 1576 | 58.0 | 1685 | 60.1 | 1797 | 59.3 | 1918 | 58.4 | 2042 | 58.7 | 2168 | 57.7 | 2229 | 57.3 | 2264 | 57.7 | 2285 | 59.0 | 2295 | 60.0 |
| 6 | 987 | 61.1 | 1504 | 56.7 | 1602 | 58.1 | 1701 | 58.7 | 1798 | 58.8 | 1962 | 58.6 | 2071 | 57.8 | 2220 | 57.6 | 2335 | 57.3 | 2412 | 58.2 | 2449 | 57.3 | 2484 | 57.6 | 2479 | 58.8 |
| 7 | 1084 | 59.9 | 1642 | 56.1 | 1760 | 58.0 | 1859 | 58.8 | 1987 | 58.1 | 2146 | 58.1 | 2268 | 57.5 | 2423 | 57.4 | 2542 | 56.7 | 2647 | 56.8 | 2656 | 56.5 | 2693 | 57.4 | 2688 | 58.3 |
| 8 | 1200 | 58.2 | 1831 | 55.3 | 1993 | 56.6 | 2099 | 57.0 | 2251 | 56.3 | 2397 | 57.6 | 2548 | 55.7 | 2703 | 55.6 | 2865 | 55.0 | 2932 | 54.9 | 2974 | 55.5 | 2984 | 55.6 | 2975 | 57.5 |
| 9 | 1386 | 55.8 | 2143 | 54.0 | 2370 | 55.1 | 2481 | 53.9 | 2674 | 55.4 | 2787 | 54.8 | 2980 | 54.4 | 3172 | 53.6 | 3338 | 54.4 | 3426 | 54.1 | 3460 | 53.4 | 3483 | 53.6 | 3442 | 55.6 |
| 10 | 1928 | 50.5 | 3041 | 49.7 | 3384 | 49.8 | 3556 | 49.4 | 3726 | 50.9 | 4080 | 49.2 | 4287 | 48.6 | 4441 | 47.8 | 4660 | 46.4 | 4752 | 45.4 | 4779 | 45.7 | 4748 | 46.7 | 4761 | 46.7 |

*Table 2*

**Residential Property Tax Burden (as Percent of Household Income) by Income Decile and Coefficient of Variation Across States, 1990 & 2000-2011**

| | *1990* | | *2000* | | *2001* | | *2002* | | *2003* | | *2004* | | *2005* | | *2006* | | *2007* | | *2008* | | *2009* | | *2010* | | *2011* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Decile* | *(t/i)%* | *C.V.* | *(t/i)%* | *C.V.* | *(t/i)%* | *C.V.* | *(t/i)%* | *C.V.* | *(t/i)%* | *C.V.* | *(t/i)%* | *C.V.* | *(t/i)%* | *C.V.* | *(t/i)%* | *C.V.* | *(t/i)%* | *C.V.* | *(t/i)%* | *C.V.* | *(t/i)%* | *C.V.* | *(t/i)%* | *C.V.* | *(t/i)%* | *C.V.* |
| 1 | 13.6 | 48.2 | 17.4 | 56.4 | 17.7 | 47.2 | 18.5 | 46.9 | 19.4 | 50.5 | 20.4 | 47.2 | 22.1 | 50.4 | 22.6 | 49.9 | 22.1 | 46.3 | 22.9 | 46.7 | 23.4 | 63.4 | 23.8 | 48.9 | 26.0 | 62.8 |
| 2 | 5.3 | 47.8 | 6.1 | 57.0 | 5.8 | 45.3 | 6.1 | 45.2 | 6.5 | 45.4 | 6.7 | 46.7 | 7.1 | 45.5 | 7.3 | 45.5 | 7.3 | 46.9 | 7.3 | 45.3 | 7.5 | 46.2 | 8.1 | 44.7 | 8.4 | 44.8 |
| 3 | 3.9 | 47.6 | 4.5 | 56.2 | 4.3 | 44.7 | 4.4 | 44.9 | 4.7 | 46.5 | 4.9 | 44.4 | 5.2 | 44.0 | 5.4 | 45.2 | 5.4 | 43.9 | 5.4 | 45.2 | 5.6 | 44.4 | 5.9 | 43.0 | 6.2 | 43.8 |
| 4 | 3.2 | 47.0 | 3.7 | 51.2 | 3.6 | 44.2 | 3.7 | 44.4 | 3.9 | 44.7 | 4.1 | 44.0 | 4.3 | 44.5 | 4.4 | 43.3 | 4.4 | 43.3 | 4.5 | 43.0 | 4.6 | 42.9 | 4.8 | 43.1 | 5.0 | 42.8 |
| 5 | 2.8 | 47.5 | 3.2 | 49.4 | 3.1 | 44.5 | 3.2 | 43.9 | 3.4 | 44.9 | 3.5 | 43.8 | 3.7 | 43.7 | 3.8 | 43.7 | 3.9 | 43.8 | 3.9 | 42.1 | 4.0 | 42.2 | 4.1 | 43.2 | 4.2 | 42.6 |
| 6 | 2.5 | 47.6 | 2.8 | 47.5 | 2.7 | 44.5 | 2.8 | 45.0 | 3.0 | 44.7 | 3.2 | 44.0 | 3.3 | 44.2 | 3.4 | 43.9 | 3.4 | 43.7 | 3.4 | 43.3 | 3.5 | 42.2 | 3.6 | 42.6 | 3.7 | 42.9 |
| 7 | 2.3 | 47.4 | 2.6 | 46.8 | 2.5 | 44.5 | 2.6 | 45.1 | 2.7 | 44.6 | 2.9 | 43.8 | 3.0 | 43.9 | 3.1 | 43.8 | 3.1 | 43.2 | 3.1 | 42.7 | 3.2 | 42.6 | 3.2 | 42.5 | 3.3 | 42.8 |
| 8 | 2.2 | 46.5 | 2.3 | 44.6 | 2.4 | 43.6 | 2.4 | 44.1 | 2.6 | 43.7 | 2.6 | 44.2 | 2.8 | 42.8 | 2.8 | 43.2 | 2.8 | 41.9 | 2.8 | 41.7 | 2.9 | 41.9 | 2.9 | 41.6 | 3.0 | 42.1 |
| 9 | 2.0 | 44.9 | 2.1 | 42.2 | 2.2 | 42.3 | 2.2 | 41.8 | 2.4 | 42.6 | 2.4 | 42.5 | 2.5 | 42.1 | 2.6 | 41.5 | 2.6 | 41.4 | 2.6 | 40.8 | 2.6 | 40.3 | 2.7 | 39.8 | 2.7 | 40.9 |
| 10 | 1.7 | 40.7 | 1.7 | 37.1 | 1.8 | 37.6 | 1.9 | 37.9 | 1.9 | 39.3 | 2.0 | 36.6 | 2.0 | 36.9 | 2.1 | 37.2 | 2.1 | 36.4 | 2.0 | 35.5 | 2.1 | 35.2 | 2.1 | 35.5 | 2.1 | 35.1 |

*Table 3*

**Average Absolute Dollar Value of Residential Property Tax Burden by State, by Year, and Rate of Growth, 1990 & 2000-2011**

| *State* | *1990 $Ave.* | *2000 $Ave.* | *2001 $Ave.* | *2002 $Ave.* | *2003 $Ave.* | *2004 $Ave.* | *2005 $Ave.* | *2006 $Ave.* | *2007 $Ave.* | *2008 $Ave.* | *2009 $Ave.* | *2010 $Ave.* | *2011 $Ave.* | *Growth Rate* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alabama | 174 | 330 | 352 | 367 | 380 | 440 | 476 | 518 | 563 | 613 | 609 | 640 | 639 | 6.4 |
| Alaska | 845 | 1,645 | 1,766 | 1,765 | 1,939 | 2,123 | 2,316 | 2,320 | 2,576 | 2544 | 2625 | 2778 | 2,549 | 5.4 |
| Arizona | 561 | 989 | 1,072 | 1,113 | 1,184 | 1,279 | 1,344 | 1,443 | 1,476 | 1589 | 1627 | 1641 | 1,585 | 5.1 |
| Arkansas | 316 | 569 | 575 | 603 | 586 | 575 | 631 | 669 | 730 | 772 | 794 | 824 | 864 | 4.9 |
| California | 1,106 | 1,899 | 2,024 | 2,177 | 2,370 | 2,597 | 2,889 | 3,163 | 3,378 | 3524 | 3506 | 3470 | 3,491 | 5.6 |
| Colorado | 945 | 1,250 | 1,299 | 1,360 | 1,444 | 1,482 | 1,571 | 1,628 | 1,665 | 1729 | 1801 | 1809 | 1,852 | 3.3 |
| Connecticut | 2,074 | 3,380 | 3,501 | 3,732 | 4,036 | 4,234 | 4,452 | 4,700 | 4,959 | 5167 | 5326 | 5437 | 5,536 | 4.8 |
| Delaware | 579 | 867 | 816 | 845 | 922 | 952 | 993 | 1,055 | 1,168 | 1265 | 1316 | 1375 | 1,384 | 4.2 |
| District of Columbia | 1,308 | 1,622 | 1,651 | 1,801 | 1,897 | 2,175 | 2,389 | 2,701 | 2,826 | 2859 | 3097 | 3251 | 3,462 | 4.7 |
| Florida | 801 | 1,430 | 1,513 | 1,605 | 1,741 | 1,904 | 2,081 | 2,293 | 2,489 | 2502 | 2409 | 2302 | 2,235 | 5.0 |
| Georgia | 660 | 1,101 | 1,132 | 1,180 | 1,269 | 1,354 | 1,453 | 1,559 | 1,652 | 1737 | 1791 | 1854 | 1,787 | 4.9 |
| Hawaii | 819 | 943 | 916 | 923 | 967 | 1,080 | 1,328 | 1,560 | 1,699 | 1755 | 1754 | 1771 | 1,579 | 3.2 |
| Idaho | 608 | 1,127 | 1,094 | 1,179 | 1,239 | 1,323 | 1,463 | 1,546 | 1,481 | 1501 | 1471 | 1484 | 1,465 | 4.3 |
| Illinois | 1,328 | 2,536 | 2,655 | 2,809 | 3,012 | 3,165 | 3,396 | 3,566 | 3,733 | 3915 | 4012 | 4159 | 4,257 | 5.7 |
| Indiana | 562 | 1,048 | 1,097 | 1,126 | 1,183 | 1,263 | 1,405 | 1,450 | 1,540 | 1600 | 1431 | 1353 | 1,338 | 4.2 |
| Iowa | 882 | 1,277 | 1,281 | 1,343 | 1,437 | 1,533 | 1,609 | 1,678 | 1,748 | 1791 | 1893 | 1936 | 2,085 | 4.2 |
| Kansa | 791 | 1,152 | 1,228 | 1,339 | 1,423 | 1,491 | 1,593 | 1,682 | 1,805 | 1875 | 1956 | 2004 | 2,045 | 4.6 |
| Kentucky | 341 | 629 | 696 | 736 | 774 | 825 | 902 | 981 | 1,033 | 1075 | 1088 | 1123 | 1,161 | 6.0 |
| Louisiana | 121 | 289 | 287 | 314 | 343 | 398 | 483 | 523 | 578 | 629 | 704 | 726 | 785 | 9.3 |
| Maine | 999 | 1,514 | 1,602 | 1,753 | 1,827 | 1,997 | 2,042 | 2,066 | 2,094 | 2173 | 2253 | 2354 | 2,324 | 4.1 |
| Maryland | 1,327 | 1,992 | 1,996 | 2,084 | 2,194 | 2,318 | 2,511 | 2,690 | 2,846 | 3054 | 3223 | 3420 | 3,439 | 4.6 |
| Massachusetts | 1,672 | 2,592 | 2,830 | 2,915 | 3,120 | 3,309 | 3,523 | 3,692 | 3,854 | 3946 | 4041 | 4129 | 4,236 | 4.5 |
| Michigan | 1,520 | 1,688 | 1,733 | 1,851 | 1,981 | 2,082 | 2,228 | 2,334 | 2,465 | 2531 | 2478 | 2467 | 2,385 | 2.2 |
| Minnesota | 924 | 1,613 | 1,636 | 1,606 | 1,690 | 1,781 | 1,944 | 2,047 | 2,210 | 2315 | 2357 | 2385 | 2,397 | 4.6 |
| Mississippi | 256 | 471 | 469 | 502 | 558 | 600 | 598 | 632 | 694 | 730 | 783 | 810 | 841 | 5.8 |
| Missouri | 537 | 953 | 1,002 | 1,086 | 1,147 | 1,244 | 1,300 | 1,429 | 1,501 | 1603 | 1621 | 1616 | 1,665 | 5.5 |
| Montana | 719 | 1,153 | 1,205 | 1,254 | 1,321 | 1,362 | 1,483 | 1,520 | 1,600 | 1646 | 1677 | 1680 | 1,739 | 4.3 |
| Nebraska | 1,088 | 1,669 | 1,719 | 1,843 | 1,868 | 2,075 | 2,181 | 2,319 | 2,433 | 2448 | 2459 | 2484 | 2,601 | 4.2 |
| Nevada | 612 | 1,198 | 1,265 | 1,359 | 1,442 | 1,565 | 1,784 | 1,874 | 2,049 | 2093 | 2113 | 2025 | 1,834 | 5.4 |
| New Hampshire | 2,128 | 3,191 | 3,148 | 3,450 | 3,606 | 3,880 | 4,101 | 4,422 | 4,578 | 4734 | 4810 | 4887 | 4,964 | 4.1 |
| New Jersey | 2,709 | 4,395 | 4,571 | 4,831 | 5,130 | 5,457 | 5,678 | 6,029 | 6,293 | 6525 | 6696 | 6838 | 7,019 | 4.6 |
| New Mexico | 381 | 688 | 738 | 817 | 789 | 842 | 927 | 963 | 1,041 | 1108 | 1199 | 1260 | 1,277 | 5.9 |
| New York | 2,133 | 3,266 | 3,302 | 3,407 | 3,571 | 3,808 | 4,048 | 4,317 | 4,541 | 4675 | 4829 | 4937 | 5,057 | 4.2 |
| North Carolina | 551 | 885 | 949 | 1,021 | 1,056 | 1,144 | 1,246 | 1,320 | 1,390 | 1479 | 1521 | 1561 | 1,601 | 5.2 |
| North Dakota | 704 | 1,185 | 1,266 | 1,387 | 1,366 | 1,451 | 1,583 | 1,716 | 1,814 | 1830 | 1963 | 1840 | 1,867 | 4.8 |
| Ohio | 806 | 1,460 | 1,535 | 1,606 | 1,707 | 1,831 | 1,972 | 2,121 | 2,223 | 2252 | 2282 | 2350 | 2,404 | 5.3 |
| Oklahoma | 390 | 650 | 683 | 735 | 779 | 848 | 857 | 927 | 980 | 1038 | 1068 | 1129 | 1,202 | 5.5 |
| Oregon | 1,483 | 1,752 | 1,756 | 1,820 | 1,925 | 2,034 | 2,154 | 2,223 | 2,308 | 2445 | 2475 | 2560 | 2,635 | 2.8 |
| Pennsylvania | 1,079 | 1,759 | 1,848 | 1,959 | 2,062 | 2,220 | 2,361 | 2,478 | 2,601 | 2650 | 2696 | 2758 | 2,830 | 4.7 |
| Rhode Island | 1,687 | 2,744 | 2,877 | 3,013 | 3,173 | 3,317 | 3,493 | 3,577 | 3,783 | 3903 | 4005 | 4160 | 4,212 | 4.5 |
| South Carolina | 421 | 667 | 712 | 770 | 851 | 929 | 932 | 1,024 | 1,103 | 946 | 972 | 985 | 1,033 | 4.4 |
| South Dakota | 919 | 1,393 | 1,508 | 1,500 | 1,579 | 1,578 | 1,584 | 1,704 | 1,736 | 1793 | 1810 | 1982 | 1,883 | 3.5 |
| Tennessee | 472 | 857 | 865 | 969 | 993 | 1,047 | 1,084 | 1,162 | 1,224 | 1262 | 1267 | 1292 | 1,311 | 5.0 |
| Texas | 871 | 1,697 | 1,809 | 1,984 | 2,192 | 2,375 | 2,535 | 2,680 | 2,780 | 2770 | 2821 | 2863 | 2,892 | 5.9 |
| Utah | 695 | 1,012 | 1,082 | 1,134 | 1,179 | 1,244 | 1,303 | 1,364 | 1,434 | 1551 | 1560 | 1608 | 1,633 | 4.2 |
| Vermont | 1,448 | 2,340 | 2,593 | 2,829 | 2,970 | 3,066 | 3,183 | 3,305 | 3,437 | 3633 | 3776 | 3766 | 3,924 | 4.9 |
| Virginia | 909 | 1,303 | 1,392 | 1,523 | 1,668 | 1,878 | 2,034 | 2,225 | 2,391 | 2459 | 2478 | 2476 | 2,463 | 4.9 |
| Washington | 959 | 2,051 | 2,114 | 2,213 | 2,292 | 2,424 | 2,520 | 2,616 | 2,761 | 2890 | 2932 | 2912 | 2,974 | 5.5 |
| West Virginia | 154 | 363 | 410 | 436 | 450 | 496 | 510 | 559 | 598 | 609 | 621 | 623 | 673 | 7.3 |
| Wisconsin | 1,626 | 2,384 | 2,476 | 2,624 | 2,727 | 2,795 | 3,041 | 3,092 | 3,186 | 3211 | 3284 | 3352 | 3,404 | 3.6 |
| Wyoming | 406 | 699 | 746 | 820 | 817 | 895 | 891 | 950 | 1,110 | 1174 | 1301 | 1249 | 1,339 | 5.8 |
| Coeff. Of Variation | 60.8 | 58.1 | 57.7 | 57.7 | 58.1 | 57.5 | 56.7 | 56.4 | 55.7 | 55.7 | 55.9 | 56.2 | 56.9 | |

*Table 4*

**Average Residential Property Tax Burden (as Percent of Household Income) by State, by Year, and Rate of Growth, 1990 & 2000-2011**

| *State* | *1990 t/i%* | *2000 t/i%* | *2001 t/i%* | *2002 t/i%* | *2003 t/i%* | *2004 t/i%* | *2005 t/i%* | *2006 t/i%* | *2007 t/i%* | *2008 t/i%* | *2009 t/i%* | *2010 t/i%* | *2011 t/i%* | *Growth Rate* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alabama | 0.8 | 1.1 | 1.1 | 1.0 | 1.2 | 1.2 | 1.3 | 1.5 | 1.4 | 1.5 | 1.4 | 1.6 | 1.6 | 3.1 |
| Alaska | 2.5 | 3.5 | 4.1 | 3.8 | 3.9 | 4.0 | 4.5 | 4.7 | 5.5 | 3.8 | 4.9 | 5.0 | 4.3 | 2.7 |
| Arizona | 2.2 | 2.6 | 2.8 | 3.0 | 3.0 | 3.0 | 3.2 | 3.2 | 3.2 | 3.4 | 3.5 | 3.7 | 3.7 | 2.6 |
| Arkansas | 1.7 | 2.0 | 1.9 | 1.8 | 1.7 | 1.7 | 1.9 | 1.8 | 1.8 | 1.9 | 1.9 | 2.0 | 2.2 | 1.3 |
| California | 2.9 | 3.9 | 4.0 | 4.1 | 4.6 | 4.8 | 5.1 | 5.4 | 5.4 | 5.6 | 5.6 | 5.8 | 5.9 | 3.5 |
| Colorado | 3.1 | 2.9 | 2.7 | 2.9 | 3.1 | 3.1 | 3.2 | 3.1 | 3.0 | 3.0 | 3.1 | 3.3 | 3.4 | 0.5 |
| Connecticut | 5.2 | 6.9 | 6.8 | 6.6 | 7.3 | 7.4 | 7.8 | 7.8 | 7.9 | 7.8 | 8.1 | 8.9 | 9.1 | 2.7 |
| Delaware | 1.8 | 2.1 | 1.9 | 1.9 | 1.8 | 2.1 | 2.0 | 2.2 | 2.2 | 2.4 | 2.6 | 2.7 | 2.6 | 1.8 |
| District of Columbia | 3.3 | 3.3 | 3.2 | 3.0 | 3.1 | 3.4 | 4.1 | 4.2 | 3.7 | 4.0 | 3.8 | 4.6 | 4.4 | 1.4 |
| Florida | 3.0 | 4.2 | 4.0 | 4.1 | 4.3 | 4.6 | 4.9 | 5.2 | 5.4 | 5.6 | 5.6 | 5.4 | 5.2 | 2.7 |
| Georgia | 2.2 | 2.6 | 2.6 | 2.7 | 2.8 | 3.0 | 3.0 | 3.1 | 3.2 | 3.2 | 3.5 | 3.9 | 3.8 | 2.7 |
| Hawaii | 2.1 | 1.8 | 1.8 | 1.9 | 2.1 | 2.2 | 2.5 | 2.8 | 3.0 | 2.9 | 3.0 | 3.3 | 3.0 | 1.7 |
| Idaho | 2.7 | 3.4 | 3.2 | 3.3 | 3.5 | 3.6 | 3.7 | 3.8 | 3.3 | 3.5 | 3.5 | 3.4 | 3.7 | 1.5 |
| Illinois | 3.9 | 5.2 | 5.4 | 5.7 | 6.0 | 6.4 | 6.4 | 6.4 | 6.5 | 6.6 | 7.0 | 7.4 | 7.8 | 3.4 |
| Indiana | 2.1 | 2.8 | 2.7 | 2.8 | 2.8 | 3.0 | 3.2 | 3.2 | 3.3 | 3.3 | 3.0 | 2.9 | 2.8 | 1.3 |
| Iowa | 3.5 | 3.3 | 3.4 | 3.5 | 3.7 | 3.9 | 3.8 | 3.8 | 4.0 | 3.7 | 3.9 | 4.0 | 4.3 | 0.9 |
| Kansa | 2.9 | 3.0 | 3.1 | 3.3 | 3.9 | 3.3 | 3.4 | 3.6 | 3.7 | 3.7 | 4.1 | 4.0 | 4.1 | 1.6 |
| Kentucky | 1.5 | 2.1 | 2.2 | 2.2 | 2.2 | 2.3 | 2.3 | 2.3 | 2.6 | 2.5 | 2.5 | 2.6 | 2.8 | 2.9 |
| Louisiana | 1.0 | 1.1 | 1.3 | 1.4 | 1.2 | 1.4 | 1.5 | 1.6 | 1.8 | 1.7 | 1.8 | 1.8 | 2.1 | 3.7 |
| Maine | 4.0 | 4.3 | 4.6 | 4.7 | 5.1 | 5.4 | 5.1 | 5.2 | 5.2 | 5.1 | 5.1 | 5.5 | 5.4 | 1.5 |
| Maryland | 3.5 | 4.1 | 3.8 | 4.0 | 4.0 | 4.1 | 4.3 | 4.3 | 4.3 | 4.7 | 5.0 | 5.3 | 5.4 | 2.0 |
| Massachusetts | 4.8 | 5.7 | 5.6 | 5.8 | 6.2 | 6.4 | 6.5 | 6.5 | 6.6 | 6.5 | 6.4 | 6.9 | 7.0 | 1.8 |
| Michigan | 5.4 | 4.3 | 4.3 | 4.5 | 4.9 | 5.1 | 5.2 | 5.4 | 5.6 | 5.7 | 5.6 | 5.8 | 5.4 | 0.0 |
| Minnesota | 3.0 | 3.9 | 3.4 | 3.4 | 3.5 | 3.7 | 3.8 | 3.9 | 4.2 | 4.2 | 4.3 | 4.4 | 4.5 | 1.9 |
| Mississippi | 1.5 | 1.7 | 1.8 | 1.9 | 2.0 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.3 | 2.4 | 2.5 | 2.5 |
| Missouri | 2.0 | 2.5 | 2.5 | 2.7 | 2.8 | 3.1 | 3.1 | 3.2 | 3.2 | 3.3 | 3.4 | 3.5 | 3.5 | 2.8 |
| Montana | 3.4 | 3.9 | 4.1 | 3.9 | 4.0 | 4.2 | 4.1 | 4.3 | 4.0 | 4.0 | 4.4 | 4.3 | 4.4 | 1.2 |
| Nebraska | 4.4 | 4.7 | 4.4 | 4.7 | 4.7 | 4.9 | 5.0 | 5.2 | 5.0 | 5.2 | 5.0 | 5.1 | 5.5 | 1.1 |
| Nevada | 2.1 | 3.2 | 3.2 | 3.3 | 3.4 | 3.6 | 3.8 | 3.8 | 3.7 | 4.2 | 4.2 | 4.3 | 4.1 | 3.2 |
| New Hampshire | 6.6 | 7.5 | 6.8 | 7.2 | 7.5 | 8.1 | 8.5 | 8.1 | 8.0 | 7.9 | 8.9 | 9.2 | 8.5 | 1.2 |
| New Jersey | 7.3 | 8.8 | 8.7 | 9.1 | 9.5 | 9.3 | 10.0 | 10.5 | 10.3 | 10.3 | 10.8 | 11.1 | 11.5 | 2.2 |
| New Mexico | 1.7 | 2.3 | 2.4 | 2.4 | 2.5 | 2.5 | 2.8 | 2.6 | 2.8 | 2.7 | 2.9 | 3.4 | 3.3 | 3.1 |
| New York | 6.2 | 7.0 | 6.9 | 6.7 | 7.2 | 7.9 | 7.9 | 7.9 | 8.0 | 7.9 | 8.3 | 8.6 | 8.7 | 1.6 |
| North Carolina | 2.2 | 2.5 | 2.6 | 2.7 | 2.8 | 2.9 | 3.1 | 3.1 | 3.1 | 3.2 | 3.3 | 3.5 | 3.5 | 2.3 |
| North Dakota | 3.1 | 3.5 | 3.6 | 3.9 | 3.6 | 3.8 | 4.0 | 4.2 | 3.9 | 3.7 | 4.1 | 3.9 | 3.7 | 0.8 |
| Ohio | 2.8 | 3.8 | 3.7 | 3.9 | 4.0 | 4.2 | 4.4 | 4.6 | 4.6 | 4.6 | 4.7 | 4.9 | 5.0 | 2.7 |
| Oklahoma | 1.6 | 1.9 | 2.1 | 2.0 | 2.2 | 2.3 | 2.2 | 2.2 | 2.2 | 2.3 | 2.3 | 2.5 | 2.6 | 2.3 |
| Oregon | 5.7 | 4.6 | 4.5 | 4.8 | 4.8 | 5.0 | 5.1 | 4.9 | 4.8 | 5.1 | 5.0 | 5.4 | 5.7 | 0.0 |
| Pennsylvania | 3.9 | 4.7 | 4.7 | 4.9 | 5.3 | 5.3 | 5.4 | 5.5 | 5.4 | 5.2 | 5.4 | 5.6 | 5.6 | 1.7 |
| Rhode Island | 5.3 | 6.2 | 6.5 | 6.9 | 6.7 | 7.0 | 6.8 | 7.3 | 7.2 | 6.9 | 7.2 | 8.2 | 7.6 | 1.8 |
| South Carolina | 1.8 | 2.1 | 1.9 | 2.0 | 2.3 | 2.3 | 2.3 | 2.5 | 2.6 | 2.2 | 2.3 | 2.4 | 2.5 | 1.6 |
| South Dakota | 4.3 | 4.1 | 4.2 | 4.0 | 4.4 | 4.4 | 4.1 | 4.1 | 4.1 | 3.9 | 4.0 | 4.2 | 4.2 | -0.1 |
| Tennessee | 2.0 | 2.6 | 2.5 | 2.8 | 2.6 | 2.8 | 2.7 | 2.8 | 2.9 | 2.9 | 2.9 | 3.0 | 3.0 | 1.9 |
| Texas | 3.0 | 3.9 | 4.1 | 4.6 | 4.7 | 5.1 | 5.2 | 5.5 | 5.2 | 5.0 | 5.2 | 5.4 | 5.3 | 2.7 |
| Utah | 2.5 | 2.4 | 2.5 | 2.5 | 2.6 | 2.8 | 2.9 | 2.8 | 2.7 | 3.0 | 3.0 | 3.1 | 3.0 | 1.0 |
| Vermont | 5.6 | 6.8 | 7.0 | 6.8 | 7.3 | 7.6 | 7.6 | 7.9 | 8.0 | 7.2 | 7.5 | 8.0 | 7.9 | 1.7 |
| Virginia | 2.6 | 2.8 | 2.8 | 3.1 | 3.1 | 3.4 | 3.6 | 3.8 | 3.8 | 3.8 | 3.9 | 3.9 | 3.8 | 1.9 |
| Washington | 3.1 | 4.3 | 4.7 | 4.9 | 4.8 | 5.0 | 5.0 | 5.0 | 4.9 | 5.1 | 5.2 | 5.2 | 5.4 | 2.6 |
| West Virginia | 0.9 | 1.4 | 1.5 | 1.6 | 1.6 | 1.8 | 1.7 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.9 | 3.3 |
| Wisconsin | 5.9 | 5.7 | 6.0 | 6.1 | 6.7 | 6.3 | 6.7 | 6.8 | 6.6 | 6.3 | 6.7 | 7.1 | 7.0 | 0.9 |
| Wyoming | 1.8 | 2.3 | 2.8 | 2.1 | 2.3 | 2.2 | 2.3 | 2.0 | 2.2 | 2.4 | 2.8 | 2.6 | 2.7 | 1.9 |
| Coeff. Of Variation | 49.2 | 47.0 | 45.9 | 46.3 | 47.1 | 46.2 | 46.2 | 46.1 | 45.7 | 44.5 | 45.3 | 45.9 | 45.6 | |

Table 5. Exploratory Model Results
Determinants of Absolute and Relative Household Property Tax Burdens
(Pooled cross-sectional fixed effect (state-year) unbalanced panel models with state clustered standard errors estimated via generalized estimating equations (GEEs))

| Dependent Variables: Property Tax Burden as Percent of Household Income (in log form) / Property Tax Burden as Ratio to Average Burden in PUMA (Relative Burden -1) / Absolute Relative Deviation (ABS of [Relative Burden -1]). | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Independent variable (parameters for fixed cross-section year effects are omitted) | [1] Household Property Tax Burden (BEA)* | | [2] Household Property Tax Burden** | | [3] Relative Property Tax Burden** | | [4] Absolute Relative Deviation** | |
| | Est. | z-value | Est. | z-value | Est. | z-value | Est. | z-value |
| Intercept | 0.6165 | 1.6 | 0.8681 | 3.1 | 0.124 | 1.82 | 0.6878 | 13.37 |
| Ratio, household's income to median household income in PUMA (as %) | -0.0046 | -60.92 | -0.0046 | -60.51 | -0.0053 | -68.26 | -0.0023 | -55.33 |
| Ratio, property's value to median residential property value in PUMA (as %) | 0.0032 | 48.05 | 0.0032 | 48.05 | 0.0038 | 45.73 | 0.0018 | 32.48 |
| Household resident age 65or > (1 = yes) | 0.117 | 4.6 | 0.114 | 4.53 | 0.1301 | 5.97 | 0.0363 | 4.2 |
| Lot Size (1= > Acre) (1 = yes) | -0.1066 | -5.72 | -0.0857 | -5.6 | 0.0033 | 0.29 | 0.036 | 7.74 |
| Total rooms in home | 0.0457 | 13.44 | 0.0433 | 13.52 | 0.0227 | 8.96 | -0.0049 | -4.02 |
| Age of structure (years) | -0.0018 | -4.95 | -0.0018 | -6.26 | -0.0011 | -5.33 | 0.0008 | 7.57 |
| Tenure—years occupants lived in residence ( and as ratio to PUMA tenure) | 0.001 | 0.94 | 0.001 | 0.97 | 0.0376 | 3.18 | 0.0415 | 12.62 |
| Business located on property (1=yes) | 0.0272 | 6.97 | 0.0274 | 7.88 | 0.0763 | 9.02 | 0.0513 | 6.27 |
| Ratio, per capita local direct gen. exp. in the state to state per capita income | 0.0594 | 3.26 | 0.0091 | 0.89 | 0.0054 | 2.89 | 0.0075 | 3.54 |
| Ratio, per capita direct gen. exps. of local govs.: PUMA to entire state (as %) | 0.0002 | 1.72 | 0.0002 | 1.54 | 0 | 0.38 | 0 | -0.14 |
| Ratio, median value of residential property: PUMA to entire state (as %) | 0.0042 | 4.03 | 0.0049 | 5.68 | 0.0008 | 6.32 | 0.0008 | 5.98 |
| Ratio, PUMA median income to state median income (as %) | -0.0037 | -1.78 | -0.0017 | -1.16 | -0.0015 | -6.82 | -0.0012 | -4.82 |
| Percent of PUMA population age < 18 | 0.0104 | 1.66 | 0.0139 | 3.53 | 0.0014 | 1.23 | -0.0016 | -1.92 |
| PUMA poverty rate in percent | -0.0114 | -1.78 | 0.0072 | 2.16 | 0.0043 | 7.09 | 0.0049 | 7.48 |
| PUMA employment as percent of total PUMA residents | 0.0032 | 2.29 | 0.0035 | 3.77 | 0.0003 | 1.79 | -0.0006 | -3.4 |
| PUMA Population per square mile | 0 | 0.04 | 0.0000 | -1.56 | 0 | -0.89 | 0 | -0.52 |
| Existence of Dillon's Rule (1=yes)*Year Counter | 0.0023 | 0.64 | -0.0053 | -1.97 | -0.0024 | -3.24 | -0.0006 | -0.85 |
| Ratio, state transfers to local govs. to total local gov. revenue in state | -1.9823 | -3.41 | -1.1097 | -3.53 | -0.0485 | -0.6 | 0.0524 | 0.79 |
| Ratio, local (non-property) tax revenue to total local revenue in state | -3.0026 | -4.54 | -1.1069 | -1.97 | -0.182 | -1.08 | 0.1988 | 1.11 |
| Acquisition value assessment (1 = yes) | 0.1079 | 1 | 0.0486 | 0.56 | 0.1119 | 2.09 | 0.0283 | 2.8 |
| Acquisition value assessment * tenure at residence | -0.0115 | -2.27 | -0.0109 | -2.02 | -0.0107 | -2.44 | -0.0035 | -4.41 |
| State homestead exemption available to all home owners (1 = yes) | 0.0854 | 1.25 | -0.0241 | -1.11 | -0.0014 | -0.15 | -0.0016 | -0.17 |
| Circuit breaker rebate program available to elderly | 0.1477 | 2.17 | 0.0072 | 0.24 | -0.0032 | -0.81 | -0.0081 | -1.81 |
| Circuit breaker rebate program available to all low income | 0.0221 | 0.28 | 0.0356 | 1.1 | 0.003 | 0.15 | -0.0176 | -1.23 |
| Existence of a property tax deferral program (1 = yes)*Year Counter | 0.0103 | 3.08 | 0.0027 | 0.98 | 0.0001 | 0.13 | 0.0006 | 1.18 |
| Statewide tax / expenditure limitation on local general purpose gov. | 0.1334 | 1.73 | -0.1713 | -2.2 | -0.0274 | -1 | -0.0225 | -1.28 |
| Statewide tax / expenditure limitation on school districts | -0.0692 | -0.71 | -0.0537 | -0.7 | -0.0051 | -0.28 | 0.0038 | 0.28 |
| Years since adoption of "strong" tax / expenditure limitation (1 = yes) | -0.0049 | -1.33 | -0.0022 | -0.89 | -0.0005 | -0.65 | 0.0002 | 0.23 |
| Existence of Full Disclosure (Truth-in-Taxation) Requirement (1 = yes) | 0.0856 | 1.3 | 0.0382 | 0.82 | -0.0086 | -0.37 | -0.0137 | -0.8 |
| Property tax rate classification: industrial burden / residential burden | -0.0115 | -0.92 | -0.0035 | -1.07 | -0.0003 | -0.4 | -0.0005 | -1.09 |
| Existence of a judicial mandate on education | 0.2814 | 4.41 | -0.2682 | -3.7 | 0.0536 | 2.06 | 0.0858 | 4.7 |
| | | | | | | | | |
| Number of Observations | 11,081,199 | | 11,081,199 | | 11,081,199 | | 11,081,199 | |

Note: Results for year and state fixed effects are omitted. *Fixed effect, year and BEA region, and state clustered standard errors. **Fixed effect, year and state, and state level clustered standard errors.

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