

THE IMPACTS OF PROPERTY AND HOUSEHOLD CHARACTERISTICS AND PROPERTY TAX SYSTEMS ON HOUSEHOLD PROPERTY TAX BURDENS: AN ANALYSIS FROM INDIVIDUAL PROPERTY DATA

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INTRODUCTION

THE AMERICAN PUBLIC HOLDS THE REAL property tax in low regard as a means of financing government, much in contrast to the view of many tax scholars. 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 continues with the similar surveys now 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). The public does not care for the local property tax.

The attitude reflected in these surveys is reflected in patterns of reliance on the tax, as demonstrated in Figure 1.¹ Use of the property tax for local government finance has been in secular decline for the past 40 years. In 1961, the property tax share of local government general revenue was 0.484; by 2004, that share had fallen to 0.281. Most of the decline had occurred by 1981, when the share was 0.280; since that year, the role has remained relatively constant. The period of greatest decline – from 1961 to 1981 – was the era of California’s Proposition 13 (1978) and similar property tax constraints enacted in many other states before and after that action, although the decline was continual over that period. Local governments have responded to the low public regard for the property tax by shifting to other revenue sources.

However, the shift away from the property tax by local governments does not tell the full property tax story. Over that same period, the property tax burden, adjusted for inflation, has been increasing at a relentless pace. This is shown in Figure 2. Over that period, total real property tax collections increased from \$84,602.8 million to \$290,828.9 million, measured in constant 2000 dollars, a compound annual rate of 2.9 percent.² That pace was

only slightly interrupted in the early 1970s (when federal general revenue sharing was introduced) and in the late 1970s/early 1980s (when the previously mentioned local tax constraint programs were being widely introduced). While localities were shifting reliance away, the inflation-adjusted property tax burden was still experiencing healthy annual growth. Indeed, for the period since 1982, after the popular revolts against the property tax had subsided, the compound annual growth rate is 3.7 percent, almost a percentage point higher than for the period as a whole. Holders of real estate are not just imagining higher tax bills – total property tax collections are increasing more rapidly than inflation by a considerable share. Figure 3 shows that total property taxes as a share of personal income generally fell to the early 1980s, rose through the early 1990s, then fell until 2000. The share has recently increased (0.0327 in 2007 versus 0.0420 in 1961).

Rising property tax burdens and unpopularity of the property tax have combined over the past decades to produce many state and local programs to control and mitigate the tax. Understanding the patterns of property tax burdens and the influence of structural control and constraint mechanisms on them adds important information for analysis of local government finances. Those are the contributions of the research presented here. It focuses on the relationship between the property tax payment made by the household and the income of that household.

A major practical concern in use of the real property tax is with the relationship between the property tax payment and the income of the household. Because the tax is based on property value and homes are likely purchased on the basis of lifetime economic status, it is quite possible for the property tax payment to become particularly burdensome relative to the annual income that the household has available to pay the tax. The fact that property tax payments are not directly related to household

Figure 1: Local Property Tax as Share of Local General Revenue, 1961-2004

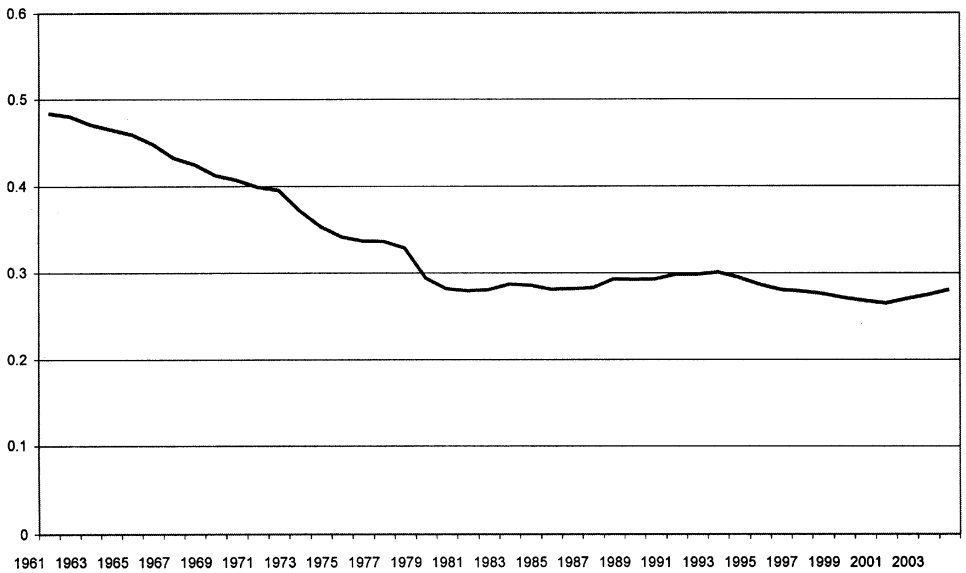


Figure 2: Real State and Local Property Tax, 1961-2004 (2000 Dollars)

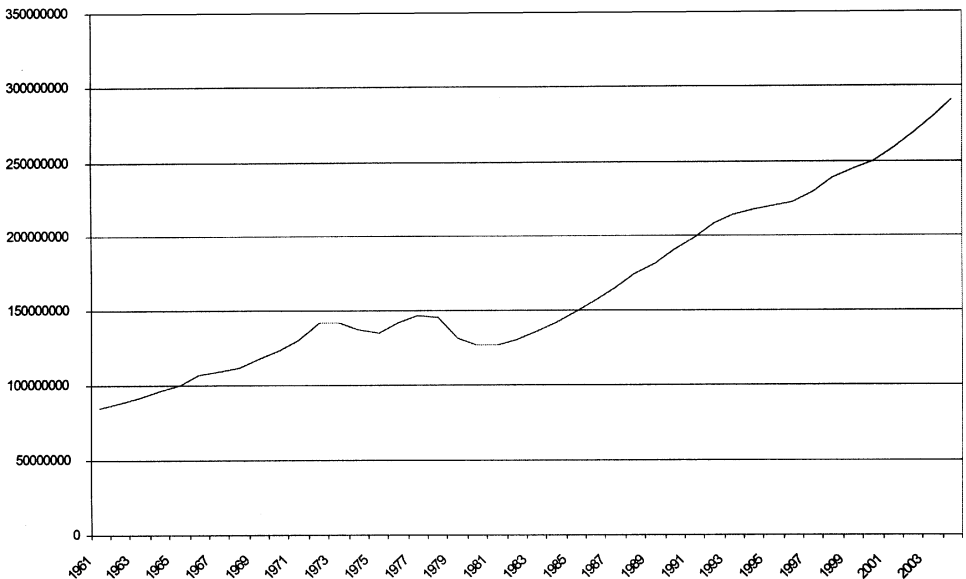
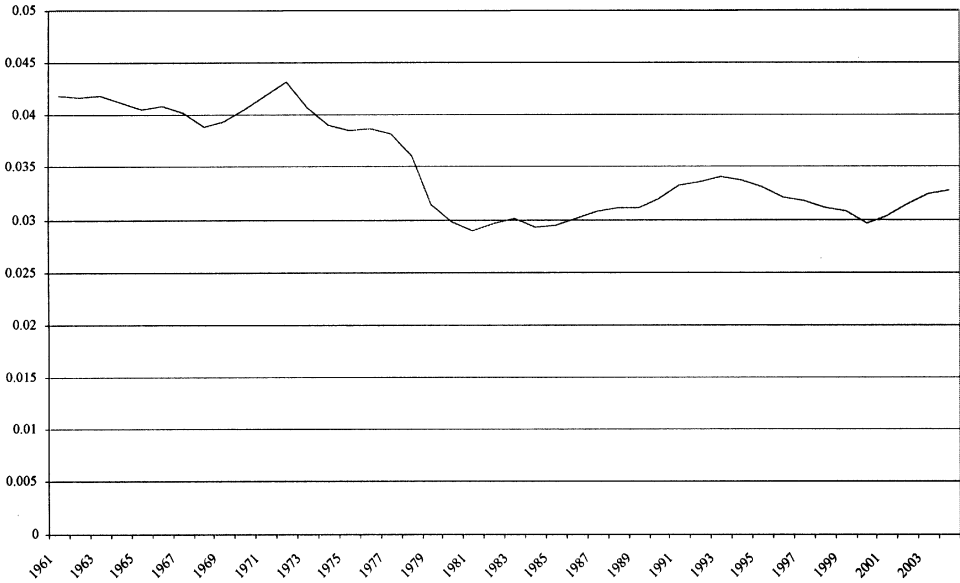


Figure 3: Property Tax as Share of Personal Income, U.S. Totals, 1961-2004

income—the stream from which payment of the tax most likely will come—is a frequent criticism of the tax.³ This overburden can result when a household business suffers a downturn, when family income earners become unemployed or have a bad economic year, or when income earners retire. Therefore, the following analysis will focus directly upon the property tax to household income ratio, a measure of some concern in design of legislative tax policy. Rather than focus on property tax rates or payments for a particular governmental unit—a city, school district, county, or whatever—this analysis examines total property tax paid by the household. From the position of the general populace, this is likely to be the most relevant question in shaping their view about the tax. The homeowner receives the total property tax bill, focuses on the total, and has little concern for what overlapping governments might be receiving particular components of it. In addition, the focus is on the property tax bill relative to the income of the household, not the rate related to the property tax base.

Data for this effective tax rate comes from the millions of household observations from the Public Use Micro Samples of the 2000 Census of Population and Housing and subsequent Annual Community Surveys done by the U.S. Census Bureau from

2000 through 2006. Tables 1 through 4 provide an overview of the property tax burdens shown in these data. Table 1 reports the absolute dollar value of residential property tax burden by household income deciles in surveys from years 2000 through 2006. As would be expected, the absolute payments do rise as income is greater and, in each decile, the average property tax payment generally increases across the years, although not in lockstep. Indeed, the average payments by the three lowest deciles all increased by more than 35 percent overall while the average payments by the three highest deciles all increased by less than 30 percent. This pattern is not likely to improve perceived fairness of the tax. The table also provides coefficients of variation across the states and shows both considerable disparity and greater disparity across states in the lower deciles than in the higher ones.

Table 2 provides the residential property tax burden as percent of household income, again by income decile and by state. The percentage for the lowest decile is consistently high in each year. This result is likely the product of housing purchased on the basis of lifetime economic status and not adjusted for transitory income fluctuations or in retirement. In the other deciles, the percentage declines consistently as household

Table 1
Absolute Dollar Value of Residential Property Tax Burden by Income Decile and Coefficient of Variation Across States, 2000-2006

Decile	2000		2001		2002		2003		2004		2005		2006	
	\$ Ave.	C.V.	\$ Ave.	C.V.	\$ Ave.	C.V.	\$ Ave.	C.V.	\$ Ave.	C.V.	\$ Ave.	C.V.	\$ Ave.	C.V.
1	927	71.0	937	67.8	1011	68.0	1069	69.2	1136	67.2	1184	67.7	1268	68.7
2	944	62.1	985	66.4	1053	64.2	1113	65.2	1190	64.6	1247	64.5	1316	64.4
3	1046	62.1	1102	60.6	1150	61.9	1236	61.6	1299	62.6	1382	62.6	1463	60.5
4	1197	60.	1206	58.3	1274	58.7	1357	59.3	1444	58.0	1533	58.2	1610	60.0
5	1322	54.7	1347	56.2	1428	57.5	1513	58.0	1601	58.1	1700	56.3	1776	56.3
6	1492	57.2	1507	55.3	1559	55.9	1684	55.0	1768	53.5	1878	55.1	1965	55.0
7	1656	51.6	1688	52.8	1771	51.8	1853	52.8	1978	53.4	2090	52.5	2171	53.1
8	1976	51.1	2005	49.2	2093	50.3	2001	50.1	2310	51.3	2413	49.8	2516	50.2
9	2427	46.8	2497	46.4	2591	47.1	2730	47.4	2864	49.2	3004	48.5	3082	47.7
10	3655	43.6	3743	42.9	3878	42.0	4064	44.8	4219	43.3	4397	43.1	4569	42.4

Table 2
Residential Property Tax Burden (as Percent of Household Income) by Income Decile and Coefficient of Variation Across States, 2000-2006

Decile	2000		2001		2002		2003		2004		2005		2006	
	(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	17.7	73.4	18.3	66.2	19.6	65.2	20.9	66.6	22.3	63.5	23.8	67.0	25.5	70.7
2	5.8	58.3	6.1	63.6	6.5	61.2	6.8	61.7	7.3	60.8	7.7	61.5	8.1	61.1
3	4.2	59.7	4.4	58.5	4.6	59.2	4.9	59.2	5.2	59.8	5.5	60.1	5.8	58.2
4	3.5	57.3	3.6	56.0	3.8	57.0	4.0	57.0	4.3	55.8	4.5	56.4	4.7	57.8
5	3.1	52.8	3.1	54.6	3.3	55.2	3.5	56.4	3.7	56.1	3.9	54.9	4.1	54.8
6	2.8	55.6	2.8	53.5	2.9	54.3	3.1	53.6	3.3	52.0	3.5	53.6	3.7	53.3
7	2.5	50.6	2.6	51.3	2.7	50.5	2.8	51.5	3.0	52.1	3.2	51.3	3.3	51.7
8	2.4	49.9	2.5	48.1	2.6	49.0	2.7	49.3	2.8	50.2	3.0	48.7	3.1	49.2
9	2.3	45.8	2.4	45.2	2.5	46.1	2.6	46.6	2.7	47.9	2.8	47.3	2.9	46.8
10	1.9	42.0	2.0	42.3	2.1	41.5	2.2	43.6	2.2	40.2	2.3	40.5	2.4	41.6

Table 3
**Average Absolute Dollar Value of Residential Property Tax Burden
 by State, by Year, and Rate of Growth, 2000-2006**

<i>State</i>	<i>2000 \$ Ave.</i>	<i>2001 \$ Ave.</i>	<i>2002 \$ Ave.</i>	<i>2003 \$ Ave.</i>	<i>2004 \$ Ave.</i>	<i>2005 \$ Ave.</i>	<i>2006 \$ Ave.</i>	<i>Growth Rate</i>
Alabama	330	352	367	380	440	476	518	7.8
Alaska	1645	1766	1765	1939	2123	2316	2320	5.9
Arizona	989	1072	1113	1184	1279	1344	1443	6.5
Arkansas	569	575	603	586	575	631	669	2.7
California	1899	2024	2177	2370	2597	2889	3163	8.9
Colorado	1250	1299	1360	1444	1482	1571	1628	4.5
Connecticut	3380	3501	3732	4036	4234	4452	4700	5.7
Delaware	867	816	845	922	952	993	1055	3.3
District of Columbia	1622	1651	1801	1897	2175	2389	2701	8.9
Florida	1430	1513	1605	1741	1904	2081	2293	8.2
Georgia	1101	1132	1180	1269	1354	1453	1559	6.0
Hawaii	943	916	923	967	1080	1328	1560	8.8
Idaho	1127	1094	1179	1239	1323	1463	1546	5.4
Illinois	2536	2655	2809	3012	3165	3396	3566	5.8
Indiana	1048	1097	1126	1183	1263	1405	1450	5.6
Iowa	1277	1281	1343	1437	1533	1609	1678	4.7
Kansas	1152	1228	1339	1423	1491	1593	1682	6.5
Kentucky	629	696	736	774	825	902	981	7.7
Louisiana	289	287	314	343	398	483	523	10.4
Maine	1514	1602	1753	1827	1997	2042	2066	5.3
Maryland	1992	1996	2084	2194	2318	2511	2690	5.1
Massachusetts	2592	2830	2915	3120	3309	3523	3692	6.1
Michigan	1688	1733	1851	1981	2082	2228	2334	5.6
Minnesota	1613	1636	1606	1690	1781	1944	2047	4.1
Mississippi	471	469	502	558	600	598	632	5.0
Missouri	953	1002	1086	1147	1244	1300	1429	7.0
Montana	1153	1205	1254	1321	1362	1483	1520	4.7
Nebraska	1669	1719	1843	1868	2075	2181	2319	5.6
Nevada	1198	1265	1359	1442	1565	1784	1874	7.8
New Hampshire	3191	3148	3450	3606	3880	4101	4422	5.6
New Jersey	4395	4571	4831	5130	5457	5678	6029	5.4
New Mexico	688	738	817	789	842	927	963	5.8
New York	3266	3302	3407	3571	3808	4048	4317	4.8
North Carolina	885	949	1021	1056	1144	1246	1320	6.9
North Dakota	1185	1266	1387	1366	1451	1583	1716	6.4
Ohio	1460	1535	1606	1707	1831	1972	2121	6.4
Oklahoma	650	683	735	779	848	857	927	6.1
Oregon	1752	1756	1820	1925	2034	2154	2223	4.0
Pennsylvania	1759	1848	1959	2062	2220	2361	2478	5.9
Rhode Island	2744	2877	3013	3173	3317	3493	3577	4.5
South Carolina	667	712	770	851	929	932	1024	7.4
South Dakota	1393	1508	1500	1579	1578	1584	1704	3.4
Tennessee	857	865	969	993	1047	1084	1162	5.2
Texas	1697	1809	1984	2192	2375	2535	2680	7.9
Utah	1012	1082	1134	1179	1244	1303	1364	5.1
Vermont	2340	2593	2829	2970	3066	3183	3305	5.9
Virginia	1303	1392	1523	1668	1878	2034	2225	9.3
Washington	2051	2114	2213	2292	2424	2520	2616	4.1
West Virginia	363	410	436	450	496	510	559	7.5
Wisconsin	2384	2476	2624	2727	2795	3041	3092	4.4
Wyoming	699	746	820	817	895	891	950	5.3
Coeff. Of Variation	58.1	57.7	57.7	58.1	57.5	56.7	56.4	

Table 4
**Average Residential Property Tax Burden (as Percent of Household Income)
 by State, by Year, and Rate of Growth, 2000-2006**

<i>State</i>	<i>2000 t/i%</i>	<i>2001 t/i%</i>	<i>2002 t/i%</i>	<i>2003 t/i%</i>	<i>2004 t/i%</i>	<i>2005 t/i%</i>	<i>2006 t/i%</i>	<i>Growth Rate</i>
Alabama	1.1	1.1	1.0	1.2	1.2	1.3	1.5	5.2
Alaska	3.5	4.1	3.8	3.9	4.0	4.5	4.7	4.9
Arizona	2.6	2.8	3.0	3.0	3.0	3.3	3.2	3.8
Arkansas	2.0	1.9	1.8	1.7	1.7	1.9	1.8	-1.7
California	3.9	4.0	4.1	4.6	4.8	5.1	5.4	5.6
Colorado	2.9	2.7	2.9	3.1	3.1	3.2	3.1	1.1
Connecticut	6.9	6.8	6.6	7.3	7.4	7.8	7.8	2.0
Delaware	2.1	1.9	1.9	1.8	2.1	2.0	2.2	0.2
District of Columbia	3.3	3.2	3.0	3.1	3.4	4.1	4.2	4.3
Florida	4.2	4.0	4.1	4.3	4.6	4.9	5.2	3.6
Georgia	2.6	2.6	2.7	2.8	3.0	3.0	3.1	2.6
Hawaii	1.8	1.8	1.9	2.1	2.2	2.5	2.8	7.9
Idaho	3.4	3.2	3.3	3.5	3.6	3.7	3.8	1.8
Illinois	5.2	5.4	5.7	6.0	6.4	6.5	6.4	3.6
Indiana	2.8	2.7	2.8	2.8	3.0	3.3	3.2	2.6
Iowa	3.3	3.4	3.5	3.7	3.9	3.8	3.8	2.3
Kansas	3.0	3.1	3.3	3.9	3.3	3.5	3.6	3.1
Kentucky	2.1	2.2	2.2	2.2	2.3	2.3	2.3	1.6
Louisiana	1.1	1.3	1.4	1.2	1.4	1.5	1.6	7.7
Maine	4.3	4.6	4.7	5.1	5.4	5.1	5.2	3.1
Maryland	4.1	3.8	4.0	4.0	4.1	4.3	4.3	1.1
Massachusetts	5.7	5.6	5.8	6.2	6.4	6.5	6.5	2.3
Michigan	4.3	4.3	4.5	4.9	5.1	5.2	5.4	3.7
Minnesota	3.9	3.4	3.4	3.5	3.7	3.8	3.9	-0.1
Mississippi	1.7	1.8	1.9	2.0	2.1	2.1	2.1	3.3
Missouri	2.5	2.5	2.7	2.8	3.1	3.1	3.2	4.4
Montana	3.9	4.1	3.9	4.0	4.2	4.1	4.3	1.3
Nebraska	4.7	4.4	4.7	4.7	4.9	5.0	5.2	1.7
Nevada	3.2	3.2	3.3	3.4	3.6	3.8	3.8	2.9
New Hampshire	7.5	6.8	7.2	7.5	8.1	8.5	8.1	1.3
New Jersey	8.8	8.7	9.1	9.5	9.3	10.0	10.5	2.9
New Mexico	2.3	2.4	2.4	2.5	2.5	2.8	2.6	2.0
New York	7.0	6.9	6.7	7.2	7.9	7.9	7.9	2.2
North Carolina	2.5	2.6	2.7	2.8	2.9	3.1	3.1	4.0
North Dakota	3.5	3.6	3.9	3.6	3.8	4.0	4.2	3.0
Ohio	3.8	3.7	3.9	4.0	4.2	4.4	4.6	3.1
Oklahoma	1.9	2.1	2.0	2.2	2.3	2.2	2.2	2.3
Oregon	4.6	4.5	4.8	4.8	5.0	5.1	4.9	1.0
Pennsylvania	4.7	4.7	4.9	5.3	5.3	5.4	5.5	2.8
Rhode Island	6.2	6.5	6.9	6.7	7.0	6.8	7.3	2.8
South Carolina	2.1	1.9	2.0	2.3	2.3	2.3	2.5	2.8
South Dakota	4.1	4.2	4.0	4.4	4.4	4.1	4.1	-0.1
Tennessee	2.6	2.5	2.8	2.6	2.8	2.7	2.8	1.9
Texas	3.9	4.1	4.6	4.7	5.1	5.2	5.5	5.7
Utah	2.4	2.5	2.5	2.6	2.8	2.9	2.8	2.9
Vermont	6.8	7.0	6.8	7.3	7.6	7.6	7.9	2.3
Virginia	2.8	2.8	3.1	3.1	3.4	3.6	3.8	5.3
Washington	4.3	4.7	4.9	4.8	5.0	5.0	5.0	2.7
West Virginia	1.4	1.5	1.6	1.6	1.8	1.7	1.8	3.5
Wisconsin	5.7	6.0	6.1	6.7	6.3	6.8	6.8	3.0
Wyoming	2.3	2.8	2.1	2.3	2.2	2.3	2.0	-2.2
Coeff. Of Variation	47.0	45.9	46.3	47.1	46.2	46.2	46.1	

incomes are higher for each year – the property tax burden as percent of household income decreases with income, as does its variation across states. For 2006, average burden in the second income decile was 2.8 times greater than the ninth decile. In each decile, the percent increases annually. The coefficients of variation across states are again large, generally being higher in the lower income deciles than in the higher deciles. Because of this variation, an analysis of these burden ratios must direct considerable attention to the several state peculiarities that may shape property taxes.

Table 3 presents the state-by-state average absolute value of property tax burden from the Community Surveys. The data show great variation from state to state – more than \$6,000 in New Jersey to less than \$550 in Louisiana and Alabama for 2006 – and considerable differences in the rate of increase across those years – from 10.4 percent in Louisiana to less than 3 percent in Arkansas. These serve to remind again that there is no single property tax in the United States, but there are vast state and local variations, with northeastern states having the highest absolute average yield per household.

Table 4 shows the average residential burden as a percent of household income for each state across the years. Again, there is great variation – from over 10 percent in New Jersey to 1.5 percent in Alabama. In some states, the percent is lower in 2006 than in 2000 but the increase is above 7 percent in Hawaii and Louisiana. The burden ratio has increased over the years in most of the states.

THE MODEL

The model seeks to identify the factors that influence the burden of the residential property tax relative to the income of the household. It is an important variable because it is often the beginning point for criticisms of the property tax and the focal point for restructuring programs aimed at property tax reduction. Three types of variables are examined as determinants of this property tax to household income ratio. These include the following: (1) characteristics of the individual household or property parcel, (2) conditions in the host state or county, and (3) elements of the state fiscal structure. Several independent variables fall into each of these influence types, as the following describes.

Individual Household or Property Parcel Characteristics

Several features of a particular property or the household living in it may well influence the ratio of the property tax bill to household income. These variables, all of which are specific to the household and come from the Community Surveys, include:

1. Household Income. The propensity of a household to spend income on housing is likely to vary with the income of the household. Thus, household income would influence the ratio of property tax to household income. This also provides a direct measure of the relationship between resulting property tax burden and income.
2. Presence of a Person 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.
3. Value of the Property. High value properties are likely to have high property tax bills, other influence held constant. Hence, the relationship should be positive. 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.
4. Home on Large Lots (One 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.
5. Rooms in Structure and Bedrooms in Structure. Rooms in structure is a proxy for size. Assessment systems often rely on property characteristics, including rooms and square footage to establish value. We have separately included total rooms and bedrooms to account for the possible differential effects of room type.

6. Year Structure Was Built. Property assessment systems frequently are better able to assign realistic values to newer properties than to older ones. Older properties are often undervalued. Therefore, it is expected that the greater the age of the structure, the lower the property valuation. The relationship should be negative.
7. Tenure of Residents in Structure. A number of states, including California, Michigan, and Florida, have formal features in their property tax assessment systems that 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.
8. Property with Annual Agricultural Sales Exceeding \$10,000. This adjusts for the existence of functioning agriculture upon the property. Valuations of property in agricultural use often significantly diverges from non-agriculture. However, working business activity may result in higher valuations due to locational and income stream factors.
9. Business Located on the Property. The existence of commercial activity on premises may affect property valuation (see above).
2. Median Home Value in the County. Median home values vary significantly across counties in the analysis. As the tax base is higher, including the contribution made by housing, governments can finance their fiscal obligations with lower statutory tax rates. That will translate into lower tax burdens for any particular property. This variable is county specific and comes from the Community Survey.
3. Ratio of County Employment to Total County Residents. When this ratio is high, the county will have a higher level of economic activity generating nonresidential property value. Revenue needs will also be greater due to service requirements of employers, however, the net fiscal residual should be positive, with the portion of the property tax burden borne by the housing stock reduced. This may produce a stimulative price effect. This variable is county specific.
4. Per Capita Student Population. Counties with a higher share of primary and secondary education students in the population are likely to have higher relative property tax burdens. Education is, by far, the single most resource intensive local government function. It is likely to produce a greater demand on property tax resources, resulting in higher relative tax burdens.

State Fiscal Structure

A number of state policies are likely to influence property tax burdens. Some are related directly to public demand to constrain or control the property tax while some others may have collateral impact. Examining these impacts is particularly significant 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. These influences, all varying at the state level, include:

1. Per Capita Local Direct General Expenditure in the State. States with high service expectations placed on their local governments place greater fiscal demands on these governments. States where this spending is high are likely to have localities with high tax rates and, therefore, higher property tax burdens. This variable is state specific and comes from U.S. Census Bureau Governments data.
1. 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 do not have free choice and, while typically given the

County and State Conditions

Some influences on the ratio are included at the level of the state or county in which the property is located. They determine certain underlying influences on the tax or market situations for the parcel.

- 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.
2. State Fiscal Assistance to Local Governments. 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.
 3. Ratio of Local General Sales Tax Revenue to Total Local Revenue. Local sales taxes provide a fiscal alternative to the property tax. Households in states with a considerable role for local sales taxes are likely to face lower property tax burdens.
 4. Ratio of Local Income Tax Revenue to Total Local Revenue. Local income taxes also provide relief from heavy use of the property tax. Where local income taxes are levied, property tax burdens are expected to be lower.
 5. Property Tax Circuit Breaker Rebates as Percent of Property Tax Collections. Circuit breaker programs establish a link between 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 more liberal circuit breaker relief for a deserving segment of the population would allow higher property tax levies to be applied. A more generous circuit breaker accommodates higher (gross) property tax burdens.
 6. 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.
 7. 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 via property taxes. This could ultimately stimulate higher spending and greater burdens.
 8. Overlapping Governments. Urban counties in the United States will be served by a number of overlapping governments, most with independent property tax levying power. The more overlapping governments, the more likely that their several property tax rates will create a higher household property tax burden. This is a county specific variable.
 9. Truth-in-Taxation (Full Disclosure) Law. Several 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.
 10. 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.

About the Data

This research examines the influences on property tax burden relative to household income for households across the United States. Household observations from the Public Use Micro Samples of the 2000 Census of Population and Housing and Annual Community Surveys through 2006 are used to evaluate residential property tax burdens across communities and time in all 50 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 2,000 substate areas in the United States with populations of 100,000 or greater.⁴

County level measures identified above have been mapped to PUMAs in each state. Because PUMAs frequently include multiple counties, 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.⁵ The panel period covers 1999 through 2006. Individual survey observations are nested within the PUMA areas. The panel is unbalanced because of censoring of PUMA designation in 2000–2004, resulting in limited substate geographic cross section in those years. Non-census/-survey data are invariant over this period within cross sections. The model estimated is preliminary in nature and is in the form of a pooled cross-sectional time-series with fixed effects.⁶

THE RESULTS

Results of the estimations are presented in Tables 5 and 6. Table 5 presents the results for the model with regressors incorporated as defined above. In both cases, the models are in log-linear form, with the dependent variable represented as the natural log of property tax payments as a percent of household income. Table 6 presents results with household income quintile dummy variables in place of household income (and property value and value proxies omitted). Models were estimated on census and survey records for single-family houses (detached or attached).⁷

One immediate observation is the high t-values and degree of statistical significance of the coefficients. With more than 6 million observations, this is not surprising and statistical significance in itself does not assure substantive significance. Still, many of the parameter estimates convey an interesting (if not important) context to the distribution of the burden of property taxes in the United States and the factors that may shape this burden.

Burden and Household/Housing Characteristics

As would be expected, property tax burdens as a portion of household income (while holding household income constant) on average increases as the value of property increases by 29 percent per each \$100,000 increase in housing value (see full model results, Table 5). Not surprisingly, persons of relatively lower household income living in relatively more expensive housing have higher property tax burdens. The reverse is also true as reflected in a coefficient for household income indicating a 9 percent decline in burden for each \$10,000 increase in income. To provide a more meaningful indication, the model was reestimated 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.⁸ These results (displayed in the last two columns of Table 5) show property tax burden across the United States to be a declining function of income.⁹ 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

Table 5
Exploratory Model Results
Distribution and Determinants of Household Property Tax Burdens
(Simple OLS Estimations of Partial Fixed-Effect Nested Unbalanced Panel Models)

<i>Independent variable</i>	<i>Dependent Variable: Property Tax Burden as Percent of Household Income (in log form).</i>			
	<i>Full Model</i>		<i>Value & Value Proxies Removed</i>	
	<i>Parameter Estimate</i>	<i>t-value</i>	<i>Parameter Estimate</i>	<i>t-value</i>
Intercept	0.58211000	92.44	1.16118000	169.31
Household Income	-0.00000941	-1.48E+003	-0.00000614	-982.21
Household Resident 65 or >	0.14277000	173.3	0.17481000	192.88
Reported Property Market Value	0.00000286	1.01E+003		
Lot Size (1= > Acre)	-0.15483000	-196.38		
Bedrooms	0.00998000	19.2		
Total Rooms in Home	0.04709000	174.98		
Age of Structure (years)	-0.00324000	-138.65	-0.00554000	-216.04
Tenure— Years Current Occupants Have Lived in Structure	-0.00301000	-42.78	-0.00636000	-81.91
Interaction: Age of Structure * Tenure	0.00006249	41.45	0.00012876	77.37
Agricultural Sales Greater than \$10,000 (1=yes)	0.04077000	9.96	0.12734000	28.44
Business Located on Property (1=yes)	0.01962000	8.74	0.07099000	28.68
Per Capita Local Direct General Expenditures in State	0.00016903	2.92E+002	0.00014241	223.32
Median Home Value in County	-0.00000086	-1.83E+002	0.00000073	150.75
Ratio of Total County Employment to County Residents	0.33897000	68.2	0.47594000	86.81
Per Capita School Enrollment	0.52341000	20.99	0.04393000	1.6
Existence of Dillon's Rule (1=yes)	0.11930000	148.02	0.10255000	115.23
Ratio of State Transfers to Local Govs. to Local Gov. Revenue	-0.98653000	-141.65	-1.08333000	-140.91
Ratio of Local General Sales Tax Rev. to Tot. Local Gov. Revenue	-3.90262000	-360.57	-3.85394000	-322.29
Ratio of Local Income Tax Revenue to Total Local Gov. Revenue	-4.56580000	-319.71	-4.17849000	-264.91
Circuit Breaker Rebates as Percent of Property Tax Collections	-0.04214000	-146.73	-0.03466000	-109.24
Existence of a Property Tax Deferral Program	0.12587000	126.66	0.14461000	131.93
Property Tax Rate Classification: Industrial Burden / Residential Burden	-0.06096000	-199.04	-0.05146000	-152.16
Number of Overlapping Jurisdictions in County	0.00021921	44.94	0.00019929	37.02
Existence of Full Disclosure (Truth-in-Taxation) Requirement	0.12076000	122.4	0.13145000	120.82
Existence of a Judicial Mandate on Education	0.25409000	338.83	0.25108000	303.25
Binary Indicator of Substitution of Average County Measures	-0.07808000	-60.53	-0.23127000	-163.77
EAST	0.53298000	480.92	0.53221000	435.04
MIDDLE	0.14417000	184.11	0.13397000	154.93
SOUTH	-0.33541000	-391.17	-0.36913000	-390.52
WEST	-0.34174000	-181.78	-0.29704000	-339.70
1999	-0.02857000	-26.63	-0.21713000	-185.84
2000	0.01989000	20.63	-0.02829000	-26.64
2001	0.02047000	21.32	-0.00453000	-4.28
2002	0.02843000	29.86	0.03495000	33.25
2003	0.02454000	27.31	0.06139000	61.9
2004	0.02553000	28.45	0.11350000	114.96
2005	-0.03999000	-37.64	0.00224000	1.92
2006	-0.05029000	-38.98	0.03786000	-26.5
Coefficient of Determination (R-Square)	.42		.29	
Number of Observations	6,156,997		6,156,997	

of lower income households. This is not new, however, the magnitude of the differential is quite large. Table 6 reestimates the reduced model, but substitutes for household income a set of dummy variables for household income quintile.¹⁰ These

results clearly demonstrate a declining property tax burden with income, even after controlling for household, demographic, fiscal, and structural factors. The lowest quintile averages a property tax burden 85 percent higher than the average across

Table 6
Exploratory Model Results

Distribution and Determinants of Household Property Tax Burdens

**Reestimation of Model From Table 5,
Omitting Property Market Value, Bedrooms, Rooms, and Lot Size
and with
Household Income Quintiles Substituted for Household Income as Regressors
(only Quintile Coefficients Are Reported)**

<i>Dependent Variable: Property Tax Burden as Percent of Household Income (in log form).</i>		
<i>Quintile Distribution</i>	<i>Parameter Estimate</i>	<i>t-value</i>
Household Income Quintile 1	0.85164	1088.37
Household Income Quintile 2	0.14439	208.03
Household Income Quintile 3	-0.12260	-183.94
Household Income Quintile 4	-0.30443	-461.27
Household Income Quintile 5	-0.56900	-610.56
Coefficient of Determination (R-Square)	.34	

all households (and 97 percent greater than the average for quintile 3), with the second quintile averaging a 14 percent higher burden (27 percent greater than quintile 3). Higher income quintiles face successively and significantly lower burdens (with 30 percent and 57 percent lower relative effective burdens, respectively).

The coefficients reported in Table 5 (full model) provide indications of the determinants of property tax burdens across a number of additional factors. Age matters for both the householder and the property. State/local property tax structures impose 14 percent higher burdens on households with occupants 65 years of age or older. Alternatively, householders living in older structures experience lower relative burdens, with burdens declining approximately 1/3 percent per year. In addition, tenure matters. Likely reflective of reassessment on sale practices, the longer occupants have resided in a home, the lower the relative property tax burden imposed. In fact, average burdens decline by nearly 1/3 percent per year of residency. The declines diminish, however, over time, possibly due to mass reassessment practices. Given older population's propensity to occupy older homes and for longer duration, the effect of structure age and resident tenure acts to diminish the otherwise higher burden on households with older occupants. Characteristics of structures also seem to matter somewhat. Relative burdens are 15 percent lower for housing on larger tracts of land

(more than one acre) located in lesser urbanized areas. Households that mix income earning activities (working agricultural or business establishments) have slightly higher burdens. Irrespective of reported market value, structures with more rooms and bedrooms also experience higher relative burdens (5 percent per room above the average, 1 percent per bedroom), possibly reflecting valuation systems reliant on construction, square footage, and design characteristics in addition to market value.

Burden and County/State Context

As identified above, we have controlled for state context through several measures that are assumed to affect housing property tax burdens. Average per capita local government spending (as an indicator of the magnitude of the local role statewide) is, as expected, associated with increases in property tax burdens. Holding constant other structural characteristics of the local revenue system (local income taxes, sales taxes, and Dillon's rule), a \$1,000 increment in per capita local spending is associated with a 17 percent increase in property tax burdens. Community tax base also affects burden, with burden declining by approximately 1 percent for each \$10,000 increase in median housing values, greater employment (and with it the need to service commuting populations and employer property) increases burden by 1/3 percent for each percentage point increase in employment

relative to population, as does the existence of a larger school age population.

Structural Factors

Constraints on local reliance on alternative fiscal instruments produce the need for an increased reliance on property taxes and increased property tax burdens. Households in states classified as employing Dillon's Rule, experienced 12 percent higher property tax burdens. Property tax burdens on households in states which allow local jurisdictions access to income and sales taxes are substantially lower. A percentage point increase in local relative reliance on sales or income taxes is associated with a 4 to 4 1/2 percent lower household property tax burden. Tax burdens are also lower for households in states which provide more relative fiscal support to local jurisdictions. Each percentage point increase in state transfers is associated with a corresponding 1 percent decline in property tax burdens. More overlapping jurisdictions using the tax base increase their tax burdens by 2.2 percent per 100 jurisdictions, while the existence of a judicial mandate regarding education finance is associated with a 26 percent increase in relative household property tax burdens.

Residential relief measures appear to also have significant ramifications for tax burdens, however, possibly not in the directions one might assume. Classification, though not generally considered a traditional relief mechanism, shifts property tax burdens to nonresidential (non-single family homes) property. For each percentage point increase in the relative effective tax burden on industrial property, the household property tax burden declines by 6 percent. Circuit breaker relief is also associated with lower household property tax burdens, with burdens declining as the percent of relief increases. However, deferral programs apparently allow targeted relief to offset 13 percent higher general tax burdens. Residential property tax burdens are 12 percent higher in states with full disclosure provisions, possibly reflecting the motivation for the enactment of full disclosure rather than its affects.

DISCUSSION/CONCLUSIONS.

This analysis provides some insights into an important policy (or political) question: what can be done about the property tax burden on homes? More state transfers to local government and more

use of alternative broad base taxes (general sales and individual income) are obvious options that are supported by this research. Less obvious options include reducing the number of overlapping local jurisdictions and freeing localities from the constraint of Dillon's Rule. Deferral programs, which likely make sense for other reasons, seem to accommodate higher tax burdens, but generous circuit breakers do not. Providing full disclosure (truth-in-taxation) does not constrain burden. Indeed, localities appear to use the requirement to successfully make their case for higher tax – or possibly the public simply doesn't understand what is going on. The typical classification program favoring residential property does reduce the burden and judicial mandates for education increases the burden. All of these influences provide a basis for asking further questions about local fiscal policies and how the property tax can fit into such programs.

Notes

- ¹ All aggregate fiscal data are from U.S. Census Bureau, Annual Survey of State and Local Government Finances and Census of Governments (1961-2004).
- ² These property tax data include state property tax collections with the local tax. However, the local tax constitutes around 97 percent of the total through the years, so the state taxes have negligible impact on these tax bills.
- ³ This investigation operates on the assumption that the household owning and occupying the property bears the economic burden of the tax. While alternative incidence assumptions are possible, this operating assumption cannot be rejected as entirely implausible. And certainly it is this ratio that creates the political static about the property tax. Of course, these data represent only part of the property tax because they do not include the tax initially paid by businesses which ultimately is borne by households, either as consumers, income earners, or capital owners.
- ⁴ Sources for measures related to state fiscal structures as follows: for Dillon's rule see Richardson, Gough, and Puentes (2003); for circuit breakers, see Lyons, Farkas and Johnson (2007); 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 provisions were compiled by authors. County employment data came from U.S. Census Bureau (2006).
- ⁵ Observations are nested within PUMAs and PUMAs are nested within states.

- ⁶ We are not embarrassed to admit that we are still in the process of determining the appropriate econometric method of estimation. Preliminary estimates are using OLS with fixed effects for State / PUMA areas and year.
- ⁷ Models were estimated with 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).
- ⁸ Specifically, the model was reestimated with property value, number of rooms, number of bedrooms, and lot size removed.
- ⁹ The coefficient for household income in this model is -.00000614 (and a t-value of -982.21) indicating a declining burden as income increases.
- ¹⁰ A restriction was placed on the five quintile coefficients forcing their sum to equal zero so that all could be placed in the model simultaneously and so that the coefficients could be interpreted as deviation from the mean burden across the respondents.

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