

**Exploring Changes in Homeowner Property Taxes  
in Wisconsin, 2000 to 2005**

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## **Abstract**

Despite policymakers' interest in property tax relief, very little is known about changes over time in the property tax liabilities and burdens faced by homeowners. Drawing on the fact that Wisconsin taxpayers are required to list their previous year's property tax payments on their income tax return, the authors have constructed a six-year panel of income tax returns that captures the property tax payment and income history of all Wisconsin resident homeowners between 2000 and 2005. The results show a great deal of variation in property taxes among non-mover homeowners; an actual decline in property taxes for 12 percent and an average annual growth rate in excess of 6 percent for 18 percent. Low-income homeowners experienced the greatest increase in property tax burdens, primarily because their incomes grew very slowly. The state's efforts at reducing the highest property tax burdens were of limited effectiveness.

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# Exploring Changes in Homeowner Property Taxes in Wisconsin, 2000 to 2005

## Introduction

The property tax plays a central role in financing public services provided by local governments. These services include elementary and secondary education, police and fire protection, sanitation, street and road maintenance, and many other services that vary by state and jurisdiction. The provision of these services by local governments, and the political accountability that accompanies local provision, have a long tradition in the United States.

Although in surveys Americans consistently respond that local governments “do a better job” than state governments and the federal government, the same surveys indicate that they dislike the property tax more than other taxes. In recent years the unpopularity of the property tax has taken the form of repeated efforts around the country to eliminate or sharply curtail the tax as a source of local government finance. The criticism of the property tax comes from both citizens and from state government policymakers.

For nearly 30 years, starting with California’s Proposition 13, voters and state legislatures have been pursuing policies aimed at reducing the property tax in general and the residential property tax in particular. Many states have placed some limitations on property tax revenue, and a number of states have restricted increases in the assessed value of property. New property tax limitations are currently being considered in a number of states. Most recent tax limitation efforts seek directly to limit the ability of local governments to raise revenues through the property tax. For example, Wisconsin has imposed limits on municipal government property tax levies. Thirty other states, including California, Florida, and Texas have placed restrictions on the growth rate of the assessed value of individual parcels.<sup>1</sup> States also spend billions in state aid to local governments in large part to lower their reliance on the property tax. In Wisconsin, close to \$7 billion goes to local governments in the form of shared revenue payments and school aid in an effort to reduce reliance on the property tax.

In addition, most states, including Wisconsin, have singled out residential homeowners for property tax relief. Even in Wisconsin, where the *uniformity clause* in the state’s constitution limits the extent to which homeowners can be given favorable property tax treatment, several property tax relief programs are targeted to homeowners and residential tenants.

In spite of these efforts, policymakers have found that the monies spent in providing tax relief have largely failed to reduce citizen frustration over growing property tax burdens. In today’s climate of economic uncertainty, weak real estate markets, and budget deficits,

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<sup>1</sup> For a detailed description and analysis of assessment limits see Haveman and Sexton (2008).

state and local governments will likely face further complaints about the property tax at a time when they have fewer resources available to address the issue.<sup>2</sup>

A reasonable question is why, after restrictions on the growth in property taxes and the expenditure of billions of state dollars to reduce property taxes, do homeowners continue to complain about rising property tax bills and high property tax burdens? Are state-imposed property tax limits and direct property tax relief measures not aiding those homeowners for whom the property tax is creating the greatest hardships? To provide answers to these questions, we need information about the size of the property tax liabilities faced by homeowners and how these tax liabilities change over time. A major goal of this paper is to provide this information.

Surprisingly little is actually known about the property tax paid by homeowners.<sup>3</sup> In nearly all states, property tax collection is the responsibility of local governments. Although information on the assessed value and on the property tax liability levied on each parcel is in the public domain, these data are maintained at the local government level and generally are not collected by state governments or stored in state depositories. Thus, assembling individual property tax assessment and tax records for any given state would in most cases involve a Herculean effort, especially as local property assessment and collection offices may not use consistent data formats. Even if a state government regularly collects property tax records consistently for all parcels in their state, property tax records contain very little information about the owner, such as income and household structure.

In most states, the only property tax information collected by the state government (generally the Department of Revenue) is data on the property tax *revenue* of local governments within the states. These revenue data can usually be disaggregated by the type of property from which the revenue was raised. Thus, many states report separately on the property tax revenue from residential, commercial, industrial, and agricultural property. As the residential property category includes rental properties, second homes, and homes owned by non-residents, in most states it is difficult to determine, even in the aggregate, the annual amount of property tax paid by homeowners on their primary residence. Reliable data on changes in property tax liabilities faced by individual homeowners is completely absent.

In this paper, we report on our efforts, using Wisconsin data, to analyze changes in homeowner property taxes. Revenue data reported by the state and local governments in Wisconsin indicate that residential property tax revenues grew by 34 percent between 2001 and 2006. These data, however, tell us nothing about the distribution of property tax increases among Wisconsin homeowners. One would expect that some taxpayers faced

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<sup>2</sup> In states that place limits on property tax rate increases, or require voter approval for rate increases, falling home values are likely to translate into property tax reductions. Although Wisconsin has state-imposed limits on annual increases in tax levies, local governments remain free to raise tax rates. Thus, in Wisconsin there is no reason that falling home prices will automatically translate into reductions in property tax liabilities for individual taxpayers.

<sup>3</sup> The 2004 Tax Incidence Study conducted by the Wisconsin Department of Revenue found the Wisconsin property tax to be regressive for tax year 2001. However, the study analyzed the tax for a single year and did not measure changes in tax burden over time.

below-average tax increases, and perhaps even tax reductions, while others faced above-average increases. We present data that will allow us to answer a set of questions about changes in property tax liabilities over time. For example, we want to know what proportion of Wisconsin homeowners benefited from tax reductions and what proportion faced steep increases. We also want to know whether low- and moderate-income homeowners are more likely to face above-average tax increases than homeowners with higher incomes. In addition we would like to know if elderly taxpayers face disproportionately large property tax increases.

The key to answering these questions is knowledge about the property tax payments of each homeowner over a period of years **and** information about the income, and age of each homeowner. In this paper we report on the construction of a data set that meets these two criteria.

### **Describing the Data**

The central element of the data set we have constructed is the individual income tax returns filed by Wisconsin residents starting in the tax year 2000. In 2005, the Wisconsin Department of Revenue (DOR) established a data warehouse designed to compile individual income tax returns, federal tax returns of Wisconsin filers, and other related information. The primary purpose of the data warehouse is to facilitate the DOR's tax compliance efforts by assisting DOR employees in selecting returns for audit and delinquent returns for collection. The data compiled in the warehouse also provide a very rich foundation for tax policy analysis.

The link between income tax returns and the property tax is a provision of the Wisconsin individual income tax code that provides Wisconsin residents with a *School Property Tax Credit* (SPTC). All homeowners are entitled to a non-refundable credit on their income tax equal to 12 percent of the property tax they paid on their principal residences during each tax year.<sup>4</sup> The maximum credit any taxpayer can receive is \$300 per year. To claim the credit, each homeowner is required to list on his or her tax return the amount of property tax paid during the tax year.

One problem with identifying Wisconsin homeowners through their use of the SPTC is that most low-income homeowners do not qualify for the SPTC because they are generally not required to file income tax returns. Because the SPTC is a non-refundable credit, some low-income homeowners who do file returns do not benefit from the credit and are thus unlikely to list their property tax payments on their returns. Fortunately, we are able to determine the property tax payments of low-income homeowners because another Wisconsin income tax credit, the homestead credit, is available to taxpayers whose income is below \$24,500. The homestead credit is a refundable "circuit breaker." It provides up to \$1,160 of property tax relief to eligible homeowners facing large property tax

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<sup>4</sup> Tenants are also eligible for the SPTC. For purposes of the credit, renters' property tax liability is considered to be equivalent to 20 to 25 percent of their annual rent payments, depending on if heat is included in the rent.



bills relative to the size of their income.<sup>5</sup> To receive the homestead credit, taxpayers must file a tax form (Schedule H) which requires them to list their annual income and property tax payments.

The starting point of our analysis is data on all income tax returns filed by Wisconsin residents for tax year 2005. From a total of about 2.7 million returns, we identify those filed by homeowners by selecting the approximately 1.32 million returns that claimed the homeowner SPTC or homestead credit.<sup>6</sup> Using tax return data for the years 2000 through 2005 from the DOR Data Warehouse, we construct, whenever possible, six-year histories of each taxpayer who was a Wisconsin homeowner in 2005. The basis for constructing the histories is the *primary* taxpayer in 2005. For married couples filing joint returns, the primary taxpayer is defined as the spouse whose name appears first on the 2005 tax return. In cases where the primary taxpayer married during the 2000 to 2005 period, the history contains the income and property tax information of the primary taxpayer (as a single filer) in the years prior to his or her marriage, and as a married filer in the year of the marriage and thereafter.<sup>7</sup>

Approximately 876,000 of the 1.3 million taxpayers who were Wisconsin homeowners in 2005 were identified as being Wisconsin homeowners in every year since 2000. The other taxpayers either became Wisconsin residents at some date after the year 2000, or while Wisconsin residents switched from being renters to owners at some point after 2000.

In this paper, we focus on the changes in property tax liabilities and property tax burdens for those Wisconsin taxpayers who were homeowners for the entire period from 2000 through 2005. The next section of the paper starts with an overview of changes in aggregate property tax revenue in Wisconsin between 2000 and 2005. We then draw on our six-year panel of taxpayer data to explore in detail the changes in the property tax liabilities of individual Wisconsin homeowners over this period. To facilitate comparison among taxpayers, the data analysis presented in this section focuses only on those Wisconsin taxpayers who were both Wisconsin residents and homeowners in every year from 2000 through 2005.

Because our tax panel includes each taxpayer's address in each year, we are able to isolate those taxpayers who reported property tax payments on the same residence in all six years. As we are particularly interested in changes in property tax liabilities that are not the result of taxpayer actions, such as a change in residence, the analysis in this paper will focus on the changes in property tax payments of those homeowners who did not undertake a residential move during the period.

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<sup>5</sup> In a parallel fashion to the SPTC, the homestead credit is available to tenants who meet the income eligibility requirements.

<sup>6</sup> This approach underestimates the number of homeowners because it does not include homeowners who do not file income tax or for some reason did not claim the SPTC.

<sup>7</sup> A discussion of more complicated changes in family structure is included in the methodology discussion in Appendix 1.

After presenting data on the distribution of property tax changes for all homeowners and for all non-mover homeowners, we disaggregate the data to explore whether the pattern of property tax changes varies by the income and age of the homeowner.

We also explore the changes between 2000 and 2005 in the property tax *burdens* borne by Wisconsin homeowners. The burden of the property tax is defined for each homeowner as his or her annual property tax payment relative to their *ability to pay*. Although there is considerable debate among economists about the best way to measure a taxpayer's *ability to pay*, in this paper we use a fairly broad measure of annual cash income based on each taxpayer's income subject to federal income taxation augmented by income from sources excluded from federal taxation, such as exempt interest and social security benefits.

The paper concludes with a brief summary of the results and a discussion of future research related to the property tax in Wisconsin that we plan to undertake using data from the tax panel.

The appendix provides a detailed discussion of the methodological issues involved in constructing a six-year panel of income tax data. We include an in-depth discussion of how the panel was constructed and the criteria used to drop taxpayers from the panel.

### **Changes in Property Tax Revenue in Wisconsin**

In Wisconsin local governments do not have the right to impose income taxes, and counties governments are limited to levying a sales tax at a rate of one-half of one percent; as a result, the property tax plays a larger than average role in local government finance. U.S. Census data for fiscal year 2006 indicate that the property tax in Wisconsin accounted for 65 percent of the own-raised revenues of local governments (U.S. Census Bureau, 2008). However, in an effort to support local government services and to reduce reliance on the property tax, the state government annually provides local governments with about \$7 billion in state aid. Even after counting all financial aid from both the state and the federal governments, the role of the property tax in Wisconsin remains quite large, accounting for 36 percent of total local government revenues. In only 9 other states does the property tax play a larger role in local government finance.

In Wisconsin, every type of government derives at least some of its revenue from the property tax. Table 1 displays the distribution of property tax levies by type of government for 2006, the latest year for which we have complete data. By far the largest share of the total tax was levied by school districts (43.5 percent), followed by municipalities (27.2 percent) and counties (19.8 percent).

**Table 1: Gross Property Tax Levy  
by Type of Government, 2006**

Type of Government	Gross Levy (in Millions of \$s)	Percent of Total
School Districts	\$3,787.84	43.5%
Counties	1,723.86	19.8%
Municipalities (incl. TIF increments)	2,370.88	27.2%
Technical Colleges	650.62	7.5%
Special Districts	90.81	1.0%
State (Forestry Tax)	82.36	0.9%
	\$8,706.37	100.0%

**Source:** Wisconsin Department of Revenue

Table 2 documents the growth of property tax levies in Wisconsin between 2000 and 2005. Total revenue from the property tax grew at an average annual rate of 5.1 percent during this five-year period, from \$6.1 to \$7.9 billion. The data indicate that the property tax levied on residential real estate grew at a substantially faster rate than the tax levied on commercial and manufacturing property. While residential property taxes grew at an average annual rate of 6.0 percent, commercial real estate taxes grew at 4.8 percent and manufacturing real estate taxes at a mere half a percent per year. As a result of these differential growth rates, the share of total property tax revenue that comes from residential property grew from 67.8 percent in 2000 to 71 percent in 2005. The growing residential share of the property tax reflects both the relatively slow growth in the value of commercial and manufacturing real estate and the quite rapid rise in home prices over this period.<sup>8</sup>

<sup>8</sup> The Wisconsin house price index calculated by the Office of Federal Housing Enterprise Oversight (2008) grew by 35.9 percent between the second quarter of 2000 and the second quarter of 2005. The same price index grew by only 25.8 percent between the second quarters of 1995 and 2000 and grew but 9.0 percent from the second quarter of 2005 to the second quarter of 2008.

**Table 2: Growth in Wisconsin Property Tax Levies 2000 to 2005**

	Calendar Year		5-Year Growth Rate	Average Annual Growth Rate
	2000	2005		
	(millions of dollars)			
Total Property Tax Levy+	6,135.1	7,857.0	28.1%	5.1%
Residential Property Tax Levy	4,161.2	5,580.8	34.1%	6.0%
Residential share of total	67.8%	71.0%		
Commercial Real Estate Property Tax Levy	1,166.5	1,472.2	26.2%	4.8%
Commercial share of total	19.0%	18.7%		
Manufacturing Real Estate Property Tax Levy	227.9	233.8	2.6%	0.5%
Manufacturing share of total	3.7%	3.0%		
Personal Income in Wisconsin	153,547.6	181,979.8	18.5%	3.5%

<sup>+</sup>The total is defined as the total property tax levy including personal property, but net of the state tax credit

**Source:** Property tax data from Wisconsin Department of Revenue (20xx) and personal income data from Bureau of Economic Analysis (2007).

The bottom row of data in Table 2 presents data on the personal income growth in Wisconsin over this five-year period. The relatively sluggish 3.5 percent annual growth rate of personal income reflects the mild recession that occurred in 2001. The fact that residential property taxes grew at a faster rate than personal income suggests that over this period of time the property tax has placed an increasing property tax *burden* (measured as property tax liabilities relative to household income) on the average Wisconsin family.

Data on aggregate residential taxes, however, provide a very imperfect and limited picture of the changes in property tax burdens over time borne by individual Wisconsin families. First, residential property is a broad category that includes, in addition to owner-occupied homes, all residential rental property, whether occupied or vacant, and residential property owned and occupied by families whose permanent residence is outside of Wisconsin. Second, comparing data on the aggregate residential property tax levied in different years only allows us to make a rough inference about the average changes in property tax burdens. An increase in property tax revenue may reflect an increase in the number of Wisconsin households rather than any increase in the burden placed on any individual household. Alternatively, if houses of different values appreciate at different rates, the rate of increase in overall residential property tax levies might be quite different (higher or lower) than the rate of change in property tax liabilities faced by the Wisconsin homeowner with average (or median) income.

Our major objective in this paper is to explore the changes in property taxes faced over time by individual Wisconsin homeowners. To accomplish this task, we must trace the property tax paying history of individual homeowners. In the next section of the paper, we describe the data and present our basic results.

## Changes in the Property Taxes of Wisconsin Resident Homeowners

We start with the 2005 individual income tax returns of all Wisconsin residents. In claiming the state's School Property Tax Credit (SPTC) or homestead credit, taxpayers must identify themselves as homeowners or renters. This self-designation allows us to identify the income tax returns of nearly all Wisconsin resident homeowners, and to determine the property taxes they paid in 2005 on their primary residence. These data indicate that in 2005 there were over 1.3 million resident homeowners who collectively paid \$3.97 billion in residential property taxes. Thus, in 2005 the average homeowner in Wisconsin paid \$3,011 in property taxes on his or her primary residence. Because averages are affected by large property tax payments made by those with high-valued houses, a better indication of the property tax paid by a *typical* Wisconsin homeowner is the *median* payment. In 2005, the median homeowner property tax payment was \$2,671, indicating that half of all homeowners in Wisconsin paid more than this amount and half paid less.

As indicated by the data in Table 3, in 2005 around 69 percent of Wisconsin homeowners paid between \$1,500 and \$4,500 in property taxes on their home. Over 17 percent paid less than \$1,500, while 14.4 percent paid more than \$4,500.

**Table 3: Property Taxes Paid by Wisconsin Homeowners, Calendar Year 2005**

2005 Property Tax	Number of Homeowners	Percent of All Homeowners
\$1,500 or Less	233,021	17.7%
\$1,501 to \$3,000	546,211	41.4%
\$3,001 to \$4,500	349,813	26.5%
More than \$4,500	189,758	14.4%
All	1,318,803	100.0%

Source: Wisconsin Department of Revenue

In this paper we are particularly interested in understanding the **changes** in the property tax liabilities of Wisconsin residents over time. For this reason, using social security numbers and other identifiers, we construct the Wisconsin taxpaying history of each 2005 Wisconsin homeowner. Those taxpayers who moved to Wisconsin in 2005 obviously have no Wisconsin history. Other taxpayers, such as those who moved into the state at some point between 2000 and 2005, have abbreviated histories. Some of the taxpayers who filed Wisconsin tax returns in every year since 2000 only became homeowners in some year after 2000. We were, however, able to identify 875,893 taxpayers who were Wisconsin homeowners for every year between 2000 and 2005.

The top panel of Table 4 presents data on the number of homeowners and their property tax payments on their principal residence in the years 2000 and 2005. A comparison of Tables 2 and 4 reveal that while residential property taxes as a whole grew 34.1 percent over the period (6.0 percent annually), the five-year growth rate of property taxes on owner-occupied homes was only 22.6 percent, (4.2 percent annually). The difference

largely reflects property taxes paid on rental, vacant and recreational homes that are included in Table 2 but not in Table 4.<sup>9</sup>

**Table 4: Growth in Total Property Taxes Paid by Wisconsin Homeowners, 2000 to 2005**

	Calendar Year		5-Year Growth	Average Annual
	2000	2005		
Number of Homeowners	1,298,485	1,318,803	1.6%	0.3%
Property Taxes Paid by Homeowners (in millions of dollars)	\$3,238	\$3,971	22.6%	4.2%
Property Tax per Homeowner Household	\$2,494	\$3,011	20.7%	3.8%
Property Tax on Median Homeowner Household	\$2,195	\$2,671	21.7%	4.0%
Number of <i>Stable</i> Homeowners (Homeowners in all years, 2000 to 2005)	875,893	875,893		
Property Taxes Paid by Stable Homeowners (in millions of dollars)	\$2,294	\$2,723	18.7%	3.5%
Property Tax per Stable Homeowner	\$2,619	\$3,109	18.7%	3.5%
Property Tax on Median Stable Homeowner	\$2,333	\$2,778	19.1%	3.6%
Number of <i>Non-Mover, Stable</i> Homeowners (Homeowners in same house, 2000 to 2005)	701,609	701,609		
Property Taxes Paid by Non-Mover, Stable Homeowners (in millions of dollars)	\$1,846	\$2,168	17.4%	3.3%
Property Tax per Non-Mover, Stable Homeowner	\$2,632	\$3,090	17.4%	3.3%
Property Tax on Median Non-Mover, Stable Homeowner	\$2,348	\$2,769	17.9%	3.4%

Although aggregate and average homeowner property taxes clearly increased during this period, these data provide no information on the magnitude of the changes over time in the property tax liabilities of individual homeowners. To begin exploring property tax changes over time, we turn to the data in the lower panels of Table 4.

We identify “stable” households as the 875,893 households who owned a home in each year of the 2000-2005 period.<sup>10</sup> These households represent 67.4 percent of all owner-occupied homeowners and they paid 70.8 percent of owner-occupied property taxes in 2005. As illustrated in the middle panel of Table 4, their property taxes grew 18.7 percent over the five-year period which is equivalent to an average annual rate of increase of 3.5 percent. However, while all of these households owned a home throughout the period, almost 20 percent of this group did not own the same residence throughout the period. Thus, changes in property taxes paid by many of these households are due, in large part, to household relocation decisions and reflect changes in housing consumption. To remove the influences of housing choice and residential location decisions from the analysis, in the rest of the paper we focus on the 701,609 homeowners who resided in the same house over the entire period. While these non-mover homeowners paid only 57 percent of the total property taxes levied on owner-occupied residential property, by focusing on the changes in property taxes paid by these homeowners, we can isolate the property tax trends due primarily to public policies, such as local government spending

<sup>9</sup>Property taxes reported in Table 2 would also include any property taxes paid by property owners who did not file either a tax return or a homestead credit during the period.

<sup>10</sup> See Appendix 2 for details on observations removed due to data anomalies.

decisions, state aid allocations, and changes in property tax relief measures, rather than on choices made by individual homeowners.<sup>11</sup>

### **Non-Mover Households**

The bottom panel of Table 4 shows the total and average taxes for the 701,609 non-mover homeowners in 2000 and 2005. Although in 2000 the average property tax payment of these non-mover households was slightly higher than the average tax paid by all homeowners and by all stable homeowners, the property tax paid by non-movers grew more slowly than the tax paid by all homeowners and all stable homeowners. Over the five-year period, the property taxes of non-mover households increased 17.4 percent, an average annual rate of 3.3 percent compared to an average annual growth rate of 3.8 percent for all homeowners and 3.5 percent for stable homeowners. By 2005, the property tax paid by the average non-mover homeowner was slightly lower than the average property tax paid by all homeowners.

The data in Table 5 demonstrate that knowledge about the average annual rate of change in property taxes provides a very incomplete picture of the change in property taxes experienced by most of Wisconsin's stable non-mover homeowners. For 12 percent of this group of homeowners, property taxes were actually lower in 2005 than they had been in 2000. For another 20.9 percent of this group, property taxes increased, but at an annual rate below the rate of inflation during this period (approximately 2.5 percent per year). At the same time, for almost 38% of non-mover homeowners, property taxes grew at an annual average rate of over 4 percent.

To begin exploring which Wisconsin taxpayers benefited from tax reductions and which taxpayers faced particularly large increases, we investigate whether the percentage change in property taxes between 2000 and 2005 was systematically related to the size of taxpayers' property tax liability in the year 2000. The data in Table 6 demonstrate that households that experienced the most rapid property tax growth tended to be those that paid the least in property taxes in 2000. Conversely, a relatively large share of households whose taxes fell between 2000 and 2005 paid a high level of property taxes in 2000.

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<sup>11</sup> Property taxes would also be affected by a household's decision to make modifications (e.g., additions, remodeling) to the property and could also be impacted by a change in a property's relative assessment due to a revaluation. While these influences can have a dramatic impact on particular properties in a particular year, we assume that these have a minimal impact on the aggregate property taxes of non-mover households.

**Table 5: Average Annual Property Tax Growth  
2000 to 2005**

	Stable Nonmover Homeowners	Percent of Total
Decrease	84,012	12.0%
Less than 2%	146,936	20.9%
2% to 4%	204,991	29.2%
4% to 6%	136,278	19.4%
More than 6%	129,392	18.4%
Total	701,609	100.0%

The bottom panel of Table 6 shows the column distribution, i.e., for each property tax level, the share of households that fall into each property tax growth breakdown. This is also shown in Figure 1. About half of the stable non-mover households paid between \$1,500 and \$3,000 in 2000 property taxes. Over 20 percent paid less than \$1,500 and another 21.4 percent paid between \$3,001 and \$4,500. Around 9 percent paid more than \$4,500 in 2000 taxes.

Since property taxes are based on a property's value, we see a pattern emerging whereby low-valued properties experienced higher property tax increases than higher-valued properties over the period. The average annual growth for the lowest-valued properties was 5.5 percent, compared to 3.3 percent overall. Well over a third of households whose 2000 property tax was less than \$1,500 saw average annual increases

**Table 6: Non-mover, Stable Homeowners  
By 2000 Property Tax Amount and Average Annual Percentage Change**

Household Count					
Average Annual Growth	\$1,500 or Less	\$1,501 to \$3,000	\$3,001 to \$4,500	More than \$4,500	Total
Decrease	16,686	34,665	21,328	11,333	84,012
Less than 2%	18,148	71,365	41,580	15,843	146,936
2% to 4%	27,512	108,332	51,179	17,968	204,991
4% to 6%	28,354	74,608	23,719	9,597	136,278
More than 6%	52,560	57,870	12,557	6,405	129,392
Total	143,260	346,840	150,363	61,146	701,609
Average Annual Growth	5.5%	3.5%	2.6%	2.5%	3.3%

Household Count					
Average Annual Growth	\$1,500 or Less	\$1,501 to \$3,000	\$3,001 to \$4,500	More than \$4,500	Total
Decrease	11.6%	10.0%	14.2%	18.5%	12.0%
Less than 2%	12.7%	20.6%	27.7%	25.9%	20.9%
2% to 4%	19.2%	31.2%	34.0%	29.4%	29.2%
4% to 6%	19.8%	21.5%	15.8%	15.7%	19.4%
More than 6%	36.7%	16.7%	8.4%	10.5%	18.4%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

of 6 percent or more. This is more than double the share seeing similar growth in the \$1,501-\$3001 property tax range. In contrast, the average growth for households paying

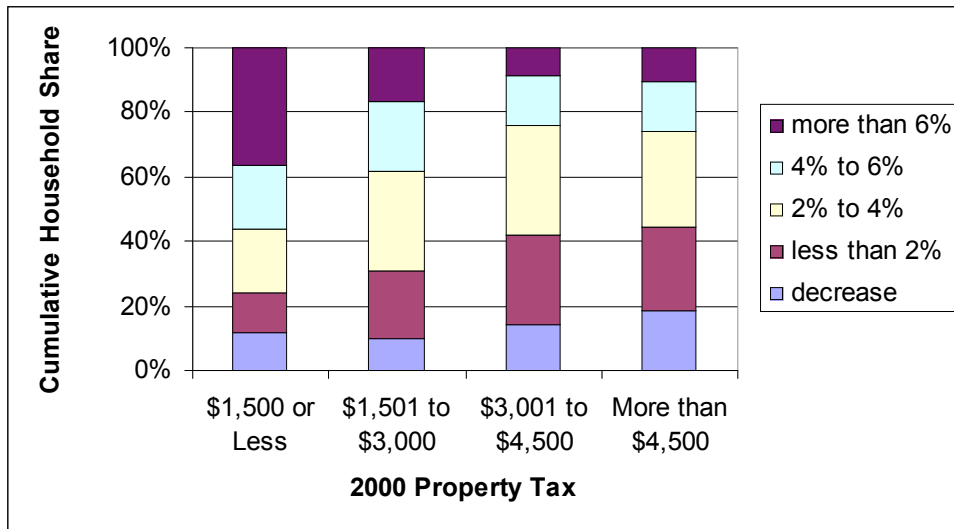


over \$4,500 in 2000 was 2.5 percent, with 44.4 percent of these households seeing either a small increase (less than 2 percent) or a decrease. Similar trends are observed for those paying between \$3,001 and \$4,500.

It is noteworthy that for almost all taxpayers, their average annual growth rate reflects steady annual increases over the period rather than a one-time change that drove up the six-year average. Indeed less than 1 percent of taxpayers saw a one-time change that is likely attributable to a revaluation.

Two things can explain why more low-valued properties saw high property tax growth over the period than higher-valued homes. Either the low-valued properties saw a greater proportionate appreciation in the assessed, and presumably, market value of their homes over the period; or these properties were more often located in areas experiencing higher levy (and tax rate) increases or possibly both.

**Figure 1: Average Annual Property Tax Growth by 2000 Property Tax Level**



### Property Tax by Income

In this section, we will explore the relationship between property tax payments and household income. For purposes of the analysis, income is defined to reflect taxpayers' ability to pay and thus includes both taxable and nontaxable income. Income is defined to be total federal income before adjustments plus nontaxable social security, deferred compensation, nontaxable pension income and nontaxable interest.<sup>12</sup> For homeowners who filed a homestead credit claim, income is defined to be homestead net income.<sup>13</sup> A more

<sup>12</sup> One half of self-employment tax is removed from income in order to make sole proprietor income comparable to wage income. In addition non-taxable pension income excludes rollovers or section 1035 exchanges.

<sup>13</sup> The calculation of homestead income includes a subtraction of \$250 for each dependent; this subtraction is ignored in the construction of income for our purposes.

detailed discussion of our income measure, including details about the steps we took to deal with missing income data are provided in Appendix 2.

Although economists continue to debate the incidence of the property tax from the perspective of the tax as a national tax, there is widespread agreement that the property tax levied on homeowners in a specific state is borne primarily by homeowners in that state. Determining a homeowner's property tax *burden* thus requires that we calculate each homeowner's property tax liability relative to an appropriate measure of the taxpayer's "ability to pay."

Economists have long argued that when one's goal is to determine tax incidence, it is inappropriate to measure ability to pay using income data from a single year.<sup>14</sup> The basic argument, which is based on Friedman's (1957) permanent income theory of consumption and the companion life-cycle model of saving (Ando and Modigliani, 1963), is that households make large purchases, such as housing, on the basis of their lifetime or permanent income, rather than on the basis of their annual income in any given year. The use of annual incomes rather than measures of lifetime income in the calculation of tax burdens will overstate the regressivity of the property tax because many people with low incomes in any given year are only temporarily poor and base their housing consumption decisions on a higher level of lifetime income. Conversely, among those with high incomes in any given year are some who only temporarily have high incomes. These households have based their housing consumption decisions on a lower level of lifetime income.

Although the existence of this so-called "annual income bias" is widely recognized, the difficulty of developing good measures of lifetime income make it hard to quantify its importance.<sup>15</sup> One very promising approach that will reduce the impact of temporary swings in income on the calculation of tax burdens is to replace each taxpayer's annual income with their average income over a period of years. Given the availability of data, in this paper we measure average income over the period from 2000 to 2005.

Our discussion of property taxes and income will start with an exploration of the incidence of the tax on Wisconsin homeowners. For that analysis we calculate the tax burden for each homeowner as the homeowner's average property tax payment over the 2000-2005 period relative to their average income over the same period. We then turn to a discussion of the **changes** in tax burdens between 2000 and 2005. For that analysis, our focus is on changes in burdens, rather than on the incidence of the tax. Thus, we calculate and compare annual tax burdens for 2000 and 2005.

Table 7 displays the 6-year average income and 6-year average property tax payments for homeowners ranked by average-income quantiles. Each quintile represents 121,069

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<sup>14</sup> On this point, see, for example, Poterba (1989).

<sup>15</sup> For a detailed discussion of the shortcoming of most of the measures of lifetime income that have been used in empirical tax incidence studies, see Chernick and Reschovsky (1997).

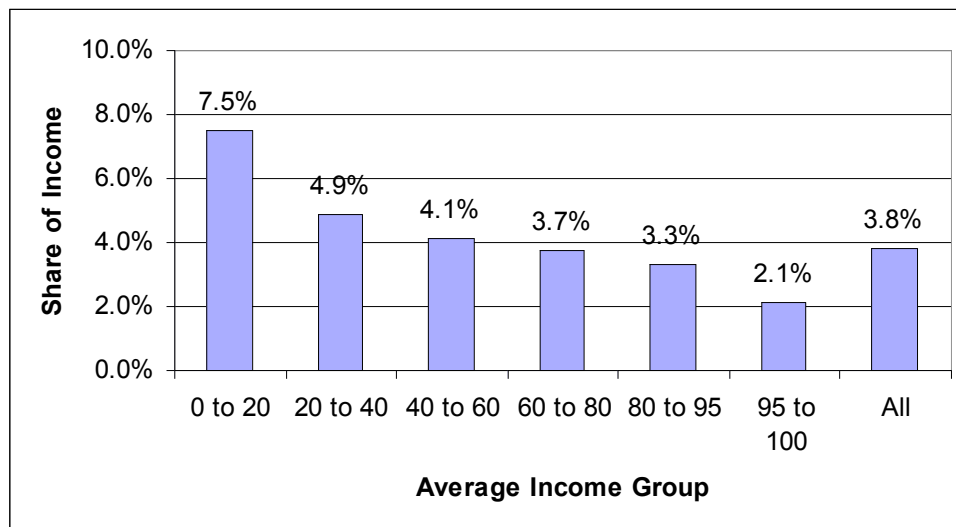
households.<sup>16</sup> The average tax paid by each quintile increases with income. The lowest quintile, households whose average income over the period was \$25,324, paid an average of \$1,898 annually in property taxes, while the top 5 percent of households, households with average income of \$285,568 over the period, had a 6-year average property tax liability of \$6,045.

**Table 7: Average Income and Property Tax by Income Class**

Income Group	Income Range		Income		Property Tax	
	Min	Max	Average	Share of Total	Average	Share of Total
0 to 20	1,072	37,811	25,324	7%	1,898	13%
20 to 40	37,812	54,221	46,275	12%	2,264	16%
40 to 60	54,222	70,496	62,140	17%	2,566	18%
60 to 80	70,497	94,272	81,084	22%	3,025	21%
80 to 95	94,273	153,362	114,680	23%	3,830	20%
95 to 100	153,363	22,691,903	285,568	19%	6,045	11%
All	1,072	22,691,903	74,445	100%	2,828	100%

From an examination of the data in Table 7, it is obvious that the property tax paid by Wisconsin homeowners represents a larger share of income for those with relatively low incomes. The regressivity of the property tax on homeowners is illustrated by Figure 2, which displays the gross property tax burden across the income groups. Overall, the property tax comprised 3.8 percent of household income over the period. The lowest income quintile spent on average 7.5 percent of their average income over the period on property taxes compared to only 2.1 percent for the 5 percent of households with the highest incomes.

**Figure 2: Gross Tax Burden, 2000 to 2005**



<sup>16</sup> Quintiles refer to 20 percent of households ranked by average income. The highest quintile is broken into smaller groups representing 15 percent and the 5 percent of households with the highest income; 15 percent of households equals 90,795 households and 5 percent represents 30,266 households.

The use of average rather than annual income to calculate tax burdens does in fact reduce the calculated regressivity of the property tax. For the bottom average income quintile, the 2005 property tax burden calculated using 2005 annual income is 0.3 percentage points higher than the average burden presented in Figure 2. The burden calculated using annual income is 0.2 percentage points higher in the second quintile and 0.1 percentage points higher in the third and fourth quintiles.

The burdens shown in Figure 2 reflect the gross burden, i.e., the burden of the property tax before taking into account other tax policies that effectively lower the amount paid. Three policies in particular effectively lower the property tax paid by individual homeowners. The state school property tax credit (SPTC) serves to reduce the property taxes for households that have an income tax liability. Second, the homestead credit provides a targeted tax credit to households with income below \$24,500. Third, the ability to deduct from federal taxes the amount of property taxes paid on residential property allows taxpayers who itemize deductions on their federal returns to, in effect, export a share of their property tax burden to the federal government in the form of a lower federal tax liability.<sup>17</sup>

In total, these three policies reduced the non-mover households' property tax by an average \$432 million per year over the 2000 to 2005 period. The largest reduction in property taxes comes from federal deductibility (\$265 million or 62 percent of the total), followed by the SPTC (\$140 million or 32 percent of the total) and the homestead credit (\$23 million, or 5 percent of the total).

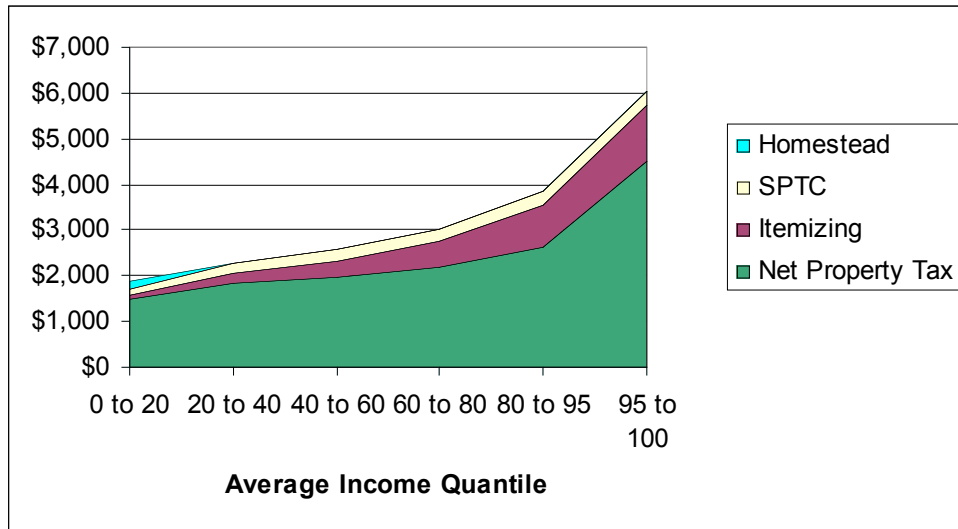
Figure 3 shows the effect of each of these measures on the average property tax by income group. By design, the benefits of the homestead credit are concentrated to households in the lowest quintile. For these households, the average homestead credit effectively lowered the average property tax by \$187.

The benefits of the federal deduction are more concentrated at higher income levels. The average property tax reduction due to the federal tax deduction was \$445; however around 70 percent of the federal deduction benefits were distributed to the top 40 percent of households with incomes over \$70,497. The average deduction benefit for these households was \$783, compared to \$220 for households in the bottom 60 percent of the income distribution.

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<sup>17</sup> The tax reduction is measured by comparing the actual federal tax liability when property taxes are taken as a deduction and what the federal tax liability would have been without the deduction.

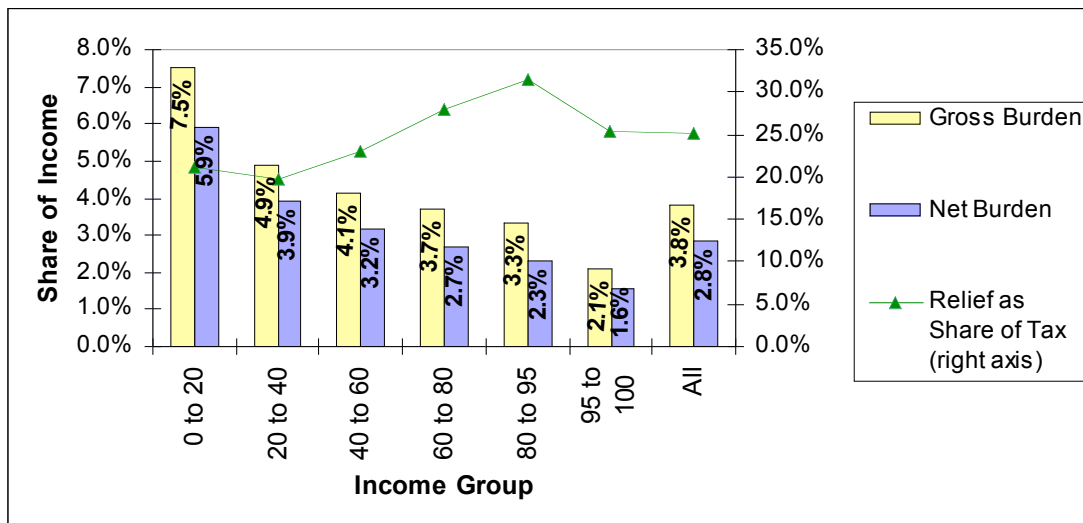
**Figure 3: Average Net Property Tax, Homestead Credit, Federal Deduction and SPTC by Average Income**



The average SPTC was \$230 over the period and was more evenly distributed than the federal deduction. Half of the credit was received by the 60 percent of households with income under \$70,497. These homeowners received an average SPTC of \$196. Homeowners in the top two quintiles received an average SPTC of \$282.

Figure 4 shows the gross and net average burden after taking these tax policies into account.

**Figure 4: Gross and Net Tax Burdens**



The tax relief measures effectively lowered the tax burden for all income groups. The overall gross tax burden was reduced from 3.8 percent to 2.8 percent. However, the tax remains regressive with the lowest quintile paying 5.9 percent of their income in property

taxes, more than double the overall average and 3.7 times more than the highest income households, who paid 1.6 percent of their income in net property taxes over the period.

As illustrated in Figure 4, the three tax relief measures offset an increasing share of taxes at higher income levels, offsetting around 20 percent of the tax paid by lowest income quintile, but over 30 percent of the tax for the households in the top income quintile. While the three relief measures served to lower the property tax for all income quintiles, the combined effect of these measures made the property tax more regressive.<sup>18</sup> Only the homestead credit served to reduce the regressivity of the property tax. Because the SPTC was quite evenly distributed across income groups, it has little effect on the regressivity of the tax.<sup>19</sup> On the other hand, because the tax benefit of itemizing increases with income, the federal itemizing of property taxes actually increases the regressivity of the property tax.<sup>20</sup>

### Changes Over Time

We now turn to the question of whether the growth rate in property tax liabilities between 2000 and 2005 was systematically different for households with different levels of income in 2005. The data indicate that over this period, property taxes grew at a somewhat faster than average rate for households in the bottom two income quintiles (3.5 percent compared to an average annual rate of 3.3 percent).

Figure 5 illustrates that fewer high-income households saw very high property tax growth as compared to lower-income households. In the highest quintile, 14 percent of households saw average annual growth over 6 percent, compared to the 21 percent of households in the bottom two quintiles. This is consistent with the fact that low-valued properties saw higher property tax growth over the period and lower-income households were more likely to own these low-valued properties.

In Tables 5 and 6 we presented data on the dollar changes in property tax liabilities that homeowners in Wisconsin experienced between 2000 and 2005. These changes, however, provide an incomplete picture of the economic impact of property taxes on homeowners. Large tax increases may have minor consequences on family budgets if household income over the period grew at a faster rate. Conversely, very modest property tax increases can lead to economic hardships if household income falls during the same period. For a more complete picture of the impact of the property tax, we now turn to an exploration of changes in property tax **burdens**.

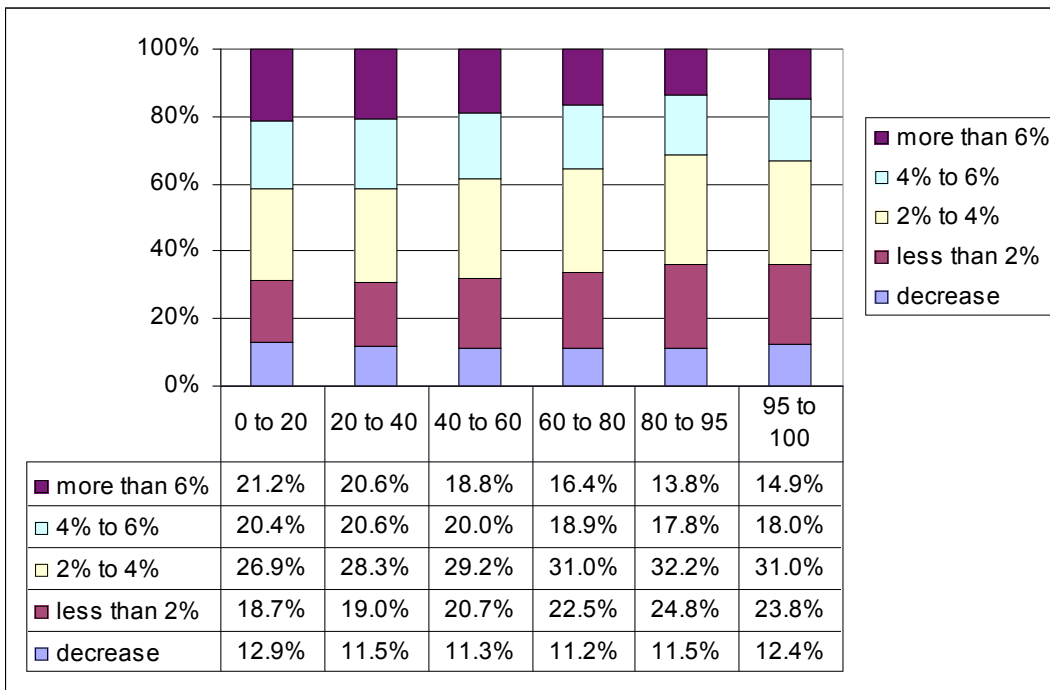
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<sup>18</sup> The Kakwani measure of progressivity fell from -.175 as measured for the gross tax to -.201 as measured for the net tax.

<sup>19</sup> Based on a Kakwani index measure of progressivity, the SPTC marginally decreases the regressivity of the property tax.

<sup>20</sup> It should be noted that if the federal government eliminated the deductibility of state and local income and property taxes, state and local governments will almost certainly reduce their reliance on these taxes and replace them with regressive consumption taxes and fees. In an interesting empirical study of the progressivity of state and local tax systems, Howard Chernick (2005) concludes that "...eliminating or curtailing the deductibility of state and local taxes would substantially reduce the progressivity of subnational tax systems." (p. 108)

**Figure 5: Average Annual Property Tax Growth by Household Income**



We address the question of changing burdens in two ways. First, we will compare property tax liabilities in 2000 relative to annual income in that year with tax liabilities in 2005 relative to 2005 annual income. This will allow us to observe changes in the average tax burdens (relative to annual income) of any given group of taxpayers, for example those in the bottom income quintile. Our second approach will focus on how individual homeowners' burdens changed over this time period. This approach will allow us to determine, for example, what proportion of homeowners in the lowest income quintile experienced increases in property tax burdens and what proportion benefited from decreases in burdens between 2000 and 2005. We are particularly interested in identifying which taxpayers faced rapidly rising burdens. In analyzing changing property tax burdens, we will start considering gross tax burdens and then look at net burden.

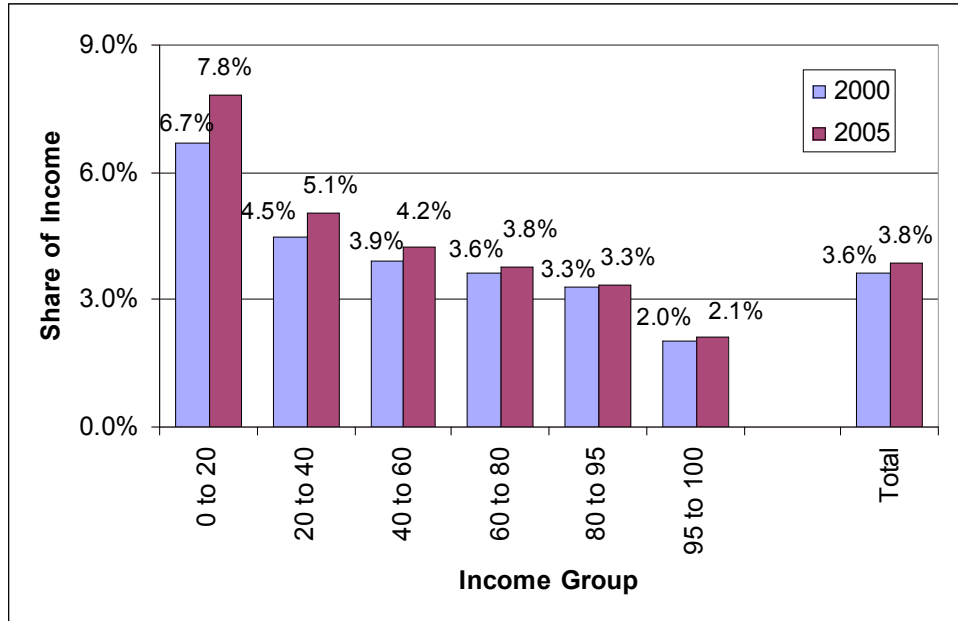
Figure 6 shows the 2000 and 2005 gross property tax burdens (with burden calculations based on annual income in each year) for non-movers by income group. For all households, the average property tax represented 3.6 percent of household income in 2000 and grew to 3.8 percent of income in 2005. This represents a 6.5 percent growth in burden for all households combined. However, the average growth obscures significant differences across households - 41.6 percent of households actually saw a decrease in their gross burden over the period, while 30 percent of households saw their burden increase by 25 percent or more from 2000 to 2005.

Households in the lowest quintile faced the greatest increase in gross burden over the period, increasing 17.4 percent over the period. Almost 40 percent of these households

faced a 2005 burden that was at least 25 percent higher than in 2000, and for 22 percent of these households, their 2005 burden was at least 50 percent higher than in 2000.

The burden is influenced by both property tax and income. While we observed that the lowest quintile faced higher growth in property tax burdens, as revealed in Figure 7, much of the explanation for why their burden grew more than other households relates to the slow growth in their incomes.

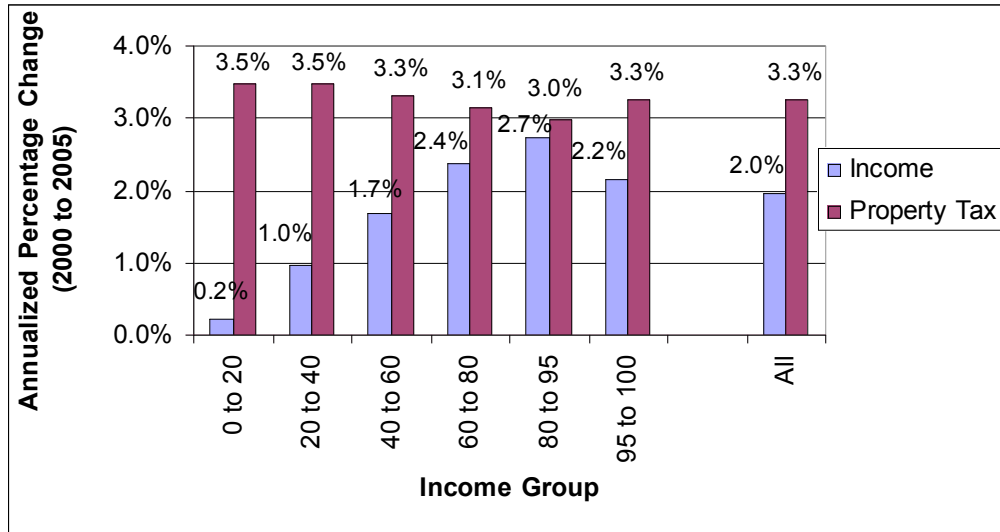
**Figure 6: Gross Property Tax Burdens, 2000 and 2005**



While the annual property tax growth over the period was roughly similar across all income groups, income grew far more slowly for low-income households. The lowest quintile saw only 0.2 percent annual income growth, compared to the 2.0 percent growth for all households. And income growth in the second quintile was only half the average among all homeowners.



**Figure 7: Annualized Change in Income and Property Tax  
By Income Group, 2000 to 2005**



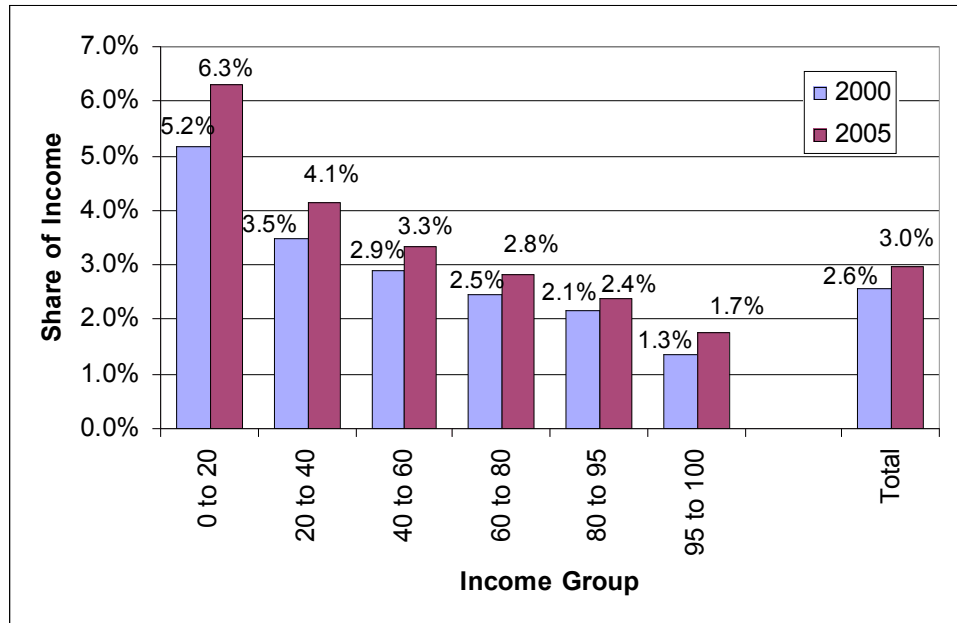
Growth in property taxes clearly contributed to the increased burden facing the lowest quintile households, but their burden would have grown by half as much had their income grown at the same pace as experienced by the average homeowner. Put another way, had there been no change in property taxes over the period, the average burden of all homeowners would have fallen 9.3 percent from 2000 to 2005; however, for the lowest quintile, their burden would have fallen by only 1.1 percent.

We know that individuals complain when their property taxes increase, but it is likely the complaints grows louder when the tax becomes less affordable in terms of a household's ability to pay. If policymakers in Wisconsin wish to reduce property tax burdens, their policy responses should recognize that both tax and income trends affected changes in the property tax burden over the 2000-2005 period.

Figure 8 shows the net burden for 2000 and 2005 after taking the three tax relief policies into account. The net burden for all non-mover homeowners increased from 2.6 percent to 3.0 percent. But as we saw in the growth in the gross burden, the lowest income households faced higher growth in their net burden relative to other households. Their net burden increased 21.8 percent over the period.

Comparing Figure 8 to Figure 6 demonstrates that net burdens grew faster from 2000 to 2005 than gross burdens, largely due to the fact that the tax relief measures did not grow to the same extent as the growth in property tax. Indeed, only the lowest income households saw any increase in the offsets from the relief measures combined, but the growth was too small (0.7 percent annually) to offset the growing property taxes. The reason for the more rapid growth of net burdens among higher income homeowners is that the value to Wisconsin homeowners of the federal deductibility of the property tax fell from

**Figure 8: Net Property Tax Burdens, 2000 and 2005**



\$293 million in 2000 to \$247 million in 2005. This decline can be attributed to the reduction in marginal federal tax rates over that period and the fact that more taxpayers became subject to the federal Alternate Minimum Tax (AMT) and thereby lost all or most of the value of their property tax deduction. During this same period, homeowners' tax savings due to the SPTC and the homestead credit grew by \$4 million and \$3.7 million, respectively, hardly enough to offset the reduced impact of federal deductibility.

Our discussion has focused on the average change in burden over time for each quintile. However, it is important to note that the average obscures large differences across households. While the overall net burden grew an average 16 percent for all households, over a third of all households saw a decrease in their net burden from 2000 to 2005, while around 40 percent saw their net burden significantly increase (25 percent or more). Similar patterns hold across all the income groups to the extent that each income group includes homeowners whose burdens decreased; however, the households experiencing large increases in burden were concentrated in the lower income groups – 43 percent of those seeing their net burden significantly increase were in the lowest two income quintiles.

### Property Taxes by Age

Homeowners in general (movers and non-movers combined) tend to be older and have higher income than the population as a whole. Table 8 compares the median age and income for the total 2005 tax-filing population, all homeowners and all non-mover homeowners. Among all homeowners, the non-mover group is slightly older than the total homeowner population with slightly higher median income.<sup>21</sup>

<sup>21</sup> The median age for non-owner tax filers was 29 and median income was \$19,219.

**Table 8: Median Age and Income  
Tax Year 2005**

	Homeowner			Percent
	Count	Median Age	Median Income	Married
All Tax Filers	2,694,598	43	36,580	41.7%
All Homeowners	1,318,803	51	61,474	67.3%
Non-Mover Homeowners	701,609	55	63,920	69.9%

Similar to the above analysis with respect to income quantiles, in this section we compare the impact of the property tax across age groups using the average property tax and average income over the period and then compare burdens across time using annual income.

Table 9 shows the total and average property taxes paid by the non-mover population by age. The share of property taxes paid by each group roughly mirrors their share of the non-mover household population. The largest share of taxes was paid by homeowners whose primary taxpayer was between 51 and 65 years old, followed by the 36-51 age group. The average property tax increased with age through the 51-65 age group, going from \$2,350 for taxpayers under 35 years of age to \$2,948 to those in the 51-65 age group.

**Table 9: Average Property Taxes by Age  
Non-mover Homeowners, 2000 to 2005\***

Age Group	Returns	Share of Returns	Property Tax	Share of Property Tax	Average Property Tax	Gross Burden
35 and Younger	22,472	3.7%	\$52,803,955	3.1%	\$2,350	3.8%
36 to 50	206,410	34.2%	\$594,822,014	34.8%	\$2,882	3.7%
51 to 65	223,858	37.1%	\$659,900,841	38.6%	\$2,948	3.6%
Older than 65	150,868	25.0%	\$401,213,404	23.5%	\$2,659	4.5%
Total	603,608	100%	\$1,708,740,214	100%	\$2,831	3.8%

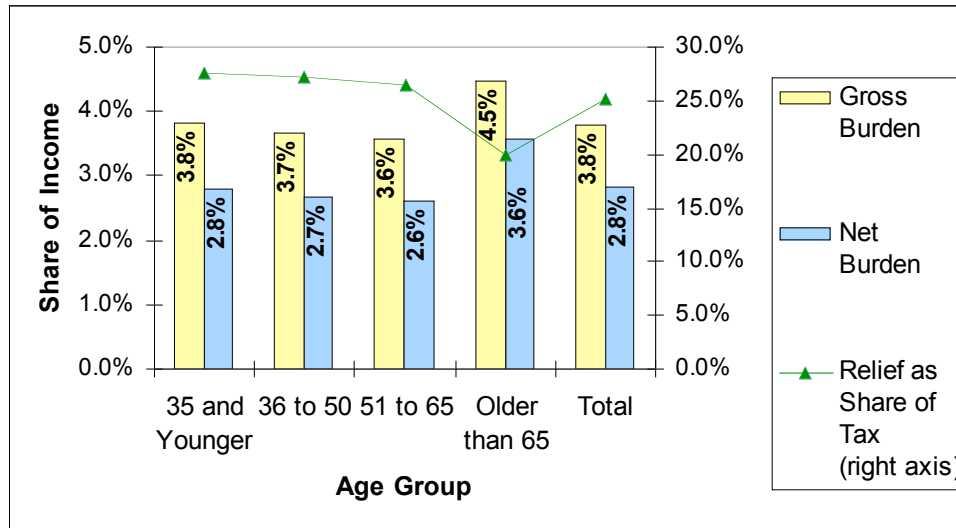
\*Includes only filers with age and income reported.

The last column in Table 9 shows the gross burden by age, using the average property tax over the 2000 to 2005 period as a share of income averaged over the same period. The average burden of households under 65 was close to the overall average of 3.8 percent. In contrast, the burden for households over 65 averaged 4.5 percent over the period, with over 40 percent of elderly homeowners having a gross burden for the period in excess of 6 percent.

Figure 9 compares the average gross and net tax burden after taking into account the three tax relief policies by age group. The over 65 households are distinct from the other age groups in several ways. The three tax relief measures, i.e., the SPTC, homestead credit and federal deductions, offset a smaller share of their taxes relative to other households. Households aged 65 or younger saw a 27 percent reduction in their property tax as a result of these measures, compared to the 20 percent reduction experienced by the over 65 households. This could be due to the fact that far fewer elderly homeowners itemize for federal tax purposes (41.1 percent) than do younger households (76.5 percent); this, in

turn, could be due to the fact that many elderly homeowners have paid off their mortgage and hence do not deduct mortgage interest on their homes.<sup>22</sup> Because the oldest households faced the highest gross burden and the smallest offset, their net burden is high relative to other households –the net burden for households aged 65 or younger was 2.7 percent of their income, compared to 3.6 percent for the over 65 households.

**Figure 9: Average Gross and Net Property Tax Burden by Age Group, 2000 to 2005**



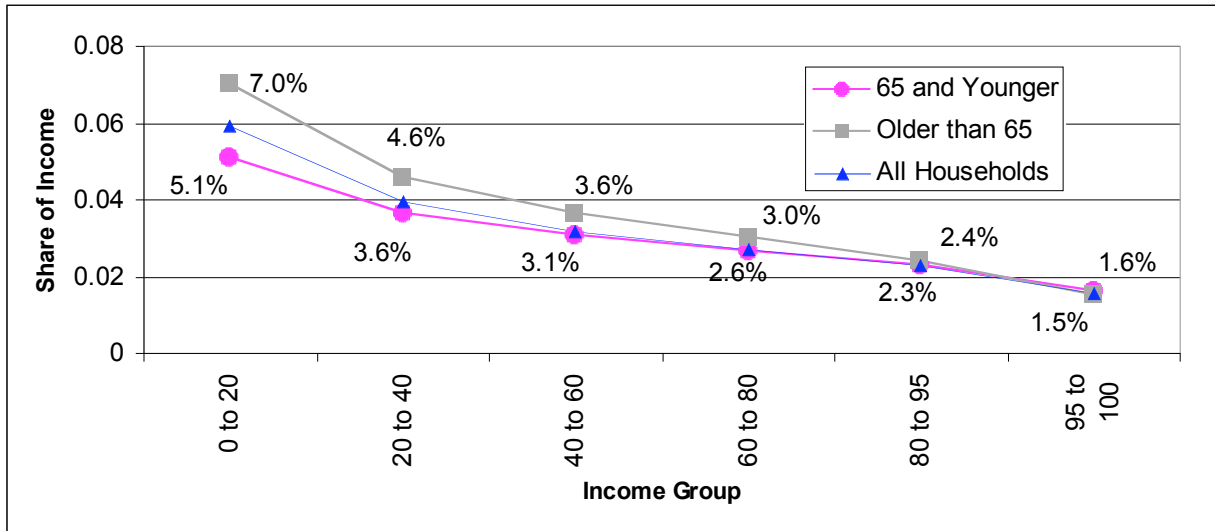
In order to understand why elderly homeowners face such high property tax burdens, it is important to untangle the effect of income on burdens. Note that both the gross burden and distribution of tax savings from SPTC and from the federal deductibility of property tax payments are driven by income. As pointed out earlier, the burden reflects as much about a household's income level as its property tax level; thus, if older households tend to have lower income, their burden will be higher at all property tax levels. Similarly, these older, lower-income households will not benefit to the same degree from income tax measures such as the SPTC and federal itemizing that are based on income tax liability.

Figure 10 illustrates average net property tax burdens by income and age. Households in the highest income quantiles face similar tax burdens regardless of age. However, disparity between age groups widens at lower income levels. Elderly households in the lowest quintile faced an average 7.0 percent net tax burden compared to 5.1 percent burden for their younger counterparts. This result is due to the fact that within the lowest income quintile, elderly households paid higher taxes and were poorer than younger households. For example, the average property tax of the oldest households in the lowest income quintile was 12 percent higher than the tax of younger households while their average

<sup>22</sup> Indeed, only 27 percent of households over 65 received a federal 1099-R informational return that reports mortgage interest paid during 2005 compared to 90 percent of households under 50 and 72 percent for households aged 51 to 65.

income was only 84 percent of the income of younger households in the same income group. The age disparity in burden within the other income quantities is largely attributable to higher property taxes - in the second quintile, households over 65 had comparable income but had 11 percent higher average property taxes than younger households.

**Figure 10: Average Net Property Tax Burden by Income and Age, 2000 to 2005**



Low-income elderly may face higher taxes and higher burdens than low-income non-elderly for several reasons. One reason could be they are more "over-housed" than their younger counterparts. While all the households included in the analysis resided in the same home over the 2000 to 2005 period, elderly households may have lived in the same home over a much longer period of time and thus their housing consumption may reflect more their past economic position than their current income. In addition, as pointed out above, elderly households may be more likely to own their home outright. With no mortgage payments to make, their property tax liability is probably their largest housing-related expense. As a result, they can better afford to stay in a home that appears greater than their ability to pay compared to younger households that face both the property tax liability and mortgage payments. The housing choice among younger households may better reflect both their current economic standing and their greater costs of home ownership.

An alternative explanation for higher property tax burdens faced by the elderly is that elderly households may be more likely to live in higher-tax jurisdictions than younger households. For example the elderly may be residing in more urban locations that have higher taxes than more suburban areas with expanding tax base and thus lower tax rates. In future research, we will explore in detail why the low-income elderly face higher taxes and higher burdens than the low-income non-elderly households.

## Changes Over Time

We now turn to the question of whether the change in property tax burden between 2000 and 2005 was systematically different for households of different ages. While the data indicate that over this period, property taxes grew at the same pace for all age groups (around 3.3 percent annually), the changes in burden were significantly different across age groups.

Figure 11 compares the annualized income and property tax growth over the period across age groups. While income growth exceeded property tax growth for households under 50, the 51-65 aged households saw income grow 1.9 percent annually compared to the 3.3 percent annual growth in property taxes. For the over 65 households, income decreased at an average annual rate of -0.8 percent, while property taxes grew at an average annual rate of 3.3 percent.

**Figure 11: Annualized Income and Property Tax Growth, 2000 to 2005 by Age Group**

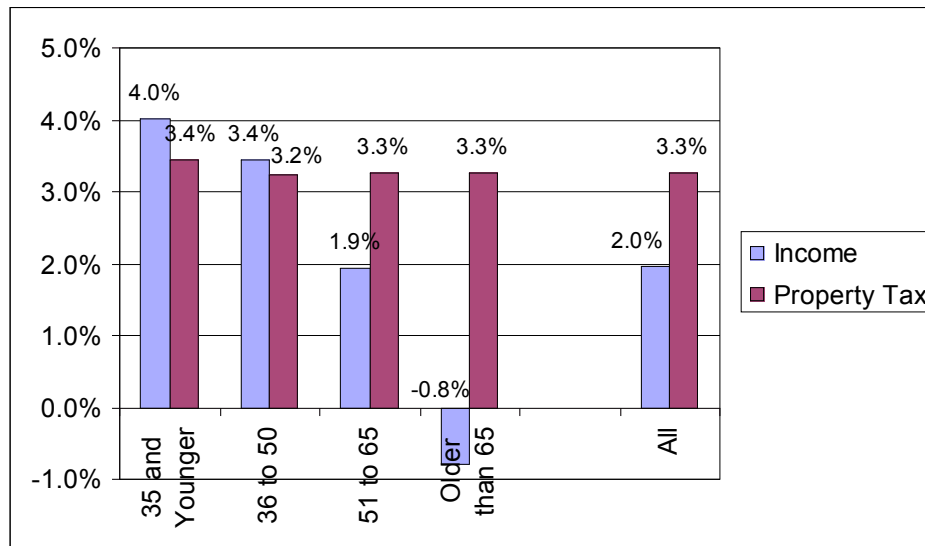


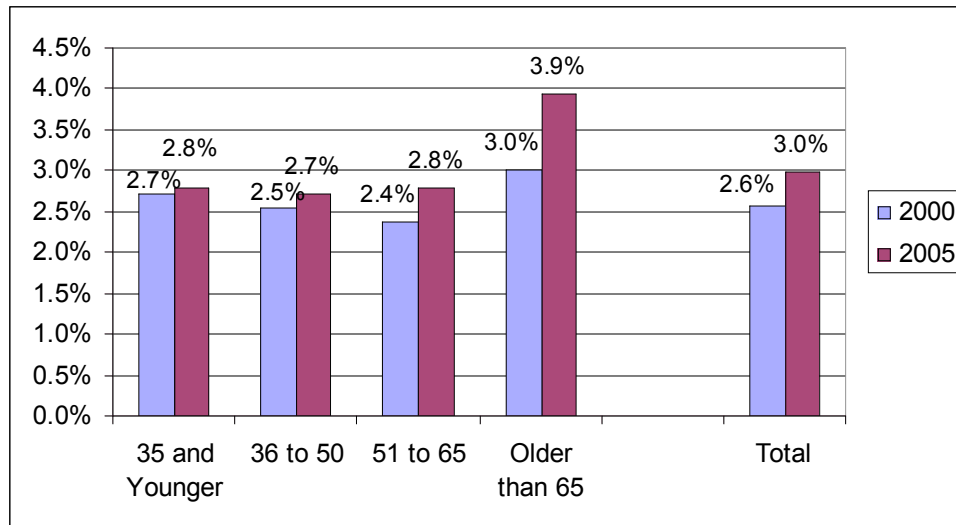
Figure 12 compares the net tax burden by age between 2000 and 2005. The 2005 net burden grew around 16 percent relative to 2000 for all households with the burden growing faster for older households - the net burden of the youngest group grew only 3 percent compared to 7.5 percent for the 36-51 aged group, 18 percent in the 51-65 group and 31 percent for over 65 households. Households with individuals over 65 faced both the highest gross burden and the highest net burden.

Except for the oldest household group, the effective 2005 tax net burdens are similar across age groups, equal to around 2.8 percent of income. In contrast, the 2005 burden facing households over 65 was 3.9 percent

As we have already observed, many households actually saw a decrease in their burden over the period, and these households tended to be younger. Among households 65 or

younger, 47 percent saw a decrease in their burden, compared to 26 percent of households over 65. This is almost a mirror image of the households seeing very high growth - 45 percent of households over 65 saw their burdens increase dramatically (by 25 percent or more), while only 26 percent of younger households saw comparable increases.

**Figure 12: Net Property Tax Burden, 2000 and 2005 by Age Group**



### Summary and Conclusions

For many years policy makers in Wisconsin, and throughout the country, have been pursuing policies designed to reduce property taxes. These policies include large increases in state aid to municipal governments and school districts intended to replace revenue from the property tax, explicit policies limiting either the level or the growth rate of property tax levies or the assessed value of property, and policies designed to reduce the property tax liabilities of certain groups of taxpayers, such as elderly homeowners. Despite these policies, the property tax remains very unpopular, especially among homeowners. New efforts to further reduce reliance on property taxation are thus high on the political agenda in many states.

Given the widespread interest in “doing something” about property taxation, it is perhaps surprising that in most states almost nothing is known about the levels and the changes in property tax levies and burdens faced by taxpayers. To begin to close this knowledge gap, at least for one state, in this paper we presents results of a study of the changes in property tax liabilities and burdens experienced by homeowners in the state of Wisconsin. We choose to focus on homeowners, in part, because they are almost always the most vocal critics of the property tax.

In most states, the only available data on property taxes come from property tax revenue data. Even identifying the total amount of property taxes paid by homeowners is generally not possible, as revenue data are usually only available separately for broad classes of property, such as residential, commercial-industrial, and agricultural.

Taking advantage of the fact that residents of Wisconsin are required to list their property tax payments on their state income tax returns, we have constructed, for nearly all resident homeowners in the state, a history of property tax payments for the six years from 2000 to 2005. Because we are interested in obtaining a picture of property tax **changes** that occur for reasons outside the control of individual homeowners, in this paper we concentrate our analysis on those homeowners who have resided in the same house since 2000.

Between 2000 and 2005 property taxes paid by non-mover homeowners in Wisconsin grew by 17.4 percent. This rate of growth is about half the growth rate of total revenue from the residential property tax over the same period (34.1 percent).<sup>23</sup> Although information on average changes is informative, our reliance on data on individual homeowners allows us to explore in detail the variation in changes in property tax liabilities and tax burdens among Wisconsin's homeowners. The main findings of our analysis include:

- Although property taxes increased for the median non-mover homeowner, for 12 percent of homeowners, nominal property taxes actually declined over the 2000 to 2005 period. For 41 percent of all non-mover homeowners, property taxes grew at a rate lower than the growth rate of the Consumer Price Index.
- For nearly one in five Wisconsin non-mover homeowners, property tax liabilities grew at an annual rate of over six percent between 2000 and 2005. For another nearly 20 percent of homeowners, property taxes grew at an annual rate between 4 and 6 percent.
- Property taxes grew at an above average rate for homeowners with relatively low property tax liabilities in 2000. Homeowners whose property taxes were \$1,500 or less in 2000 experienced average annual property tax growth of 5.5 percent, with over a third of these households facing average annual increases of more than 6 percent. In contrast, for homeowners who paid more than \$4,500 in property taxes in 2000, property taxes grew at an annual rate of 2.5 percent. For nearly half of this group of homeowners, property taxes actually declined in real terms over the next five years.
- Using data on average property tax payments and average income over the 2000 to 2005 period, we find that the property tax on Wisconsin homeowners is regressive. Net of state property tax relief efforts and federal deductibility of property taxes, we find that the lowest quintile paid 5.9 percent of their income in property taxes, more than double the overall average and 3.7 times more than the burden on homeowners in the top 5 percent of the income distribution. These homeowners paid 1.6 percent of their income in property taxes over the period.

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<sup>23</sup> Adjusting for inflation, using the Consumer Price Index, property taxes paid by non-mover homeowners grew by 3.6 percent over this 5-year period, an amount that corresponds to an annual rate of 0.7 percent.



- Although average net property tax burdens grew from 2.6 percent of (annual) income in 2000 to 3.0 percent in 2005, for over a third of homeowners, property tax burdens actually fell over the period.
- Households in the lowest income quintile faced the greatest increase in property tax burdens over the period. The main reasons why property tax burdens rose for most low-income homeowners is that their income grew very slowly. For the lowest quintile, income grew at an annual rate of only 0.2 percent compared to a 2 percent annual growth rate for all homeowners.
- Homeowners who were over the age of 65 in 2005, not only faced higher tax burdens than younger homeowners, but their burdens rose at a faster than average rate between 2000 and 2005. The reason for these higher burdens is the lower than average income of the elderly and the fact that between 2000 and 2005, the income of elderly homeowners declined while the income of the non-elderly rose.
- Wisconsin uses two income tax credits that are designed explicitly to reduce property tax burdens, the School Property Tax Credit (SPTC) and a circuit-breaker, called the homestead credit. In addition, homeowners who itemize deductions on their federal returns benefit from property tax deductibility. In 2005, the two state credits plus federal itemizing of property taxes saved non-mover homeowners \$412 million, offsetting 22.5 percent of their property taxes. The largest offset (60 percent of the total) was the result of the federal income tax deduction and was largely distributed to higher income households. The SPTC represented 34 percent of the total relief provided to these homeowners and was more evenly distributed across households. Less than 6 percent of the total relief measures was provided by the homestead credit which benefits low-income, primarily older households.

Elected officials in Wisconsin and elsewhere face the brunt of citizen complaints about rising property taxes. Undoubtedly, the current economic downturn will increase the frequency and the intensity of these complaints. The results of this paper can help public officials craft policies to effectively address taxpayer concerns about the property tax.

The main conclusion we draw from the data presented in this paper is that the burden of the property tax on homeowners and any economic hardships it creates vary tremendously among homeowners. While some homeowners are facing both high and increasing property tax burdens (at least relative to their current income), for other homeowners, the property tax is relatively low and/or falling over time.

The policy lesson we take from our findings is that in a world with limited resources (certainly the world we live in), it is essential to **target** property tax relief to those residents who are most in need of relief from high or rapidly rising property tax burdens. Unfortunately, to a large extent, in Wisconsin, the state has pursued a set of policies that can only be described as highly untargeted. In its fiscal year 2008 budget, the state government is providing local governments (including independent school districts) with \$8.7 billion of

state financial assistance. While this money is intended to help local governments finance high quality education, essential local government services, and social services to the needy, another quite explicit objective of state grants is to allow local governments to reduce their reliance on property taxation. In fact, state policy has done more than just hope that local governments will use state aid to reduce property taxes. It has effectively enforced property tax reductions through the enactment of a revenue limit on school districts and property tax levy limits for municipal and county governments. For school districts facing revenue limits, every additional dollar of general state school aid must be offset by a dollar reduction in property taxes. For all local governments these policies require local governments and school districts to either restrict or reduce their property tax levies. The only way that these governments can accomplish this goal is by lower property tax mill rates.

Lowering property tax rates, by definition reduces property taxes for everyone who pays property taxes. The tax relief is thus provided to both residents and non-residents and to the owners of all types of property, including residential, commercial, industrial, and agricultural. Among homeowners, a rate reduction provides the largest dollar amounts of tax reductions to those who own the most expensive homes, not those facing the highest burdens. By pursuing untargeted property tax relief policies, relatively few state resources are available to benefit those taxpayers that either face the highest tax burdens or experience the fastest growth in tax burden.

One reason why the two existing tax credits designed to provide property tax relief are not more effective is their relatively small size. The total of SPTC credits received by non-mover homeowners was \$142 million in 2005, an amount that was only 7.7 percent of the \$1.8 billion in gross property taxes paid by these households. The homestead credit, with its restricted eligibility, was received by only 13.4 percent of all non-mover homeowners in 2005 and provided \$23.2 million of tax relief, offsetting 1.3 percent of the gross property tax liability of eligible homeowners.

Aside from increasing their size, changes in the design of the two credits could improve their effective in providing more property tax relief to those taxpayers facing high property tax burdens. The SPTC does very little to reduce the regressivity of the property tax. As currently formulated, below a maximum credit, the amount of the credit is proportional to property tax payments. However, as taxpayers' income have no impact on the amount of credit received, and as the credit is non-refundable, many taxpayers with low incomes and high property tax burden get either no benefit or very limited benefit from the SPTC.

While eligibility for the homestead credit is limited to low-income taxpayers, several aspects of its design limit its effectiveness in reducing property tax burdens. First, because the maximum credit is limited to \$1,450, but the gross tax liability of many eligible taxpayers, especially the elderly, exceeds that amount by over a \$1,000, many homestead credit recipients face above average net property tax burdens. Second, because eligibility for the credit is limited to taxpayers with incomes below \$24,500, many low-income homeowners, those in the bottom income quintile, have incomes above the eligibility

limit.<sup>24</sup> Also, because the income limit is not indexed for inflation, over time as nominal incomes rise, a smaller share of Wisconsin's taxpayers are eligible for the homestead credit.

We end the paper by suggesting several steps policy makers in Wisconsin might take in order to reduce the high property tax burdens faced by **some** Wisconsin homeowners.<sup>25</sup> First, we recommend that the SPTC be redesigned so that its benefits are targeted to lower income taxpayers by providing them with a higher credit rate and a phasing out of benefits as taxable income rises.

Second, we recommend that the reach of the homestead credit be expanded by increasing the maximum allowable credit and by raising the income eligibility limit. Although the uniformity clause in Wisconsin's constitution would prevent removing the income eligibility limit or raising it to cover a large share of Wisconsin taxpayers, the Wisconsin Supreme Court has ruled that the homestead credit is constitutional because it is a "welfare" rather than a "tax" statute. Adjusting for inflation the income ceiling that was sanctioned by the court in a 1990 ruling would justify an income ceiling in 2008 of approximately \$60,000.<sup>26</sup> Whatever new income limit and maximum credit are chosen, they should be indexed for inflation.

Third, we recommend that the state consider expanding and reforming its existing tax deferral program. The current program is very limited and its existence is probably unknown to most homeowners. An advantage of a property tax deferral program is that homeowners can remain in their home if they so choose even if their property tax bills are large relative to their current income. From a public policy standpoint, the clear beneficiaries of a tax deferral program are the current homeowners, rather than their heirs, who indirectly benefit from the existing tax credits. Deferral programs could be improved by linking eligibility directly to either high property tax burdens or rapid increases in property tax levies or burdens. Homeowner participation in deferral programs could be improved by simplifying the application procedures and investing in outreach efforts, targeted specifically to elderly homeowners.

The primary purpose of this paper is to investigate changes in property tax liabilities and burdens among Wisconsin homeowners and to identify which taxpayers, by income and age, faced the largest increases in tax liabilities and burdens. In future work, we will attempt to *explain* the findings of this paper. Why did property tax liabilities grow rapidly for some homeowners between 2000 and 2005, when other homeowners with similar incomes and similar ages, experienced slow property tax increases, or even decreases? To begin answering this question, we will use information on the address of each homeowner to match tax and income information with municipal, county, and school district

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<sup>24</sup> The top of the bottom income quintile of non-mover homeowners is \$37,524.

<sup>25</sup> As the analysis in this paper has been limited to homeowners, we do not address the question of whether property tax relief measures aimed at tenants should be modified.

<sup>26</sup> In *McManus v. Wisconsin Department of Revenue* (1990), the Wisconsin Supreme Court ruled that the state's Farmland Preservation credit, which at the time of the ruling had an income eligibility ceiling of \$38,429, was not in conflict with the constitution's uniformity clause. Adjusted for inflation, that 1990 income ceiling would now be equal to about \$60,000.

information on property tax mill rates and on revaluations. With this information, we should be able to determine whether state policies that changed the distribution of state aid or the valuation of property, such as use value taxation for agricultural land, had an impact, perhaps unintended, on the tax burdens faced by homeowners. We will also explore whether differential rates of changes in property values in different parts of the state may help explain the observed variation among homeowners in property tax liabilities and burdens. Finally, we will explore the oft-repeated claim that high tax burdens are forcing elderly homeowners to sell their homes. Although this paper has focused on the subset of homeowners who chose to stay in the same home, the tax panel we have constructed allows us to look in detail at homeowners in 2000 who chose to move at some later date.

## **Appendix 1: Methodology**

The analysis relies on the Department of Revenue's data warehouse that includes Wisconsin individual income tax returns, federal individual income tax return information, and IRS informational return information beginning with year 2000. Inherent in panel data in general and in tax information in particular are challenges related to data matching. For purposes of the data warehouse, the challenges relate primarily to matching social security numbers across data sources and across time. This study encountered other matching challenges from changes in taxpayers' circumstance, taxpayer reporting errors and data capture errors. The potential for matching difficulties are compounded with each additional year of data.

In particular, the analysis had to contend with the changes in household composition, changes in household location and timing irregularities of property tax payments.

### **Household History**

To measure burden across time, care must be taken to identify changes in household composition. The tax burden of a household can change dramatically in cases of marriage and divorce due to the addition or loss of a working member of a household.

The primary Wisconsin tax return data set contains one observation for each tax return from tax years 2000 to 2005. Each observation contains unique customer IDs for both the primary taxpayer (the individual listed first on the return) and the taxpayer's spouse if filing jointly. For the purpose of analyzing property tax histories, it is important to reconfigure the data set so that each observation contains an individual's return history.

Since some individuals either stopped filing Wisconsin returns during the period or changed marital status, the individual histories are created beginning with 2005 information. For each 2005 return, the primary taxpayer's customer ID is matched to returns from 2000 to 2004. As a result, in the reconfigured data set, each observation contains Wisconsin tax return data from 2000 to 2005 for an individual who was a primary taxpayer in 2005. Additional histories are constructed based on the most recent available return for individuals who did not file 2005 returns.

As an example, if Anne (primary) marries Ben (spouse) in 2005, the reconfigured data set will construct a history of Anne's returns. The history will include their joint 2005 return and Anne's prior year returns. If Ben was married to Carol in any previous year and Carol was a primary taxpayer in 2005, Carol's return history will include the joint returns that Ben and Carol filed. As a result, some of Ben's returns are included in the reconfigured data set, but an individual history is not constructed for Ben because Ben was not a primary taxpayer in 2005. Table A1 shows the individuals in this example as they would be included in the original data set and the reconfigured data set.

## Change of Residence Designation

Property tax trends and burdens are clearly affected if a household moves to a different residence. In order to identify whether an individual has moved during the 2000-2005 period, it is necessary to compare addresses from multiple years and determine when two addresses are sufficiently different to reflect a change of address. Unfortunately, requiring the reported alpha numeric addresses for any two years to be identical is overly restrictive for many non-movers due to slight changes made by the taxpayer or to data capture errors. For example "123 Main St" is not identical to "123 Main Street", and neither of these strings is identical to "123 N Main St". It is, however, unlikely that these three strings represent distinct addresses if they are reported during consecutive years by an individual taxpayer.

**Table A1: Comparison of Original Data Set with Reconfigured Data Set**

Original Data Set				
	Taxpayer		Year	Description
	Primary	Secondary		
Return 1	Anne	-	2000	Anne's single 2000 return
Return 2	Ben	Carol	2000	Ben and Carol's joint 2000 return
Return 3	Anne	-	2001	Anne's single 2001 return
Return 4	Ben	Carol	2001	Ben and Carol's joint 2001 return
Return 5	Anne	-	2002	Anne's single 2002 return
Return 6	Ben	Carol	2002	Ben and Carol's joint 2002 return
Return 7	Anne	-	2003	Anne's single 2003 return
Return 8	Ben	-	2003	Ben's single 2003 return
Return 9	Carol	-	2003	Carol's single 2003 return
Return 10	Anne	-	2004	Anne's single 2004 return
Return 11	Ben	-	2004	Ben's single 2004 return
Return 12	Carol	-	2004	Carol's single 2004 return
Return 13	Anne	Ben	2005	Anne and Ben's joint 2005 return
Return 14	Carol	-	2005	Carol's single 2005 return

Reconfigured Data Set						
	Tax Year					
	2000	2001	2002	2003	2004	2005
Anne's History	Anne (single return)	Anne (single return)	Anne (single return)	Anne (single return)	Anne (single return)	Anne and Ben (joint return)
Carol's History	Ben and Carol (joint return)	Ben and Carol (joint return)	Ben and Carol (joint return)	Carol (single return)	Carol (single return)	Carol (single return)

Note: Since Ben was not a primary taxpayer in the most recent year that he has a return, his return history is not created in the reconfigured data set.

To allow for slightly different descriptions of the same address, the study employs a SAS function called *complev* which measures the difference between two alpha numeric string variables. The function returns the number of insertions, deletions, or replacements of single characters that are required to convert one string to the other (the Levenshtein edit distance). For example, with the addresses "123 Main St Apt 1" and "123 Main Street", the Levenshtein distance is five because five individual changes are required to convert the first string into the second string. Specifically, these changes are: space becomes "r", "A" becomes "e", "p" becomes "e", space is deleted, and "1" is deleted.

The *complev* function also contains optional features including a modifier that truncates the longer of the two strings to the length of the shorter string. Using this modifier, the distance between "123 Main St Apt 1" and "123 Main Street" is three because the longer string is truncated before the comparison is made.

For this data set a two-step filter was created to designate movers. The filter first truncates the address strings to 12 characters and then uses the above mentioned modifier so that both strings are the same length. *Complev* values of five or more are tentatively designated as movers. In the second step, the filter repeats the procedure, but truncates the addresses to four-character strings. If *complev* returns a value of zero in the second step, the individual is considered a non-mover for the year even if the person had tentatively been designated as a mover in the first step. For example, if the addresses are "N1234 Hwy 56" and "N1234 State Road 56", step one would result in a distance of six, but step two would result in a distance of zero, so the individual would be designated as a non-mover for the year.

Independently, the *complev* function is also used to identify addresses that begin with "PO Box", since it is not possible to designate mover or non-mover status based on P.O. Boxes. If an address is identified as a P.O. Box, the address is designated as missing.

In order to assess the accuracy of the filter, 100 households with 2005 returns were randomly selected and their addresses were manually compared.<sup>27</sup> For 96 of the histories, the manual comparison results agreed with the filter for all years. For three of the cases, the manual results disagreed in a single comparison and in the remaining case, there were two disagreements.

Of the 100 manually checked observations, the four with disagreements are listed below. The numbers and street names have been changed, however, for confidentiality purposes. In some cases, individuals change the way in which they enter their addresses, while in other cases characters are incorrectly scanned into the data set.

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<sup>27</sup> The manual comparison resulted in 331 instances of unchanged addresses, 58 instances of changes of address, and 111 instances of missing address information. Note that one year of missing address information generally results in two year to year comparisons that cannot be made.

<b>Table A2: Full Street Addresses for Four Households for Which the Filter Incorrectly Designates Moves</b>				
Tax Year	Individual 1	Individual 2	Individual 3	Individual 4
2000	1234 N Analysis Ave	1234 E 56th St	1234 89th Ave Apt 789	12340 Ribon Rd
2001	1234 N Analysis Ave	1234 E 56th St	1234 89th Ave Apt 789	12340 Ribon Rd
2002	1234 N Analysis Ave	P 0 PO Box 999	1234 89th Ave Apt 789	12340 Ribon Rd
2003	5678 N Analysis Ave	PO Box 999	1234 89th Ave Apt 789	S12340 Ribbon Rd
2004	5678 N Analysis Ave	PO Box 999	1564 89th Ave Apt 559	12340 S Ribbon Rd
2005	5990 N Analysis	PO Box 988	1564 89th Ave Apt 559	S1234o Ribbon Rd
Filter result	No moves (complev value is less than 5)	Move 01-02 (3 P.O. Boxes)	No Moves (Apt 789 and Apt 559 were truncated)	Move 04-05
Manual Result	Move 02-03 & Move 04-05	No moves (4 P.O. Boxes)	Move 03-04	No Moves

Several similar manual comparisons were completed using variations on the two-step filter. In each case, the comparison used 100 randomly selected individuals in which the baseline filter (described above) disagreed with the alternative filter in at least one year. In all the variations, the filters agreed on 99% of cases and the baseline filter outperformed the alternative filter.

Table A4 shows the number and percentage of households that are classified as non-movers, movers, or missing address for each year. Individuals may not have a complete return history for a variety of reasons. For example, anyone who moves into or out of the state will likely have some missing returns as will anyone whose income does not reach the filing requirement threshold in all years.



<b>Table A3: Number of Correct and One-off Observations for the Baseline Filter and Alternative Filters</b>				
Data Set	Number of Observations	Percent of All Observations	Result of 100 Manual Comparisons: Correct / One-off	
			Baseline Filter	Alternative Filter
All Observations (detail in previous table)	3,528,636	100.0%	96 / 3	-
Baseline Filter Disagrees with Alternative 1	32,072	0.9%	48 / 42	40 / 41
Baseline Filter Disagrees with Alternative 2	27,314	0.8%	70 / 26	18 / 66
Baseline Filter Disagrees with Alternative 3	13,977	0.4%	88 / 11	6 / 70
Baseline Filter Disagrees with Alternative 4	8,726	0.2%	67 / 24	25 / 69
Baseline Filter Disagrees with Alternative 5	15,636	0.4%	48 / 38	42 / 38
Baseline Filter Disagrees with Alternative 6	14,067	0.4%	47 / 38	44 / 48

The baseline filter designates an individual as a non-mover if *complev* returns a value of less than 5 when the addresses are truncated to 12 characters or *complev* returns a value of zero when the addresses are truncated to 4 characters. Based on these criteria, the baseline filter is designated as 5 of 12, 0 of 4. The alternatives are as follows: Alt 1) 4 of 12, 0 of 4, Alt 2) 6 of 12, 0 of 4, Alt 3) 5 of 12, 0 of 5, Alt 4) 5 of 12, 0 of 3, Alt 5) 5 of 13, 0 of 4, Alt 6) 5 of 11, 0 of 4

### **Smoothing Property Tax History**

For many households, the property taxes claimed on their returns vary more than the actual property tax due on their primary residences. Since the SPTC is based on property tax *paid* in a given calendar year rather than property tax *due* for the given year, many individual claims exhibit some time shifting of payments. For example, an individual may have property taxes of about \$2,000 each year of the 2000 to 2005 period, but may have one year in which the payment amount is zero and another year in which the payment amount is near \$4,000. In this case, smoothing the payments gives a more accurate representation of how the individuals' property tax bills change with time.

In order to adjust for large property tax changes like the one suggested in the example, a mechanism is necessary to objectively distinguish histories that should be adjusted from histories that should not be adjusted. In order to do this, reported property taxes for 2001 to 2004 were compared to adjacent years. An observation was considered to be an outlier if it was more than 25% higher than both adjacent years or both adjacent years were more than 25% higher than the observation.

**Table A4: Number of Households Classified by Change of Address**

Number of Households					
Classification	Comparison Years				
	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005
No Return Either Year	622,737	624,326	612,606	590,723	574,074
No Return One Year	431,040	432,583	434,833	448,519	493,368
Has Both Returns, but Missing Street Address	120,501	115,388	108,327	101,601	93,495
Non-Moves	2,008,586	2,008,352	2,015,373	2,022,600	1,994,557
Moves	345,772	347,987	357,497	365,193	373,142
Total	3,528,636	3,528,636	3,528,636	3,528,636	3,528,636
Percent of Households					
Classification	Comparison Years				
	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005
No Return Either Year	17.6%	17.7%	17.4%	16.7%	16.3%
No Return One Year	12.2%	12.3%	12.3%	12.7%	14.0%
Has Both Returns, but Missing Street Address	3.4%	3.3%	3.1%	2.9%	2.6%
Non-Moves	56.9%	56.9%	57.1%	57.3%	56.5%
Moves	9.8%	9.9%	10.1%	10.3%	10.6%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

For the years 2000 and 2005, only one adjacent year is available, so a modified comparison was necessary. If the adjacent year had not already been identified as an outlier, then the 2000 or 2005 observation was itself considered to be an outlier if it was more than 25% higher than the adjacent year or if the adjacent year was more than 25% higher than the observation. If the adjacent year had been identified as an outlier, then the 2000 or 2005 observation was compared to then next closest year (2002 or 2003, respectively). In those cases, the 2000 or 2005 observation was considered to be an outlier if it was more than 25% higher (lower) than the adjacent year and more than 35% higher (lower) than the next adjacent year.

Table A5 gives some hypothetical property tax histories and the designated outlier observations. In History 1, the 2004 observation is an outlier because it is more than 25% higher than both the 2003 observation and the 2005 observation. The 2000 observation is an outlier because 2001 was not an outlier and 2000 was more than 25% higher than the 2001 observation. Histories 2 and 3 represent more typical observation patterns, which have no designated outliers or a single pair of outliers. History 4 is representative of an

individual who "doubles up" his or her property tax payments.<sup>28</sup> For that individual, the interior years (2001-2004) are all outliers because they are not near the neighboring observations. The 2000 observation and the 2005 observation are not considered to be outliers because adjacent years were identified as outliers and they do not vary by more than 35% from next adjacent years (2002 and 2003, respectively).

After outlier years were designated, replacement values were necessary to continue the analysis. Individuals with more than two years of outlier observations were excluded from the analysis in this paper because replacement values would be more subject to quirks of the remaining values. For individuals with only one or two outliers, however, ordinary least squares trend lines were calculated from the remaining values and the outlier values were replaced with the trend line estimates for those years. As examples, in History 1 above, the year 2000 value would be replaced with \$727 and the year 2004 value would be replaced with \$979. Similarly, in History 3, the 2002 and 2003 values would both be replaced with \$1,000. History 2 would be unaffected by the procedure and History 4 would be subject to a special adjustment as indicated above.

Tax Year	History 1	History 2	History 3	History 4
2000	\$1,000	\$1,000	\$1,000	\$0
2001	750	1,100	1,000	2,000
2002	850	1,200	2,000	0
2003	1,000	1,300	0	2,200
2004	2,000	1,400	1,000	0
2005	\$1,000	\$1,500	\$1,000	\$2,400
Outlier Years	2000, 2004	None	2002, 2003	2001-2004

While much of the analysis compares changes in 2005 relative to 2000, this smoothing exercise ensures that the five-year change reflects reliable property tax histories and is not the result of individual outliers.

The intervening years are, however, important to understand how property taxes change from year to year. Property taxes that fluctuate widely represent a greater burden on the taxpayer, at least for planning purposes, than property taxes that follow a smooth trend. Moreover, if taxes fluctuate widely for many taxpayers, a comparison of the beginning and end periods may be inappropriate to the extent that the taxes reported for either the beginning or end year may be unusually high or low relative to the intervening years.

To assess how closely the 2000 and 2005 tax years represent the entire period, a trend analysis was conducted. For each tax filer, all years were used to construct a trend line for property taxes for the 2000 to 2005 period. The trend line was then compared to the

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<sup>28</sup> For individuals who double up their payments in alternating years, a trend line is calculated based on the available years and allocated to all years.

actual reported property tax to assess how closely property taxes followed a linear trend or fluctuated about that trend for each year between 2000 and 2005.

Table A6 shows the number of households by average absolute deviation from the trend line over the six year period. The average deviation for 40.3% of the tax filers included in the analysis was less than 2% and another 37.8% had deviations of less than 4% on average; this suggests that the growth measured between 2000 and 2005 closely mirror the growth pattern throughout the period. Only 3.8% of the households had average deviations from the trend line of more than 8%.

**Table A6: Observed Property Tax Absolute Deviation from Trend Line Values, Stable, Non-mover Households**

Deviation from Trend Line:	Average Absolute Deviation	
	Count	Percent
Less than 2%	282,819	40.3%
2% to 4%	265,046	37.8%
4% to 6%	95,469	13.6%
6% to 8%	31,666	4.5%
8% to 10%	11,885	1.7%
More than 10%	14,724	2.1%

Decomposing the households by annualized change in property tax, allows for an examination of maximum and average absolute deviations for different trend values. Table A7 reports the average deviations by average annual property tax growth. Taxpayers whose average annual property taxes are the most extreme – either with average decreases or average annual increase of more than 8% had a higher incidence of large deviations relative to other taxpayers. Of taxpayers with average annual property tax decreases, 18% also had average deviations from the trend of 6% or more. Among taxpayers with high average annual property tax increases, nearly one third also had average deviations from the trend of 6% or more. For the other groups, between 3.3% and 8.4% of tax filers had average deviations of 6% or more. This suggests that individuals with large changes in property taxes are less likely to follow a smooth trend.

**Table A7: Observed Property Tax Absolute Deviation from Trend Line Values by Annualized Change in Property Tax, Stable Non-mover Households Counts and Percents**

Average Deviation from Trend Line	Change in Property Tax					
	Decrease	less than 2%	2% to 4%	4% to 6%	6% to 8%	more than 8%
Less than 2%	20,081	78,125	109,069	51,417	16,595	7,532
2% to 4%	31,111	48,409	71,798	60,663	32,277	20,788
4% to 6%	17,668	14,367	17,290	17,834	14,041	14,269
6% to 8%	7,575	4,112	4,740	4,390	3,776	7,073
8% to 10%	3,246	1,173	1,260	1,221	1,182	3,803
More than 10%	4,331	750	834	753	790	7,266

Average Deviation from Trend Line	Change in Property Tax					
	Decrease	less than 2%	2% to 4%	4% to 6%	6% to 8%	more than 8%
Less than 2%	23.9%	53.2%	53.2%	37.7%	24.2%	12.4%
2% to 4%	37.0%	32.9%	35.0%	44.5%	47.0%	34.2%
4% to 6%	21.0%	9.8%	8.4%	13.1%	20.4%	23.5%
6% to 8%	9.0%	2.8%	2.3%	3.2%	5.5%	11.6%
8% to 10%	3.9%	0.8%	0.6%	0.9%	1.7%	6.3%
More than 10%	5.2%	0.5%	0.4%	0.6%	1.2%	12.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

A similar analysis using property tax levels in 2000 is reported in Table A8. For individuals with property tax amounts above \$1,000 in 2000, the most common average deviations were less than 4%. Among the individuals with property tax amounts below \$1,000 in 2000, the average deviation was most likely to be in the 2% to 6% range. This suggests that individuals with small initial property taxes are less likely to follow a smooth trend.

The trend analysis suggests that our focus on growth between 2000 and 2005 accurately reflects the trend in property taxes over the period. Some households with either low property tax levels, with average annual decreases, or with very high increases experienced greater volatility throughout the period than other taxpayers; however, these households represent a small share of the overall population.

<b>Table A8: Observed Property Tax Absolute Deviation from Trend Line Values by Property Tax Level, Stable Non-mover Households Counts and Percents</b>						
Average Deviation from Trend Line	Property Tax in 2000					
	1 to 1000	1000 to 2000	2000 to 3000	3000 to 4000	4000 to 5000	gt 5000
Less than 2%	10,887	69,330	100,625	59,415	23,766	18,796
2% to 4%	19,258	85,327	85,766	42,337	17,469	14,889
4% to 6%	11,856	34,226	26,516	12,637	5,242	4,992
6% to 8%	5,189	11,513	7,982	3,684	1,569	1,729
8% to 10%	2,500	4,275	2,720	1,177	548	665
More than 10%	4,389	5,098	2,643	1,196	586	812

Average Deviation from Trend Line	Property Tax in 2000					
	1 to 1000	1000 to 2000	2000 to 3000	3000 to 4000	4000 to 5000	gt 5000
Less than 2%	20.1%	33.1%	44.5%	49.3%	48.3%	44.9%
2% to 4%	35.6%	40.7%	37.9%	35.2%	35.5%	35.5%
4% to 6%	21.9%	16.3%	11.7%	10.5%	10.7%	11.9%
6% to 8%	9.6%	5.5%	3.5%	3.1%	3.2%	4.1%
8% to 10%	4.6%	2.0%	1.2%	1.0%	1.1%	1.6%
More than 10%	8.1%	2.4%	1.2%	1.0%	1.2%	1.9%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

## Appendix 2: Excluded Cases

Approximately 56,000 observations were dropped from the analysis out of concern over the quality of the property tax. In addition, approximately 96,000 observations were dropped due to insufficient or poor income information.

Care was taken to ensure the analysis on growth in property taxes over the period was not biased by either data errors or assumptions. In particular, we were concerned that data capture or taxpayer errors in the 2000 property tax data (the beginning period of the analysis) or the 2005 data (the end point) could dramatically influence growth estimates for a given observation. As described in the methodology section, observations were also dropped if they had insufficient or questionable data to make reasonable smoothing adjustments required for the data to reflect the year the property tax was levied versus when the tax was paid.

Observations were dropped from the analysis if they met any of the following conditions:

- Property tax reported was rounded to the hundreds for three or more years (19,000 cases).
- The property tax history had more than two positive or negative outliers that required smoothing for more than two years (15,500 cases)
- Property taxes reported for two consecutive years summed to the reported value of another year; these observations would not have been considered outliers for purposes of smoothing but appeared to reflect payment anomalies rather than the tax levy paid (18,600 cases).
- The "smoothed" property tax data produced a greater outlier effect than the original data (1,600 cases)
- The maximum property tax reported over the six-year period was five or more times higher than the minimum tax reported (6,800 cases).
- The 2005 property tax was greater than 200% of the 2000 property tax and was significantly higher than the trend line for the six-year period (2,200 cases).
- The 2005 property tax was 70% or lower than the 2000 tax and was significantly lower than the trend line for the six-year period (2,500 cases).
- The property tax reported for all years was identical (3,800 cases).

The first condition created no bias regarding growth trends over the period. Conditions 2 through 6 would have created an upward bias to the growth trends, i.e., most of the observations that were excluded under these conditions reported very high property tax growth between 2000 and 2005. Conditions 7 and 8 had a downward bias to the extent that the excluded observations reported decreasing or no growth over the period.

### Income Data

To analyze the property tax burden, income data were required to estimate households' ability to pay. While Wisconsin income tax data are available for all SPTC and HC

claimants, the income reported on Wisconsin income tax returns does not adequately measure ability to pay.

Approximately 90% of SPTC claimants file a Wisconsin Form 1 tax return. The income reported on this form includes not only income elements, such as wages and interest income, but also adjustments to income allowed for tax purposes, such as a deductions for moving expenses or student loan interest. To the extent that these deductions do not capture ability to pay, the analysis had to rely on federal tax information that captures the income elements that more accurately measure ability to pay. The DOR data warehouse receives federal tax information from the Internal Revenue Services for individuals determined to be Wisconsin taxpayers based on the address reported on taxpayers' tax returns.

Should the mailing address on a taxpayer's return not be a Wisconsin address, the federal information will be unavailable in the data warehouse. In addition, a match between the federal and state data may not be possible for a particular taxpayer because of a data capture or taxpayer error made on the taxpayer's social security number or the spouse's social security number.

In total approximately 96,000 observations were dropped due to income data considerations:

- Approximately 28,600 observations were dropped due to a lack of federal income data and homestead income data for either 2000 or 2005;
- Approximately 3,200 observations with total income less than \$1,000 for 2000 or 2005 were excluded;
- Around 63,500 observations were dropped because the 2005 income level was either more than double the 2000 income or was less than half the 2000 income;
- Approximately 1,000 observations were dropped because the highest income year had an income level more than 5 times the second highest income year.



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