Volatility of Individual Property Tax Payments

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Abstract

The most important independent source of local government revenue in the United States is the property tax. Yet the widespread unpopularity of the property tax leads voters to support state policies that limit or redefine their property tax bases, thereby restricting total government revenue. Extensive research exists on what motivates taxpayers to vote for these policies. However, this prior research focuses on how the levels and changes in total revenues may affect motivation or support for tax limits. This paper establishes that understanding the levels of and changes in the tax payments of individual taxpayers is critical to understanding the motivations of individual taxpayers' support for property tax limitations. Using data sources from the Minnesota Department of Revenue, this paper explains why property taxes vary among taxpayers and for individual taxpayers over time; it concludes that policies focusing solely on restricting local government revenue fail to address much of the cause of variation in individual property tax bills over time.

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Introduction

The property tax is the most important independent source of local government revenues in the United States. State and local governments collected $389.7 billion in property taxes in 2007, $9 billion more than the U.S. federal government collected in corporate income taxes. Property taxes remain the largest local source of municipal revenue, representing 29% of total municipal own source revenues and 49% of total municipal tax revenues.[1]

Widespread political efforts by state governments to provide property tax relief are a testament to the property tax's unpopularity.[2] State policies targeted directly at the property tax tend to limit local government access to the property tax base and/or redefine the property tax base. As of 2006, forty states limit local government access to tax base through limitations on property tax revenues and property tax rates.[3] The effects of these limitations have been studied extensively.

Extensive research also exists on the motivations for these property tax limitations. The most prominent explanation is that voters limit local governments' access to local tax base because local government officials behave as budget maximizers. Unchecked, this budget maximizing creates a large and inefficient local government. This is referred to as the leviathan model of local government.[4]

The leviathan government motivation for tax limitations focuses on the total revenues the government collects. This paper establishes that the levels of and changes in total property tax revenues do not always well describe the levels of and changes in individual tax payments. Understanding the levels of and changes in the tax payments of individual taxpayers is important to understanding the motivations of individual taxpayers' support for property tax limitations.

Why Property Taxes Vary

Not all taxpayers' property tax bills are the same. Property tax bills vary across a state and even within cities, school districts, and counties. A taxpayer's property tax bill may also increase or decrease over time. This section investigates the reasons why property taxes vary across taxpayers and for the same taxpayer over time.

A common equation for a taxpayer i's property tax payment, T_{ijt}, to jurisdiction j at time

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1 Source: US Census.

2 In the most recent annual survey by the Tax Foundation, 38% of respondents listed the property tax as the worst tax state and local tax. In a virtual tie for a distant second place, income and sales taxes received 20% and 19% of the vote for worst state and local tax.

3 See Anderson (2006) for a recent overview of property tax limitations in the United States.

4 See Cutler, Elmendorf, and Zeckhauser (1999) for a review of tax limit motivations.

t, is

$$T_{ijt} = \tau_{jt} V_{it} \tag{1}$$

where τ_{jt} is the property tax rate in jurisdiction j at time t, and V_{it} is the taxable value of property i and time t.

Rearranging this equation we can see a simple relationship between the local jurisdiction's (e.g., city, school district, county) total tax revenue and the individual's tax bill. Using the fact that the tax rate τ_j is by definition the ratio of requested tax revenue R_j over the total tax base B_j yields

$$T_{ijt} = R_{jt} \cdot \frac{V_{it}}{B_{jt}}. \tag{2}$$

The last term in the equation is the ratio of taxpayer i's tax base to the total tax base in the jurisdiction; it is often called the tax share, S_i, of taxpayer i.

Revenues and tax shares change over time and also vary across cities, school districts, and counties. Taking the natural log of equation (2) and totally differentiating yields an expression for percentage differences in tax payments across time, across locations, and across individual taxpayers. For any variable x, let $\dot{x} = dx/x$, or the percentage change in x, then

$$\dot{T}_{ijt} = \dot{R}_{jt} + \dot{V}_{it} - \dot{B}_{jt}. \tag{3}$$

This equation states that, for example, a 10% difference in revenue between two jurisdiction causes, all else equal, a 10% higher property tax bill for the taxpayer in the high revenue jurisdiction. The equation also states that if, from time t to time $t + 1$, the entire tax base increases by the same percentage, so that $\dot{V}_{it} = \dot{B}_{jt}$ in jurisdiction j, all tax payments will remain constant $(\dot{T}_{ijt} = 0)$ if tax revenues remain constant. Within the same jurisdiction j, individual tax payments will differ only because individuals' tax shares differ.

A convenient way to express percentage changes in the property tax bill of a residential homeowner is

$$\dot{T}_{ijt} = \dot{r}_{jt} + \dot{h}_{ijt} + \dot{rs}_{jt} \tag{4}$$

where r_{jt} is per-household property tax revenue; h_{ijt} is the ratio of the value of home i to the average home value in jurisdiction j (*the homestead ratio*); and rs_{jt} is the share of total tax base jurisdiction *j* derives from residential homes (*residential tax share*).[55]

Equation (4) is one equation we will use to describe the tax differences of individual taxpayers across jurisdictions and over time. It says that property tax differences arise from three things: differences in revenues, differences in homestead ratios, and differences in the residential tax share. A simpler equation breaks property tax differences and changes into two components the revenue and the tax share,

$$\ddot{P}_{it} = \ddot{\rho}_{jt} + \ddot{S}_{it}. \qquad (5)$$

At one point in time we can then ask three related questions. Do property tax payments vary across households? If so, by how much do property tax payments vary across households? And finally, why do property tax payments vary across households? We look to equations 4 and 5 to explore why.

We can also ask three related questions about property taxes over time. Do property tax payments vary over time for an individual household? If so, by how much do property tax vary over time for an individual household? And finally, why do property tax payments vary over time for an individual household?

Data Description

This paper combines data from two separate data sets covering partially overlapping time periods. Both data sources are from the Minnesota Department of Revenue and provide data for Minnesota. The first data set is available from 1994-2003 and provides city level data on property tax base, property tax rates, and property tax revenues. The second data set is available from 2000-2006 and provides parcel level information on property values.

Variation Across Space

This section of the paper examines homeowners' property tax payments in cities with population greater than 5,000 in 2002. Some cities are excluded from the sample because of missing data, leaving 120 cities in the sample. The administrative data allow for the calculation of each component of equation 4 in 2002. In all there are 822,944 residential homes in these 120 cities. Further below, the analysis will use a more restricted sample containing consistent information on properties from 2000 to 2006. For now, however, the use of only one year allows for the use of a large sample of properties and cities.

City Level Variation

Table 1 describes the distribution of city level variables for 120 cities in Minnesota. The sample average city population is 25,738 and the average per capita market value of city's property is $63,149. Minnesota property tax institutions convert the estimated

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[5] Value here refers to the taxable value of properties, not the market values.

market value of property into a measure of tax base. In practice tax base is a small portion of estimated market value, the exact relationship is not pertinent here.

Equation 4 establishes that per-household property tax revenue and the residential tax share are the two city level variables that determine an individual's tax bill. The per household property tax levy averages $898. Examining the interquartile ranges informs that the difference between the 75th and 25th percentile is $362, or about 44% of the median.

Residential tax share also varies across cities, with an interquartile range of 0.192 or 19 percentage points. As equation 4 indicates an increase in residential tax share from the median to the 75th percentile (a 15% increase in s_{jt}) produces, all else equal, a 15% increase in an individual's city property tax bill.

Table 1 also displays the distribution of the tax bill for the median valued home in each city. The median tax bill for a city's median home is $451 with an interquartile range of $243 or 54% of the median.

Finally the table describes the variation in taxes within cities. The last row of table 1 displays the distribution of the coefficient of dispersion across cities. The coefficient of dispersion is calculated for each city by first calculating, for each home in a city, the absolute value of the percentage difference in a home's tax bill from the city's median home's tax bill. A city's coefficient of dispersion is the average of these absolute percentage differences. If all homes in a city paid exactly the same in property taxes, the city's coefficient of dispersion equal zero. The lowest coefficient of dispersion for any city was 12%, implying that the average absolute difference in a household's tax bill from the median household's tax bill was 12%. The average coefficient of dispersion across cities was 32%.

The coefficient of dispersion of cities' median home's property tax bills is 29% (not shown in table). This is a measure of the variation across cities in median home's tax bills. It first calculates, for each city, the absolute value of the percentage difference between a city's median home's property tax bill and the median of cities' median home's property tax bills. The coefficient of dispersion is the average across cities of these absolute percentage differences. If each city's median home's property tax bill was identical, the coefficient of dispersion would equal zero. The 29% coefficient suggests that there is must as much if not more *within-city* variation than across-city variation in property tax bills. Note that all of the within-city variation in property tax bills is caused by differences in tax shares, rather than differences in the city's total property tax revenue.

Individual Level Variation in Property Taxes

Table 2 displays summary statistics for individual homes across the 120 cities. Again returning to equation 4 we know that the individual level variable that creates differences in individual tax bills is the homestead (tax) ratio. This is on average 1 across the 822,944 homes in the sample. The interquartile range, however, indicates that there are substantial homestead ratio differences across homes in the 120 cities. Going from the median homestead ratio to the 75th percentile ratio produces, all else equal, a 25% increase in an individual's property tax payment. A one standard deviation increase from the mean produces a nearly 50% increase in an household's property tax payment.

The average household city property tax bill is $520 with the interquartile range ($288) that is 63% of the median value. The city tax bill is only a portion of the total property tax bill which includes city, school district, county, and special assessment property taxes. There is substantial variation in the amount of city property tax paid by homeowners across these 120 cities.

What causes this across household variation in the property tax bills? Is the tax bill variation primarily to due to differences in city property revenues or differences in taxshares?

Running the regression

$$ln(T_{ij}) = \alpha + \beta_1 ln(r_j) + \beta_2 ln(h_{ij}) + \beta_3 ln(s_j) + u_i \qquad (6)$$

yields $R^2 = 1$, $\beta_k = 1$ for $k = 1, 2, 3$, and $\hat{\alpha} = 0$. This result comes from equation 4, the three right-hand side variables must explain all of the variation in households' property tax bills. Removing homestead ratio and residential tax share from the regression and calculating the new R^2 provides an understanding of what share of the total variation in households' property tax bills is caused by variation in total property tax revenues.

Running this regression

$$ln(T_{ij}) = \alpha + \beta_1 ln(r_j) + u_i \qquad (7)$$

yields an $R^2 = 0.24$, implying that a substantial share of the total variation in households' property tax bill is caused by things other than cities' property tax revenues.

Variation Over Time

This section uses data from 82 cities with population greater than 5,000 each year from 2000 to 2006. The sample includes all primary residences with estimated market values greater than or equal to $50,000 in each year. These restrictions produce a sample of over 500,000 residential homes. Since data on property tax levies are only available through 2003, imputed tax bills are only calculated for four years (2000-2003).

Table 3 presents summary statistics for the sample. According to equation 5 attention should focus on the percentage change in the tax levy and the percentage change in the tax share. The sum of these components approximates the percentage change in an individual's property tax bill. The first row displays the average tax base (in millions of nominal dollars) of the 82 cities in the sample each year from 2000 to 2006. Average tax base increases over time to over $3 billion in 2006. Row 2 shows the average percentage change in total tax base across the cities; the average percentage change in tax base is around 10% for most years. As the discussion above indicates, however, increases in total tax base do not imply equal increases in tax revenues.

Row 4 displays the average percentage change in city property tax levies, which are one component of the total tax bill. We only observe 3 years of the percentage changes because of data limitations. Although the average percentage change in levy is smaller than the average percentage change in tax base for 2002 and 2003, the standard deviations on the levy changes are relatively large. Row 6 describes percentage changes to the total property tax levy, which includes school district, special district, and county levies in addition to the city levy. The total levy falls in 2002 because of school finance reform.

The second half of Table 3 displays information about the 506,554 parcels of primary residences in the sample. The first row shows the average estimated market value of a parcel, which is increasing over time, although row 2 shows that there is again substantial standard deviation in the percentage changes of estimated market value.

What directly affects tax bills, however, is the tax share displayed in row 3. The tax share is expressed as the amount a taxpayer pays per $100,000 of property tax revenues. Thus in 2001 the average share was $9.66 per $100,000 of revenue. There is substantial variation in the tax share across the sample, which may not be surprising because the sample consists of properties scattered over 82 cities.

Row 4 shows percentage changes in tax bills which, remembering equation 5, correspond directly to percentage changes in actual tax bills. The average percentage change in tax share is negative for all years, but the standard deviation is often at least 6 times as large as the average. In fact, being one standard deviation away from the mean in 2006 implies a percentage change range from over a 5% increase to an approximately 9% decrease. The remaining rows Table 3 show levels and changes in the a parcel's city tax bill and a parcel's total tax bill.

Figure 1 examines for the entire sample the distribution of percentage changes in tax bills and tax shares from 2000 to 2003. The dark line is the estimated density of the percentage changes in tax share and shows that most parcels experience percentage changes between –10% and 10% a range of 20%. Changes in tax shares and changes in levies combine to produce the histogram showing the distribution of percentage changes in the city tax bill. The distribution of tax bill changes appears to represent a rightward shift of the tax share distribution, which demonstrates that most levy changes, unlike tax share changes, are positive. Figures 2, 3, and 4 examine these distributions across different subsets of the population: suburban status, income quartile, and population quartile. These figures suggest that, at least to the naked eye, there are not substantive differences in the distribution of tax share and tax bill changes across subsets of the sample. Suburban taxpayers appear to experience a similar range of tax shares changes to non-suburban taxpayers; taxpayers in high income cities appear to experience a similar range of tax share and levy changes to taxpayers in lower income cities; taxpayers in larger cities appear to experience a similar range of tax share and levy changes as taxpayers in smaller cities. There are, of course, more subtle differences that may be explored in future work.

A Closer Look: Examining Select Cities

It is helpful to examine a few cities more closely to understand exactly how much variation exists within a single city as opposed to across cities. Table 4 shows summary statistics for eight different cities in MN. Among the eight cities are the two largest cities in Minnesota (Minneapolis and St. Paul) as well as two cities with population under 10,000 (Orono and Grand Rapids). Three very wealthy cities appear at the top of the table (Plymouth, Eden Prairie, and Orono), each has a median household income greater than $75,000 and median home values exceeding $190,000. The remaining five cities on the list have more modest income levels and home values.

The median tax share of residential homes varies substantially across the cities and also within each city. The largest cities exhibit small tax shares because a single home is a very small portion of the total tax base. The standard deviations of tax share, reported around the mean rather than the median, represent in almost every case at least 50% of the median tax share, demonstrating substantial variation among residential homes within a city.

Consider, Orono, a very wealthy suburb of Minneapolis. The large standard deviation of the tax share suggests that Orono has not effectively used zoning to equalize tax shares across properties, as works like Hamilton (1975) and Fischel (2001) discuss. Maplewood, however, has a much smaller standard deviation, representing less than 50% of the median tax share. Figures 5 and 6 display the distribution of tax shares for all the sample residential properties in each of the eight cities for 2003. In Figure 6 Grand Rapids and Orono are striking in the spread of their tax share distributions. The remaining cities show much more concentration, although still a substantial range of tax shares.

Returning to Table 4, the last two columns describe the two components that effect the percentage change of taxpayers' property tax bills: tax share and tax levy. The percentages changes are changes from 2002 to 2003, there is no standard deviation for the tax levy change because it is uniform across the city. Except for one city, every single city's standard deviation exceeds its mean change by well over 100%. To put this in perspective consider that if the tax levy in Maplewood increases by 7.05% every residential taxpayer's tax bill increases by 7.05%, all else equal. Thus, a taxpayer in Maplewood reading in the paper that the tax levy increased by 7% might expect her tax bill to increase by approximately 7%. Yet it's likely that her tax bill will increase or even decrease by a much different amount. Taxpayers within one standard deviation of the mean percentage change in tax share fall in a range of tax share changes from approximately –9% to 10%. Again, these percentage changes in tax shares correspond directly to percentage changes in individual tax bills.

Figure 7 displays the 2000-2003 distribution of tax share changes and tax bill changes in

Maplewood and other cities. The histogram shows the wide range in percentage changes in tax bills, from small decreases all the way up to 40% increases in tax bills. This spread is created by the spread in tax share changes. The other seven cities displayed in Figures 7 and 8 exhibit similarly large ranges. St. Paul is interesting because it has limited changes in tax levies over time, thus the distribution of changes in tax bills is almost exactly like the distribution of changes in tax shares.

Conclusion

This research presents evidence on the magnitudes and causes of across household variation in property tax liability at one point in time as well as over time. Across household variation in property taxes is not necessarily a good or bad thing. Within a city, the variation in households' property tax bills comes from differences in the taxable value of individual homes. High-valued homes pay more in property taxes while lower valued homes pay, sometimes substantially, less in property taxes. This likely reflects vertical equity if a home's value is said to reflect a household's permanent income.

Examining horizontal equity across cities is a bit tricky since it's difficult to control for differences in the quality of public services enjoyed by households in different cities. Is it unfair that, holding city revenues constant, the owner of a $100,000 home in one city will pay more in property taxes than an owner of an identically valued home in a city with more total tax base? Since property taxes are a within-city (i.e., jurisdiction) cost-sharing mechanism, across city comparisons seem inappropriate.

Within the city, variation in tax shares and changes in tax shares is substantial. Changes in tax shares alone produce as much or more than 10% increases or decreases in tax bills, even if tax revenues remain constant. This research demonstrates that individual tax bills do vary over time and that this variation is substantial. Policies that focus solely on restricting local government revenues fail to address much of the cause of variation in individual property tax bills over time.

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Tabkes

Table 1:
MN Property Taxes Across Cities, 2002
(Standard Deviations in Parentheses)

Variable	Mean	Min	p25	Median	p75	Max
Population	25,738	5,010	7,987	13,525	24,387	382,700
	(44,968)	-	-	-	-	-
Per capita total mkt value	$63,149	20,482	41,153	59,378	77,927	236,003
	(29,943)	-	-	-	-	-
Per capita total tax base	$701	239	467	635	827	2,040
	(319)	-	-	-	-	-
City Residential Tax Share	.596	.223	.498	.602	.69	.884
	(.14)	-	-	-	-	-
City Residential Market Share	.701	.34	.639	.706	.771	.90
	(.10)	-	-	-	-	-
City levy (thousands)	$6,658	487	1,758	2,898	6,771	137,360
	(13,876)	-	-	-	-	-
Per household city levy	898	274	662	823	1,024	2,887
	(425)	-	-	-	-	-
Median home city tax bill	$470	154	344	451	587	1,255
	(178)	-	-	-	-	-
Within-City Coefficient of Dispersion, Taxes	32%	12%	26%	31%	38%	85%
	(10)	-	-	-	-	-
Cities	120					

Source: Author's tabulations based on Minnesota Department of Revenue Data.

The year is the assessment year, the year prior to the year in which taxes are payable. The sample contains cities within Minnesota with population of at least 5,000 in 2002. Some cities were removed from sample for data reliability issues. Columns represent the average (across cities), minimum, 25^{th} percentile, median, 75th percentile, and maximum of each variable. Residential tax share and market share variables represent the average share of tax base or market value that a city derives from residential homestead property. Market value differs from taxable value because of the Minnesota class rate system. The *Coefficient of Dispersion, Taxes* is the average absolute percentage deviation of a city's households' tax bills from the median household's tax bill.

Table 2:
MN Property Taxes Across Homes in Cities, 2002
(Standard Deviations in Parentheses)

Variable	Mean	Min	p25	Median	p75	Max
Estimated Market Value	$174,349	25,000	117,000	153,500	201,600	9,278,000
	(110,519)	-	-	-	-	-
Taxable Value	$1,561	16	997	1,362	1,830	85,329
	(1034)	-	-	-	-	-
Tax Share City Taxes (per $1,000)	.088	0	.018	.047	.107	5.617
	(.119)	-	-	-	-	-
Market Share City Taxes (per $1,000)	.103	.001	.024	.058	.129	5.156
	(.131)	-	-	-	-	-
Homestead Tax Ratio	1.011	.014	.727	.913	1.16	21.888
	(.523)	-	-	-	-	-
Homestead Market Ratio	1.011	.058	.742	.916	1.148	21.605
	(.486)	-	-	-	-	-
City Tax Bill	$520	15	332	455	620	16,770
	(333)	-	-	-	-	-
Total Tax Bill	$1,926	31	1,272	1,693	2,244	84,435
	(1,229)	-	-	-	-	-
Homes	822,944					

Source: Author's tabulations based on Minnesota Department of Revenue Data.

The year is the assessment year, which is the year prior to the year in which taxes are payable. The sample contains homestead properties within Minnesota cities with population of at least 5,000 in 2002. Some cities were removed from sample for data reliability issues. Homes with estimated market value less than $25,000 were excluded. Columns represent the average (across homes), minimum, 25th percentile, median, 75th percentile, and maximum of each variable. Market value differs from taxable value because of the Minnesota class rate system and various property tax exemptions. Total tax bill does not include special assessments, but includes city, school district, and county property taxes. Homestead ratio is the ratio of a home's value to the average home value in the city.

Table 3:
Parcel Data Summary Statistics: Means
(Standard Deviations in Parentheses)

Variable	2000	2001	2002	2003	2004	2005	2006
		City Level Statistics					
taxbase *(millions)*	1,557	1,832	2,086	2,309	2,541	2,793	3,055
	(2,635)	(3,107)	(3,513)	(3,877)	(4,241)	(4,697)	(5,055)
%Δ taxbase	-	22.31	14.29	11.09	10.99	9.74	11.3
	-	(49.91)	(4.98)	(4.14)	(3.93)	(3.13)	(13.74)
citylevy *(per capita)*	201	246	250	267	-	-	-
	(89)	(112)	(111)	(111)	-	-	-
%Δ citylevy	-	23.66	2.8	8.07	-	-	-
	-	(24.59)	(10.86)	(7.46)	-	-	-
totlevy *(per capita)*	1,112	888	918	958	-	-	-
	(465)	(354)	(360)	(364)	-	-	-
%Δ totlevy	-	-19.51	4.13	4.98	-	-	-
	-	(9.17)	(8.26)	(4.53)	-	-	-
cities	82	82	82	82	82	82	82
		Parcel Level Statistics					
totalemv	146,111	166,401	188,309	206,988	225,111	242,990	258,662
	(87,850)	(100,795)	(114,760)	(126,102)	(136,921)	(149,596)	(163,328)
%Δ totalemv	-	14.41	13.61	10.27	8.93	7.75	6.24
	-	(11.92)	(8.96)	(8.26)	(6.7)	(6.53)	(6.22)
share	10.09	9.66	9.47	9.30	9.13	8.95	8.66
	(12.98)	(12.33)	(12.01)	(11.69)	(11.41)	(11.21)	(10.81)
%Δ share	-	-1.37	-.46	-.35	-1.07	-1.62	-2.84
	-	(11.8)	(7.63)	(7.4)	(6.39)	(6.03)	(6.48)
citybill	558	642	677	716	-	-	-
	(374)	(384)	(414)	(436)	-	-	-
%Δ citybill	-	19.6	5.98	6.48	-	-	-
	-	(19.6)	(5.98)	(6.48)	-	-	-
totbill	3,222	2,461	2,623	2,723	-	-	-
	(3,222)	(2,461)	(2,623)	(2,723)	-	-	-
%Δ totbill	-	-135.99	29.08	18.36	-	-	-
	-	(-135.99)	(29.08)	(18.36)	-	-	-
parcels	506,554	506,554	506,554	506,554	506,554	506,554	506,554

Note: Standard deviations are in parentheses. Authors tabulations based on data from Minnesota Department of Revenue. Included in the sample are all parcels classified as primary residences with estimated market values greater than $50,000 in cities with population greater than or equal to 5,000. *taxbase* is in millions of dollars. *emv* is estimated market value; *share* is a parcel's tax share. *totlevy* is the total property tax levy and it falls dramatically in 2001 due to school district finance reform. These calculations use estimated market value rather than net tax capacity to calculate tax base and tax shares. See the paper for details.

Table 4:
Select Minnesota Cities: Summary Statistics (2003)
(Standard Deviations in Parentheses)

			Medians			Means	
City	Pop	Income	Home Value	Tax Share	Per Capita Levy	%Δ Share	%Δ Levy
PLYMOUTH	65,894	77,008	191,100	3.2 (1.45)	248	.1 (5.17)	2.15
EDEN PRAIRIE	54,901	78,328	193,600	3.35 (2.22)	409	-.12 (4.31)	-1.84
ORONO	7,538	88,314	329,700	22.55 (29.39)	410	-1.8 (8.78)	2.37
GRAND RAPIDS	7,764	28,991	76,600	23.9 (9.01)	489	-.39 (3.91)	2.69
MOORHEAD	32,177	34,781	84,100	8.86 (3.33)	143	-4.16 (2.46)	2.79
MAPLEWOOD	34,947	51,596	125,900	5.96 (1.86)	308	.44 (8.71)	7.05
MINNEAPOLIS	382,295	37,974	113,700	.68 (.55)	387	3.24 (6.03)	7.78
ST PAUL	287,151	38,774	105,000	.94 (.59)	176	1.18 (11.61)	-.37

Note: Standard deviations are in parentheses. Authors tabulations based on data from Minnesota Department of Revenue. Included in the sample are all parcels classified as primary residences with estimated market values greater than $50,000 in cities with population greater than or equal to 5,000. *Home Value* is the median home value in the 2000 Census and *Income* is median household income from the Census. Population is the population in 2003. Percentage changes are calculated using the change from 2002 to 2003.

FIGURE CAPTIONS

Figure 1: Distribution of Percentage Changes in Tax Shares and Tax Bills for all Sample Parcels

Figure 2: Distribution of % Changes in Suburbs and Not in Suburbs

Figure 3: Distribution of % Changes by Income Quartile

Figure 4: Distribution of % Changes by Population of City

Figure 5: Distribution of Tax Shares (2003) in Select Cities

Figure 6: Distribution of Tax Shares (2003) in Select Cities (continued)

Figure 7: Distribution of % Changes in Select Cities

Figure 8: Distribution of % Changes in Select Cities