Evidence on the Incidence of Residential Property Taxes Across Households

Abstract - Property taxes are assessed by local taxing jurisdictions, including the county, city, and school district in which a property is located. This study examines the incidence of the residential property tax burden across 357,264 owner-occupied homes in Dallas County, Texas. Progressivity indices are computed for total property taxes combined and for each jurisdictional tax (county, city, and school district). After allowing for the federal income tax deduction of property taxes, total property taxes combined are approximately proportional. County and school taxes are proportional to slightly progressive, while city taxes are moderately regressive. Analysis suggests that tax rates contribute to the regressivity of city taxes because lower-income cities tend to have relatively higher tax rates. The homestead exemption affects the incidence of city and school taxes, but in opposite ways. It makes city taxes more regressive, but makes school taxes more progressive. The over-65 exemption increases progressivity for all three jurisdictional taxes.

INTRODUCTION

Property taxes have always been the primary tax of local governments in the U.S. (Wallis, 2001). For fiscal year 1999, local governments in the U.S. collected total tax revenues of $316 billion, with property tax revenues representing 72 percent ($228 billion) of that amount. Local governments in the state of Texas collected total tax revenues of $23.6 billion in 1999, with 80 percent ($18.8 billion) of that amount being property tax revenues. Property taxation has long been relied on to fund local government needs, even though policymakers generally believe that property taxes are regressive (Wassmer, 1993; Musgrave, 2001). Despite this widespread belief, prior studies provide inconclusive evidence on the incidence of the property tax, with some studies finding property taxes to be regressive, and others finding them to be progressive (Suits, 1977; Phares, 1980; Metcalf, 1994).

This paper uses property-specific data to provide evidence on the incidence of residential property taxes assessed on homeowners, and to examine how institutional features (such as exemption amounts and rates) affect property tax incidence. Although the property tax’s design is similar across local taxing jurisdictions, the institutional features differ. Therefore, I examine the incidence of county, city, and school district taxes separately.
The 2000 Certified Appraisal Master File from the Dallas Central Appraisal District provides a sample of 357,264 owner-occupied homes in Dallas County, Texas. The sample properties have a total market value of approximately $44.7 billion, and paid a little over $850 million in total property taxes for the 2000 tax year. The mean average property value is $125,057, and the mean average property tax payment is $2,381. The majority of this amount is for school taxes (about 59 percent). County and city taxes comprise about 18 percent and 23 percent, respectively.

The results of this study are as follows. After taking into account the deductibility of property taxes for federal income tax purposes, results suggest that total property taxes for all jurisdictions combined are approximately proportional. County and school taxes are proportional to slightly progressive, while city taxes are moderately regressive.

I examine the effect of three institutional features on property tax incidence: tax rates, the homestead exemption, and the exemption for homeowners age 65 and older. Tax rates have little-to-no effect on the incidence of county and school taxes, but do contribute to the regressivity of city taxes. Lower-income cities tend to have higher tax rates than middle- and high-income cities. The homestead exemption affects the incidence of city and school taxes, but in opposite ways. It makes city taxes more regressive because middle-income cities have smaller homestead exemption amounts than either low- or high-income cities. In contrast, the homestead exemption makes school taxes more progressive because the exemption amount (as a percentage of property value) decreases as property values increase. The over-65 exemption increases progressivity for all three jurisdictional taxes. This occurs because there is a disproportionate number of over-65 homeowners in the bottom of the income distribution, and because the exemption amount decreases as property values increase.

By providing evidence on property tax incidence and the distributional effects of specific property tax features, this study can help educate policymakers and other parties interested in property tax reform. Property taxes are one of the most unpopular taxes (Dearborn, 1993; Baer, 1998), and are frequently cited as being unequally distributed across local jurisdictions. While these perceived iniquities have led politicians and voters to press for a variety of property tax limitations, there remains little evidence and understanding of how these features combine to affect property tax incidence (Netzer, 2001).

This study extends and improves upon prior research on property tax incidence in several ways. First, this study uses property-level data to directly measure property tax incidence. In general, other studies use estimates of total U.S. property tax collections from the national income accounts data. Second, this study examines property tax incidence separately for counties, cities, and school districts. Examining these taxes separately is important because it enables me to determine how tax rates, exemptions, and differences in income across different cities and school districts affect the property tax distribution. Prior studies lack the detailed information required for this level of analysis. Last, this study estimates the effect of federal tax deductibility on property tax incidence.

The remainder of the paper is organized as follows. The next section reviews prior research that examines property tax inci-

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1 This study focuses only on persons who own their home and does not address the incidence of property taxes for renters (for example, see Carroll and Yinger (1994)). Property taxes are also levied on non-residential real estate, including commercial, industrial, and agricultural properties. I do not address the incidence of these taxes.
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dence. Section 3 describes the data and sample, including descriptive statistics. Section 4 presents the results, and Section 5 presents sensitivity analysis. Section 6 examines the features of the property tax that affect its incidence. The final section presents conclusions.

PROPERTY TAXES

Local governments in all 50 states levy property taxes, and an additional 34 states levy a state-level property tax (Lorelli, 2001). The property tax liability owed to a taxing jurisdiction is equal to the jurisdiction’s tax rate times the property’s taxable value. Taxable value is equal to the property’s assessed market value (determined by the local appraisal district), minus any allowable exemptions. It is common for state governments to enact one set of property tax features that apply to all local governments (for example, a standard exemption amount). In Texas, local governments determine their own exemption amounts, subject to certain state-imposed minimums.

The two most common exemptions are the homestead exemption and the over-65 exemption. The homestead exemption is only available for the residential property where the homeowner resides. Neither the homeowner nor spouse can claim a homestead exemption on any other property, including vacation homes or secondary residences. The over-65 exemption is available for homeowners aged 65 or older. These households are less likely to have school-aged children, may be light users of public services, and are more likely to have smaller incomes. Therefore, for each jurisdiction, a homeowner’s property tax liability is calculated as follows:

\[ \text{PropTax}_{ij} = \text{TaxValue}_{ij} \times t_j = (AMV_i - HS_{ij} - \text{over65}_{ij}) \times t_j, \]

where

- \( \text{PropTax}_{ij} \) = property tax liability of residential property \( i \) to taxing jurisdiction \( j \),
- \( \text{TaxValue}_{ij} \) = taxable value of residential property \( i \) for taxing jurisdiction \( j \)'s purposes,
- \( AMV_i \) = assessed market value of residential property \( i \), determined by the local appraisal district,
- \( HS_{ij} \) = amount of homestead exemption for residential property \( i \) allowed by taxing jurisdiction \( j \),
- \( \text{over65}_{ij} \) = amount of over-65 exemption for residential property \( i \) allowed by taxing jurisdiction \( j \), and
- \( t_j \) = jurisdiction \( j \)'s tax rate.

In some instances, a tax burden can be shifted from one taxpayer to another so that the tax’s statutory incidence differs from its economic incidence. Economists have posited three main theories about the economic incidence of property taxes: the traditional view, the new (or capital tax) view, and the benefit view. In general, these three theories make different predic-

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2 There is also a disability homestead exemption available to persons who meet the definition of disabled under the Federal Old-Age, Survivor’s and Disability Insurance Act. If a person qualifies for both the over-65 and disability exemptions, s/he can only choose one. The 2000 County Report of Property Values (obtained from the Texas State Comptroller’s office) indicates that 88,697 households in Dallas County claimed the over-65 exemption, while only 9,535 claimed the disability exemption.

3 In addition to residential-related exemptions, Texas state law specifies that a homestead’s assessed market value (before exemptions) cannot be increased by more than 10 percent per year, times the number of years since the last appraisal. This 10 percent cap expires if the home is sold, and the homestead’s value can then be increased by more than 10 percent if necessary. To assess the impact of the 10 percent cap on tax incidence, I re-estimate the Suits indices assuming there is no legislative cap on annual appraisal increases. Results are essentially identical to those reported in the paper.

4 See Zodrow (2001) and Fullerton and Metcalf (2002) for a discussion and comparison of the three views of property tax incidence.
tions about the taxpayer who ultimately bears the property tax burden. The traditional view argues that the property tax is borne by both property owners and tenants. To eliminate possible shifts in the tax burden, I eliminate renter-occupied housing and include only owner-occupied, residential properties. The new view argues that the property tax is borne primarily by the owners of capital (Fullerton and Metcalf, 2002). For purposes of this study, I assume that residential property owners are the “owners of capital,” and that home ownership proxies for capital ownership. The benefit view posits that the property tax is not a tax but a user charge for local public services. Because the property tax is a voluntary price paid for goods and services received, the benefit view argues that tax incidence is irrelevant (Fullerton and Metcalf, 2002). The benefit view, however, depends on strong assumptions about zoning and taxpayer mobility (Metcalf, 1994; Zodrow, 2001), and its assumptions are likely to be satisfied only in suburban areas, if at all (Fischel, 1995; Ladd, 1998, pp. 34–5). In this study, I assume that tax incidence is important and that the property tax burden falls on the property owner of owner-occupied housing.

Studies examining property tax incidence generally use the Suits index to measure progressivity (Suits, 1977). The Suits index estimates a tax system’s progressivity by measuring the relation between the cumulative percentage of the tax burden and the cumulative percentage of total income. The index can vary from −1 to +1, with −1 indicating maximum regressivity and +1 indicating maximum progressivity. An index value of 0 indicates a proportional tax.

Prior research provides conflicting conclusions on property tax incidence, reporting Suits indices ranging from −0.13 to 0.23. The differences in results likely arise because of differences in the years examined, in the income measure used (annual vs. lifetime), and in the method used to allocate taxes to a sample of households. Suits (1977) examines property tax incidence for 1966 and 1970 using the total residential and commercial property tax collections reported in the national income accounts (Survey of Current Business, U.S. Department of Commerce). The tax burden of approximately $25–30 billion is allocated across a stratified sample of 30,000 households using the Survey of Current Business and an IRS file of 87,000 individual tax returns. Suits calculates an index value of 0.23 for 1966, and 0.18 for 1970. These indices suggest that property taxes are progressive, and that their progressivity decreased over the four-year period examined.

Phares (1980) also uses property tax data from the national income accounts. He allocates approximately $55 billion of residential and commercial property taxes across a stratified sample of about 200,000 households using the Survey of Income and Education, the Consumer Expenditure Survey, and an IRS file of 206,000 individual tax returns. He estimates Suits indices for each of the 50 states for 1977, and finds indices ranging from −0.23 to −0.06, with an average value of −0.13. The Suits index for Texas is −0.06. In contrast to Suits (1977), Phares’ results suggest that the property tax is regressive.

Metcalf (1994) examines the incidence of residential property taxes using the Consumer Expenditure Survey for 1984 and

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5 Using home ownership as a measure of capital ownership seems to be a reasonable assumption for two reasons. First, I do not examine taxes imposed on non–residential (e.g., commercial and industrial) property, which are more likely to be shifted to owners of non–residential capital. Second, residential property values are correlated with capital income measures. For example, in the 1998 Texas data file, real estate taxes have a greater than 90 percent correlation with taxable interest income, tax–exempt interest income, dividends, and capital gains (all potential proxies for capital ownership). For the zip code data, residential property values have a greater than 70 percent correlation with taxable interest income. (The zip code data does not include details of the other income types.)
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1989. Of the 1,600 households surveyed, between 20 and 35 percent of the homeowners in different regions of the U.S. reported no property tax liability (renters), and Metcalf (1994) must estimate a property tax amount for each of these households. To compute the Suits indices, Metcalf (1994) uses two measures of income: annual income and consumption. Using annual income, Metcalf (1994) finds that the property tax is regressive in both 1984 and 1989 (Suits indices of –0.09 and –0.11, respectively). Using a consumption–based definition of income, however, his evidence suggests that property taxes are less regressive in 1984 (Suits index of –0.04) and slightly progressive in 1989 (Suits index of 0.01).

DATA AND SAMPLE

The 2000 Certified Appraisal Master File, purchased from the Dallas Central Appraisal District (DCAD), contains information for 623,032 residential properties in Dallas County. DCAD is responsible for appraising all properties in Dallas County. From the total file, I delete properties that are not classified as single–family residences (114,802 observations), properties that are under construction or in a special taxing district (12,301 observations), properties that are in cities with less than 100 properties or are not classified as within a city or school district (19,567 observations), and properties with no homestead exemption (119,098 observations).6 This results in a final sample of 357,264 owner–occupied properties. Each property is a single–family residence that is classified as a homestead, and is taxed by three separate taxing jurisdictions: Dallas County, and the city and school district in which the residence is located. The final sample includes residential properties from 25 cities and 15 school districts. The largest city and school district are the city of Dallas and the Dallas Independent School District (ISD), with 157,804 and 137,459 properties, respectively.

Dallas County provides a 20 percent homestead exemption ($5,000 minimum), a $69,000 over–65 exemption, and a 0.505667 percent tax rate.7 If a taxing jurisdiction offers a homestead exemption, the State of Texas requires that the minimum amount be $5,000. Of the 25 cities, 15 do not allow a homestead exemption. Seven of the cities (including Dallas) allow a 20 percent homestead exemption. One city allows a 10 percent homestead exemption, and two cities allow a 1 percent homestead exemption. All of the cities provide for an over–65 exemption. The amounts range from a low of $3,000 to a high of $75,000, and the median amount is $30,000. (The over–65 exemption is $64,000 for the city of Dallas.) The property tax rates also vary widely across cities, with a range from 0.2462 to 0.7900 percent. The median tax rate is 0.6675 percent.

The state of Texas mandates that all school districts must grant a $15,000 homestead exemption. Five of the 15 school districts in the final sample (including Dallas ISD) also offer a percentage–based homestead exemption that a taxpayer receives in addition to the $15,000 mandatory exemption amount. The percentages range from 10 to 20 percent of a property’s market value. All school districts provide for an over–65 exemption, with amounts ranging from $10,000 to $45,000. The median over–65 exemption is $10,000, and Dallas ISD’s over–65 exemption is the largest ($45,000). School tax

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6 Homestead exemptions can only be claimed for the residential property where the homeowner resides. I delete properties with no homestead exemption because I cannot assume that the homeowner occupies the property (i.e., the homeowner may be using it as rental property or as a vacation home).

7 The total county tax rate is the sum of tax rates from the following jurisdictions: Dallas County (0.196), School Equalization (0.005667), Parkland Hospital (0.254), and Dallas County Community College (0.05).
rates are about three times the amount of the county and city tax rates, and do not vary much across school districts (from 1.2467 to 1.6950 percent). The median rate is 1.548 percent.

Table 1, Panel A, provides summary information on the sample’s total property values relative to all residential properties in Dallas County. The 357,264 sample properties have a total market value of almost $44.7 billion. Relative to all residential properties in Dallas County, the sample represents 61.3 percent of all properties and 75.3 percent of the total market value. The sample’s taxable values range from $29.8 billion to $33.6 billion. The taxable values for city and school district purposes are slightly larger than for county purposes because of the smaller exemptions that cities and school districts provide. Panel B provides information on the total property taxes paid by the sample properties for the year 2000, and the classification of those taxes as paid to the county, city, or school district. In total, the sample properties paid a little over $850 million in property taxes, with $501 million (59.0 percent) going to the school districts. The remaining property taxes were paid to cities ($198 million) and to Dallas County ($151 million).

Table 2 presents descriptive statistics for the sample properties individually. The first row shows that the mean assessed market value for all properties is $125,057, while the median value is $87,620. Although the range of property values is wide, one–half of the sample homes have an assessed value between $61,140 and $135,160. The next three rows of Table 2 provide information on the taxable values for county, city, and school district purposes. The median county and school district taxable values are both about $62,000, while the median city taxable value is $71,448. The larger taxable value for cities arises because the majority of cities (15 of 25) do not allow a homestead exemption. In contrast, the county and all school districts provide a homestead exemption. The minimum taxable value for all three jurisdictions is zero, reflecting the fact that the over–65 exemption can reduce a property’s taxable value to no less than zero.

The last four rows of Table 2 describe property taxes paid. On average, home-

| TABLE 1 |
| SUMMARY INFORMATION ON TOTAL PROPERTY VALUES AND PROPERTY TAXES PAID |
| Panel A: Total Property Values of Sample | | |
| Sample | As Reported by Dallas County | Sample as a Percentage of Dallas County |
| Number of Residential Properties | 357,264 | 582,394 | 61.3% |
| Market Value | $44,678,424,130 | $59,340,997,920 | 75.3% |
| Taxable Values: | | |
| County | $29,797,148,307 | $43,742,651,998 | 68.1% |
| City | 33,599,311,888 | 51,365,353,873 | 65.4 |
| School District | 31,843,223,054 | 47,172,441,676 | 67.5 |
| Panel B: Total Property Taxes Paid by Sample | | |
| Amount | As a Percentage of Total Property Taxes |
| County Taxes | $151,141,679 | 17.7% |
| City Taxes | 197,910,080 | 23.3 |
| School Taxes | 501,548,640 | 59.0 |
| Total Property Taxes | $850,600,399 | 100.0% |

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Table 2: Descriptive Statistics for Individual Properties (N = 357,264)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Median</th>
<th>StDev</th>
<th>Min</th>
<th>Q1</th>
<th>Q3</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Value</td>
<td>$125,057</td>
<td>$87,620</td>
<td>$164,076</td>
<td>$2,700</td>
<td>$61,440</td>
<td>$135,160</td>
<td>$16,360,790</td>
</tr>
<tr>
<td>Taxable Value:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>County</td>
<td>$83,404</td>
<td>$61,777</td>
<td>$123,161</td>
<td>$0</td>
<td>$31,288</td>
<td>$97,176</td>
<td>$8,783,200</td>
</tr>
<tr>
<td>City</td>
<td>94,046</td>
<td>71,448</td>
<td>123,893</td>
<td>0</td>
<td>39,136</td>
<td>111,704</td>
<td>8,783,200</td>
</tr>
<tr>
<td>School District</td>
<td>89,131</td>
<td>62,770</td>
<td>129,002</td>
<td>0</td>
<td>34,320</td>
<td>102,893</td>
<td>9,866,100</td>
</tr>
<tr>
<td>Property Taxes:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>$2,381</td>
<td>$1,723</td>
<td>$3,260</td>
<td>$0</td>
<td>$942</td>
<td>$2,777</td>
<td>$255,722</td>
</tr>
<tr>
<td>County</td>
<td>423</td>
<td>313</td>
<td>623</td>
<td>0</td>
<td>160</td>
<td>492</td>
<td>44,414</td>
</tr>
<tr>
<td>City</td>
<td>554</td>
<td>434</td>
<td>659</td>
<td>0</td>
<td>244</td>
<td>673</td>
<td>58,628</td>
</tr>
<tr>
<td>School District</td>
<td>1,404</td>
<td>982</td>
<td>2,026</td>
<td>0</td>
<td>537</td>
<td>1,629</td>
<td>152,681</td>
</tr>
</tbody>
</table>

Owners paid property taxes totaling $2,381 (mean) or $1,723 (median) for the 2000 tax year. One–half of the homeowners paid between $942 and $2,777. On average, homeowners paid $1,404 for school taxes, $423 for county taxes, and $554 for city taxes.

Results

I use the Suits index to measure property tax progressivity. The Suits index (5) is constructed from a graph of the cumulative tax burden (y axis) against cumulative income (x axis):

$$S = 1 - \frac{\sum_{k=1}^{10} \frac{1}{2} (PT_k + PT_{k-1})(Y_k - Y_{k-1})}{5,000}$$

where

- $PT_k =$ cumulative percent of property tax burden for population deciles 1 through k, and
- $Y_k =$ cumulative percent of total income for population deciles 1 through k.

Negative index values indicate a regressive tax, 0 indicates a proportional tax, and positive values indicate a progressive tax.

Measuring Household Income

The first step in calculating $S$ is to rank the sample households according to income. Lifetime income measures are preferable to annual income measures because lifetime measures are less subject to temporary fluctuations (Metcalf, 1994, pp. 65–6), and because individuals are likely to make consumption decisions based on lifetime income and not annual income (Fullerton and Metcalf, 2002). Consistent with prior research (Poterba, 1989, 1991; CBO, 1990; Metcalf, 1994), I use consumption as a proxy for lifetime income, and use residential property value to measure consumption. To calculate $S$, I rank households according to residential property value, divide them into deciles, and use cumulative property value as the measure of $Y$ in equation [2] above.

I use a property’s assessed market value (available from the DCAD file) to proxy for its market value. Because $S$ is based on property value rankings rather than absolute values, differences between a property’s assessed market value and its actual market value should not bias $S$ unless assessed–to–actual market value varies systematically with value. The main reason for differences between assessed

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8 Assessed market value used for ranking purposes is the DCAD market value without regard to the legislative cap, if applicable (see footnote 3 above).
value and market value is infrequent assessment (O’Sullivan, Sexton, and Sheffrin, 1995, p. 37). If property values are increasing over time (as in Dallas County), then properties with less frequent assessments will generally have lower assessment ratios. To examine whether the frequency of assessment varies systematically across property values for this study’s sample, I compute the average appraisal lag across property value deciles. Appraisal lag is defined as the most current appraisal year minus the prior appraisal year.

Results suggest that lower-value properties are assessed less frequently than higher-value properties (the correlation coefficient between appraisal lag and property value is –0.229, and the mean appraisal lag monotonically decreases across the ten property value deciles). If infrequent assessments lead to lower assessment ratios, then the DCAD assessment practices may cause assessment ratios to be lower for low-value properties than for high-value properties. Accordingly, the Suits indices may understate property tax progressivity somewhat. In the sensitivity analysis section, I examine the effects on the Suits index of this possible measurement error in appraisal values.

**Measuring the Property Tax Burden**

The second step in computing \( S \) is to determine the property tax burden for each household. Property taxes are deductible for federal income tax purposes, thereby decreasing the net tax burden of those taxpayers who can itemize. To allow for the effect of the federal tax deduction on property tax incidence, I compute a measure of the expected net property tax burden for each household (i.e., the property tax burden after deducting the expected federal income tax benefit due to itemizing). This expected net property tax payment (\( \text{NetPropTax} \)) is calculated as:

\[
\text{NetPropTax}_i = \text{PropTax}_{ij} \cdot p_r(\text{item}) \cdot (1 - MTR_{ij}) + \text{PropTax}_{ij} \cdot (1 - p_r(\text{item})),
\]

where

\( \text{PropTax}_{ij} = \) actual property taxes paid by household \( i \) to taxing jurisdiction \( j \),

\( p_r(\text{item}) = \) probability that household \( i \) itemizes property taxes on its federal income tax return, and

\( MTR_{ij} = \) household \( i \)'s marginal tax rate.

I then use \( \text{NetPropTax} \) as the measure of \( PT \) in equation [2] above.

The probability that a household itemizes depends upon the household’s income level. Because information about income is not publicly available for individual households, I estimate income for each household using the Internal Revenue Service 1998 Zip Code Data File (the most current year available). This file provides aggregate AGI and number of returns, by zip code. There are 212 zip codes in the sample, with an average of 1,685 properties in a zip code. For each zip code, I estimate the average AGI per household (aggregate AGI divided by number of returns). For the sample households, the AGI estimates range from $21,668 to $671,866, with a median value of $49,825. Both the mean and median AGI values monotonically increase across property value deciles, and the Spearman correlation coefficient between property value and AGI is 0.70.

Each household’s AGI estimate is then matched with its corresponding AGI bracket from the Internal Revenue Service

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9 The mean (median) appraisal lag is 7.8 (8) years for the lowest decile and 3.5 (2) years for the highest decile. Appraisal lags are significantly different across deciles (\( \alpha < 0.001 \) using the Kruskal–Wallis test). The Kruskal–Wallis test is a nonparametric test that tests whether the distribution of a variable is the same across the different deciles. No assumptions about the actual form of the probability distributions are required (Hollander and Wolfe, 1973).
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1998 Texas Data File. For each of 12 different AGI brackets, this file provides (1) the average income tax liability, and (2) the percentage of taxpayers that report real estate taxes on their Form 1040, Schedule A. Information from the corresponding AGI bracket is used to calculate \( MTR_i \) and \( pr_{(item)} \) for each household. For the sample, \( pr_{(item)} \) ranges from 0.09 to 75.1 percent. These values are used in equation [3] to provide an estimate of the property tax burden for each household, after deducting the expected federal income tax benefit due to itemizing. It should be noted that this method of estimating household income fails to capture variations in the probability of itemizing and in marginal tax rates that exist across households within a given zip code. For example, to the extent a high-income household lives in a low-income neighborhood, the estimate of \( pr_{(item)} \) and \( MTR \) for that household will be too low. I explore the effects of measurement error in a later section.

Results

Table 3, Panel A, presents the median property value, the percentage of property value owned, and the percentage of net property taxes paid by each decile. Households in the lowest decile have a median property value of $30,420, while those in the highest decile have a median property value of $322,095. Panel A, column 3, shows that the wealthiest 20 percent of the households (deciles 9 and 10) own 49.3 percent of total property value, and paid 49 percent of the total net property tax burden. (They paid 49.9, 45.1, and 50.3 percent of county, city, and school taxes, respectively.) Panel B of Table 3 shows the cumulative percentages of property values and net property tax payments by decile. For example, the poorest 20 percent of households own 2.3% of total property value and pay 1.3% of total net property taxes. The wealthiest 20 percent of households own 34.7% of total property value and pay 33.5% of total net property taxes.

<table>
<thead>
<tr>
<th>Sample Decile</th>
<th>Median Property Value</th>
<th>Total Property Taxes</th>
<th>County Taxes</th>
<th>City Taxes</th>
<th>School Taxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$30,420</td>
<td>1.3%</td>
<td>1.8%</td>
<td>1.9%</td>
<td>0.9%</td>
</tr>
<tr>
<td>2</td>
<td>49,100</td>
<td>3.2%</td>
<td>4.6%</td>
<td>5.0%</td>
<td>4.2%</td>
</tr>
<tr>
<td>3</td>
<td>61,440</td>
<td>4.4%</td>
<td>5.8%</td>
<td>6.3%</td>
<td>5.6%</td>
</tr>
<tr>
<td>4</td>
<td>72,450</td>
<td>5.7%</td>
<td>6.9%</td>
<td>7.5%</td>
<td>6.8%</td>
</tr>
<tr>
<td>5</td>
<td>82,500</td>
<td>6.6%</td>
<td>7.5%</td>
<td>8.6%</td>
<td>8.0%</td>
</tr>
<tr>
<td>6</td>
<td>93,360</td>
<td>7.7%</td>
<td>8.1%</td>
<td>9.1%</td>
<td>10.0%</td>
</tr>
<tr>
<td>7</td>
<td>109,730</td>
<td>8.8%</td>
<td>9.6%</td>
<td>10.0%</td>
<td>11.0%</td>
</tr>
<tr>
<td>8</td>
<td>135,160</td>
<td>10.9%</td>
<td>11.7%</td>
<td>11.7%</td>
<td>11.8%</td>
</tr>
<tr>
<td>9</td>
<td>179,210</td>
<td>14.6%</td>
<td>15.5%</td>
<td>15.5%</td>
<td>15.6%</td>
</tr>
<tr>
<td>10</td>
<td>322,095</td>
<td>34.7%</td>
<td>33.5%</td>
<td>34.8%</td>
<td>34.7%</td>
</tr>
</tbody>
</table>

Panel B: Cumulative Percentages

<table>
<thead>
<tr>
<th>Sample Decile</th>
<th>Median Property Value</th>
<th>Total Property Taxes</th>
<th>County Taxes</th>
<th>City Taxes</th>
<th>School Taxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$30,420</td>
<td>2.3%</td>
<td>1.3%</td>
<td>1.8%</td>
<td>1.9%</td>
</tr>
<tr>
<td>2</td>
<td>49,100</td>
<td>6.2%</td>
<td>4.5%</td>
<td>5.3%</td>
<td>5.8%</td>
</tr>
<tr>
<td>3</td>
<td>61,440</td>
<td>11.2%</td>
<td>8.9%</td>
<td>9.9%</td>
<td>10.8%</td>
</tr>
<tr>
<td>4</td>
<td>72,450</td>
<td>16.9%</td>
<td>14.7%</td>
<td>15.5%</td>
<td>17.1%</td>
</tr>
<tr>
<td>5</td>
<td>82,500</td>
<td>23.5%</td>
<td>21.6%</td>
<td>22.1%</td>
<td>24.6%</td>
</tr>
<tr>
<td>6</td>
<td>93,360</td>
<td>31.0%</td>
<td>29.7%</td>
<td>29.7%</td>
<td>33.2%</td>
</tr>
<tr>
<td>7</td>
<td>109,730</td>
<td>39.8%</td>
<td>39.3%</td>
<td>38.8%</td>
<td>43.2%</td>
</tr>
<tr>
<td>8</td>
<td>135,160</td>
<td>50.7%</td>
<td>51.0%</td>
<td>50.1%</td>
<td>54.9%</td>
</tr>
<tr>
<td>9</td>
<td>179,210</td>
<td>65.3%</td>
<td>66.5%</td>
<td>65.2%</td>
<td>70.4%</td>
</tr>
<tr>
<td>10</td>
<td>322,095</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Suits Index: 0.006 0.012 -0.047 0.026

\(^{1}\)This table uses net property tax payments (NetPropTax) as the measure of \( PT \) in equation [2]. NetPropTax is the household’s estimated property tax burden after deducting the expected federal income tax benefit due to itemizing.
percent of households own 6.2 percent of total property value, but paid only 4.5 percent of total net property taxes. (They paid 5.3, 5.8, and 3.7 percent of county, city, and school taxes, respectively.)

The last line of Table 3 presents Suits indices for total property taxes combined and for each of the jurisdictional taxes. The Suits index for total property tax payments is 0.006, suggesting that property taxes are approximately proportional. For the separate jurisdictions, the Suits indices for county and school taxes are 0.012 and 0.026, respectively. This suggests that county and school taxes are proportional to slightly progressive. In contrast, the Suits index for city taxes is –0.047, suggesting that city taxes are moderately regressive. The regressivity of city taxes arises primarily because the top decile owns 34.7 percent of the property value, but has a city tax burden of only 29.6 percent. In contrast, households in each of deciles 4 through 9 have a net tax burden greater than their proportionate share of property value. For example, households in decile 7 own 8.8 percent of the property value, but have a net city tax burden of 10.0 percent.10

SENSITIVITY ANALYSIS

As discussed above, I must estimate household AGI in order to determine the probability that a household itemizes property taxes on its federal tax return. Using an AGI estimate could potentially affect the Suits indices calculations. A household’s probability of itemizing generally increases as AGI increases. Therefore, if a household’s AGI estimate is too low, then the probability of itemizing will be too low, and the estimated net property tax burden will be too high. Conversely, if the AGI estimate is too high, then the estimated net tax burden will be too low. The effect of measurement error on the Suits index depends on the direction and magnitude of the error, as well as whether the error differs across the income distribution. To test for the effects of possible measurement error in AGI, I adjust AGI in several ways and estimate the Suits indices for each scenario.

The most likely source of measurement error in AGI arises because my estimation method does not capture income variations within neighborhoods. There are likely to be high-income households in low-income neighborhoods, as well as low-income households in high-income neighborhoods. For these households, AGI will be measured with error. If the measurement error in AGI is not systematically different across property value deciles, but only adds noise to the net property tax measure in equation [3], the Suits index values are unaffected. I run several simulations by adding noise to the data, and the Suits indices are essentially identical to those in Table 3.

A more serious problem for drawing inferences could occur if AGI measurement error is systematically different for households in the upper versus lower ends of the income distribution. For example, if AGI is underestimated more (or overestimated less) for high-income households than for low-income households, then the Suits indices will be biased upward. Conversely, if AGI is underestimated more (or overestimated less) for low-income households, the Suits indices will be too low.

To examine the bias from measurement error that differs systematically across deciles, I run simulations by adjusting AGI upward for households in the top five deciles of Table 3, and then for households

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10 I also rank households using AGI as the measure of income, divide the households into deciles, and compute the Suits indices using cumulative AGI as the measure of Y in equation [2]. Results are qualitatively similar to those reported in Table 3, with values of 0.005, –0.044, and 0.012 for county, city, and school taxes, respectively. The Suits indices computed in this manner are not affected by possible systematic differences in assessment ratios.
Evidence on the Incidence of Residential Property Taxes Across Households

in the lower five deciles. As expected, the first adjustment results in less progressive Suits indices than those in Table 3, and the second adjustment results in more progressive indices. However, in both cases, the magnitude of the bias is relatively small. The largest effects change the Suits indices by about 0.016 to 0.019. In addition, because the changes in Suits values are similar across jurisdictions, the relative differences between the jurisdictional indices remain approximately the same.

I also examine the effects of possible measurement error in appraisal values. As discussed earlier, the main reason for differences between assessed value and market value is infrequent assessment (O’Sullivan et al., 1995, p. 37). Given the increasing property values in Dallas County during this time period, properties with less frequent assessments will have assessed market values that are generally too low. Using property value as a proxy for lifetime income will therefore understate income for these households. To examine the effects of measurement error in appraisal values, I re-estimate the Suits indices after adjusting property values for appraisal lags. Specifically, I adjust property values upward by 10 percent times the number of years since the last appraisal, and then re-estimate the Suits indices using these adjusted property values to rank households. As expected, the recomputed Suits indices are slightly more progressive than in Table 3, with an average increase of about 0.024. (Recall that appraisal lag was more severe for low-value properties.) The relative differences between the jurisdictional indices remain approximately the same.

FEATURES OF THE PROPERTY TAX THAT AFFECT ITS INCIDENCE

Local Features

There are three institutional features that can affect property tax incidence: tax rates, the homestead exemption, and the over-65 exemption. Table 4 provides information on how these features differ across decile groups for each of the jurisdictional taxes. Panel A shows that the average county tax rate is identical across decile groups (because all households in Dallas county are taxed at the same county tax rate), and that the average school tax rates are similar across all decile groups. Accordingly, differences in tax rates have little-to-no effect on the tax incidence of county and school taxes. In contrast, Panel A shows that the average city tax rate is highest for the lowest-valued properties, indicating that tax rates contribute to the regressivity of city taxes. The average city tax rate is 0.6428 percent for deciles 1 through 3, versus 0.6072 and 0.6034 percent for the other decile groups.

Panel B presents information on the average homestead exemption amount as a percentage of property value (i.e., the percentage of the property’s market value

11 Specifically, I double AGI for the top 10 percent of households, as well as the top 20, 30, 40, and 50 percent, and do the same for the lowest 10, 20, through 50 percent of households. For the upper-income adjustments, the largest difference comes from doubling AGI for the top 20 percent of households. This results in Suits values of –0.003, –0.065, and 0.011, for county, city, and school taxes, respectively. For the lower-income adjustments, the largest difference comes from doubling AGI for the bottom 50 percent of households, resulting in Suits values of 0.031, –0.027, and 0.044, for county, city, and school taxes, respectively.

12 My analysis does not allow for the probability of itemizing to vary across taxpayer age groups, and there is some evidence that taxpayers aged 65 and older are less likely to itemize. For 1999, 32.0 percent of taxpayers under age 65 itemized, while only 29.4 percent of taxpayers age 65 and older itemized. I re-run all my analyses assuming that no over-65 taxpayers itemize, and also assuming that only the wealthiest taxpayers over-65 itemize (i.e., those in the upper 10 or 20 percent of households). All results are essentially identical to those reported in the paper. These results do not differ appreciably because the probability that over-65 taxpayers itemize is already fairly low. Almost 40 percent of over-65 taxpayers are in deciles 1 through 3, and the median probability of itemizing for each of these deciles is between 6.6 and 17.2 percent. I thank Sandra Byberg at the IRS Statistics of Income Office for providing the 1999 information.

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that is exempt from tax). The homestead exemption contributes little to making county taxes more progressive because all properties in Dallas County are allowed a 20 percent homestead exemption, with a $5,000 minimum. For both cities and school districts, however, homestead exemptions differ significantly across decile groups. The homestead exemption contributes to the regressivity of city taxes because middle–decile households receive a smaller percentage homestead exemption than upper–decile households. The middle column of Panel B shows that the homestead exemption averages about 14 percent of market value for properties in the bottom three and top three deciles, and only about 8 percent of property value for the middle deciles. Fifteen of the 25 cities represented by the sample provide no homestead exemption, and a large number of these households fall in the middle of the income distribution.

In contrast to city taxes, the homestead exemption increases the progressivity of school taxes. The last column of Panel B shows that the homestead exemption decreases as property values increase, averaging about 44 percent of market value for properties in the bottom deciles, 23.1 percent for the middle deciles, and 18.4 percent for the top deciles. As mandated by the state of Texas, all 15 school districts in the sample provide for a $15,000 homestead exemption. A fixed exemption amount increases school tax progressivity because it decreases the effective tax rate for lower–valued properties more than it does for higher–valued properties.  

The over–65 exemption increases tax progressivity for all three jurisdictional taxes for two reasons. First, there is a disproportionate number of over–65 homeowners in the bottom part of the distribution. For the lowest three deciles,
Evidence on the Incidence of Residential Property Taxes Across Households

about 34 percent of homeowners are over age 65, while for the middle and upper deciles, only about 22 percent of homeowners are over age 65. Second, all jurisdictions have fixed over–65 exemption amounts, and this disproportionately benefits lower–income homeowners. Panel C of Table 4 provides information on the average over–65 exemption as a percentage of property value. For all jurisdictions, the over–65 exemption (as a percentage of property value) decreases as property values increase, and this pattern is most pronounced for county and city taxes. For the poorest over–65 homeowners, the average county and city exemption amount exceeds 75 percent of property value, while for the wealthiest over–65 homeowners, the county and city exemptions average about 36 and 30 percent of property value, respectively. For school districts, the exemption averages about 39 percent of property value for the poorest over–65 households, and only about 15 percent for the wealthiest. These results reflect the relative generosity of the over–65 exemption amounts offered by each jurisdiction. Dallas County’s over–65 exemption is a fixed amount of $69,000. All cities offer an over–65 exemption, with amounts ranging from $5,000 to $75,000. The median exemption amount for the sample properties is $50,000. Most school districts offer an over–65 exemption of only $10,000, although Dallas ISD (representing 38.5 percent of the sample) offers a $45,000 exemption amount.

All states (except Kansas and Missouri) and the District of Columbia mandate some form of a homestead exemption and/or an over–65 exemption (Duncombe and Yinger 2001). Forty–five states offer special exemptions that apply to elderly homeowners as well as other possible groups (e.g., the disabled and/or veterans), and twenty states offer a general homestead exemption to all homeowners. Sixteen states offer both general and special exemptions. The state–mandated exemption amounts range from $1,000 to full exemption (Baer, 1998). This data does not reflect exemptions that are granted at the option of local governments. Therefore, the use of general and special homestead exemptions appears prevalent. Results of this paper suggest that exemptions are effective at increasing property tax progressivity when they are a fixed amount, but that differences in exemption amounts across municipalities can contribute to tax regressivity. Exemptions for the elderly also increase progressivity because older homeowners are concentrated in the bottom of the income distribution. For exemptions to be effective, however, eligible homeowners must be aware of and obtain the exemption. Baer (1998) examines elderly taxpayers in six states and estimates that participation rates in exemption programs range from 60 to nearly 100 percent. Baer (1998) also finds that participation rates are lower for low–income households. Although a program may be well–designed, poor administration could reduce the exemption’s effectiveness at increasing tax progressivity.

Effects of Federal Tax Deductibility

The deductibility of property taxes for income tax purposes causes them to be less progressive because the beneficiaries of the reduced liability are generally concentrated in the upper tiers of the income distribution. These property owners are more likely to itemize, pay larger property tax amounts, and have higher marginal tax rates. For the sample households, the average probability of itemizing increases monotonically across deciles, from 6.6 percent for decile 1 to 70.5 percent for decile 10. To measure the effects of federal tax deductibility on property tax incidence, I re–compute the Suits indices using actual (or nominal) tax payments as the measure of PT in equation [2]. Results are presented in Panel D of Table 4. Not allowing for federal tax deductibility in-
increases all Suits indices by a little less than 0.04 points. For total property taxes combined, the recomputed Suits index is 0.043 compared with 0.006 with deductibility (see Table 3).

CONCLUSIONS

By examining residential property taxes for 357,264 owner-occupied homes in Dallas County, Texas, this study provides evidence on the incidence of residential property taxes, and on how institutional features affect that incidence. After allowing for the federal income tax deduction of property taxes, total property taxes combined are approximately proportional. County and school taxes are proportional to slightly progressive, while city taxes are moderately regressive. Tax rates contribute to the regressivity of city taxes because lower-income cities tend to have relatively high tax rates. The homestead exemption makes city taxes more regressive, but makes school taxes more progressive. The over-65 exemption increases progressivity for all three jurisdictional taxes.

The property tax remains one of the most unpopular taxes because of perceived inequities. This study provides researchers and policymakers with evidence on the distribution of the property tax burden, and also on the distributional effects of specific property tax features. This evidence can educate those parties who are interested in property tax reform about the ultimate impact of a proposed change to the property tax’s design. A useful extension of this study would be to make hypothetical changes to different property tax features and estimate the redistribution that would occur if such proposals were enacted. One could also examine alternatives to the property tax (i.e., local sales and income taxes), and compare the incidence of these alternative taxes with that of the property tax.

Acknowledgments

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