City of Milwaukee:

Distributive Impacts of a Local Vehicle Registration Fee

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Foreword

Students in the Master of Public Affairs (MPA) program in the Robert M. La Follette School of Public Affairs at the University of Wisconsin–Madison produced this report for the City of Milwaukee, Department of Administration's Budget and Management Division. The opinions and judgments presented in the report do not represent the views, official or unofficial, of the La Follette School or of the clients for which the report was prepared.

The authors of this report are enrolled in the Public Affairs Workshop, Domestic Issues, the capstone course in their graduate program. The La Follette School offers a two-year graduate program leading to a Master of Public Affairs or a Master of International Public Affairs degree. The Workshop provides practical experience applying the tools of analysis acquired over three semesters of prior coursework to actual issues clients face in the public, non-governmental, and private sectors. Students work in teams to produce carefully crafted policy reports that meet high professional standards within the timeframe of a single academic semester. The reports are research-based, analytical, and when appropriate, evaluative.

I am grateful to Wilbur R. Voigt whose generous gift to the La Follette School supports the workshop projects. With his donation, we are able to finance the production of the final reports, plus other expenses associated with the projects.

This report would not have been possible without the encouragement and leadership of the City of Milwaukee's dedicated employees. The report also benefited greatly from the support of the staff of the La Follette School. Outreach Director Terry Shelton, along with Kari Reynolds, Mary Mead, and Gregory Lynch, contributed logistical and practical support. Karen Faster, La Follette publications director, edited the report and shouldered the task of producing the final bound document.

This report was generated primarily for the educational benefit of its student authors and the purpose of the project was to improve their analytical skills by applying them to an issue with a substantial policy or management component. This culminating experience is the ideal equivalent of the thesis for the La Follette School degrees in public affairs.

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Executive Summary

This report analyzes how a $20 municipal vehicle registration fee would affect socioeconomic groups within the City of Milwaukee.

Wisconsin Statute section 341.35 permits municipalities and counties to impose a flat annual registration fee on all motor vehicles that are customarily kept in the municipality. The municipality may impose the fee by enacting a local ordinance. The municipal fee is charged in addition to any state registration fee.

This report assesses the potential effects of a municipal vehicle registration fee on various categories of residents. We use Census 2000 data and employ descriptive statistics to estimate how the burden of the fee would be distributed. We also use qualitative case study comparisons with similar cities and regression analysis to inform our analysis.

We consider policy alternatives including the status quo, a $20 flat fee without property tax offset, and a $20 flat fee with property tax offset. We then assess the alternatives based on three equity factors — socioeconomic, homeownership, and geographic — to determine how each alternative distributes the financial burden among various groups of residents.

Our analysis indicates that while a flat fee is regressive, it would comprise such a small percentage of income – even at the lowest income levels – that its regressive impact would be negligible. However, when combined with a property tax offset, the local vehicle registration fee would disproportionately affect renters, as they would pay the registration fee but not benefit directly from a corresponding reduction in property taxes. A property tax offset alongside the vehicle registration fee would exacerbate the regressive effects of the fee on renters. Therefore, we recommend the City of Milwaukee implement a $20 local vehicle registration fee without a corresponding offset to property taxes. This alternative would allow the City to diversify its non-property tax revenue without disproportionately burdening lower-income residents.

Background

This report examines how the imposition of a $20 local vehicle registration fee would affect residents in the City of Milwaukee. Our analysis includes an examination of the distributional effects along the dimensions of socioeconomic status, homeownership (renters versus owners), and geographic area. As requested by the client, the City of Milwaukee Budget and Management Division, we also analyze data by aldermanic district to provide information specific to each council member's constituency.

A flat fee is regressive by nature as it always represents a higher percentage of income for those with lower incomes. Our analysis examines *how* regressive a local vehicle registration fee would be for Milwaukee residents. We also determine if the regressive nature of the fee is mitigated by using the fee to reduce property taxes.

Wisconsin's Local Vehicle Registration Fee Statute

Wisconsin Statute section 341.35 permits municipalities and counties to impose a flat annual registration fee[1] on all state-registered motor vehicles, "which are customarily kept in the municipality." Municipalities were allowed to impose vehicle registration fees in 1967, and counties were allowed to do so beginning in 1979. The statute has not changed since 1983 (Wisconsin Legislative Fiscal Bureau, 2007). The municipal fee is charged in addition to the state registration fee and can be imposed by passing a local ordinance. The fee applies only to automobiles and trucks with a gross weight under 8,000 pounds, which generally excludes commercial vehicles (Wisconsin Statute § 341.35 [2005-06]). To change the fee structure to anything other than a flat fee, the Wisconsin legislature would have to amend this statute.

After enacting the local ordinance that imposes the fee, the municipality must notify the state Department of Transportation (DOT) regarding the amount of the fee at least sixty days before the ordinance goes into effect (Municipal or County Vehicle Registration Fee [1996]). No additional administrative activities are required of the municipality (Osterman, 2005). Upon receiving notice, the DOT collects the municipal registration fee in addition to the annual state registration fee.[2] After retaining an administrative fee of 10 cents per registration, the DOT remits the municipal fees to the municipality on a monthly basis (Osterman, 2005).

Municipalities may use the registration fees only for "transportation related purposes" (Wisconsin Statute § 341.35 [2005-06]). However, neither the statute nor the DOT administrative rules define what exactly constitutes a "transportation related purpose." Using the State's General Transportation Aids Cost Reporting

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[1] Some jurisdictions refer to a local vehicle registration fee as a "wheel tax." In this report, we refer to this fee as a local vehicle registration fee.

[2] As of 2008, the annual state registration fee is $75 for non-commercial vehicles under 8,000 pounds (Wisconsin Department of Transportation, 2008).

Manual as a guide, transportation-related expenditure categories include, but are not limited to, street repairs, street cleaning, snow removal, street maintenance and construction, street lighting, traffic control, sidewalk maintenance and construction, storm sewer maintenance and construction, and a portion of law enforcement costs (Wisconsin Department of Transportation, 2007b).[3]

City of Milwaukee Governance

The City of Milwaukee has fifteen aldermanic districts, each represented by one member on the Common Council. Thus, with a simple majority, or eight votes, the council may pass an ordinance. After passage by the council, the mayor has seven working days to approve or disapprove the proposal. If the mayor vetoes the proposal, the council may override the mayor with a two-thirds majority, or ten votes. The council is not allowed to amend the vetoed proposal during the override process (City of Milwaukee Common Council-City Clerk's Office, n.d.).

With eight Common Council votes, or ten to override a mayoral veto, Milwaukee may impose a local vehicle registration fee under state law. Upon notification to the DOT, the City may begin collecting these fees without any additional administrative action (City of Milwaukee Common Council-City Clerk's Office, n.d.).

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[3] The Transportation Aids Cost Reporting Manual indicates that 26 percent of eligible law enforcement expenditures are included in the General Transportation Aids Formula for cities with populations greater than 35,000. The exceptions to eligible law enforcement costs are jail facilities, courts, and purchases of 911-emergency systems (Wisconsin Department of Transportation, 2007b).

Policy Alternatives

This section describes the three policy alternatives evaluated in this report: the status quo, a flat $20 fee without a property tax offset, and a flat $20 fee with a property tax offset.

Status Quo

The City of Milwaukee does not impose a local vehicle registration fee. Residents pay only the state vehicle registration fee. The City pays for transportation-related expenses with property taxes, state transportation aid,[4] and user fees. In addition, the City uses long-term debt and special assessments for transportation-related capital improvements and may use grants to fund specific transportation projects. Appendix A summarizes the City's annual transportation costs and related transportation revenues.[5] The City's transportation costs exceeded related revenues by more than $51 million for 2006, and the City estimates similar amounts for 2007 and 2008.

Appendix B includes a summary of street-related capital improvement costs. In 2006, the City assessed $2.1 million of the $18.1 million capital budget to property owners. The City projects that it will assess $2.3 million of street improvements to property owners in 2007 and $4.1 million in 2008.

Flat $20 Fee Without Property Tax Offset

Under this alternative, the City of Milwaukee would impose a local vehicle registration fee of $20, without using the additional revenue to control or reduce the property tax levy. According to a 2005 Legislative Reference Bureau study on a similar fee, this fee would have generate $6.8 million in revenue, based on 2006 vehicle estimates (Osterman, 2005).[6] The City would use this revenue to supplement the budget, as opposed to using it to control or reduce the property tax levy. Under this alternative, the City could expand transportation services by adding staff or implementing new programs. The City could also use the additional revenue to increase the amount or scope of transportation-related capital improvement projects in the annual budget. Alternatively, the City could maintain transportation spending

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[4] The DOT's General Transportation Aids (GTA) program distributes state transportation revenues to local governments. Funds come from fuel taxes and vehicle registration fees (Wisconsin Department of Transportation, n.d.). Approximately 30 percent of state-collected transportation revenues are returned to local governments to offset the cost of not only maintenance and road costs, but also traffic and police costs. The funds can be used for projects that include constructing roads, filling potholes, plowing snow, and repairing street gutters. Payments are made to all counties, cities, villages, and towns in Wisconsin on a quarterly basis. The DOT notes that municipalities can only receive aid "equivalent to no more than 85 percent of their three-year average aidable costs" (Wisconsin Department of Transportation, n.d.). Milwaukee will receive $4.5 million in GTA funds for calendar year 2008 (Wisconsin Department of Transportation, 2007a).

[5] Appendix A includes costs that are eligible for reimbursement under the State's General Transportation Aids formula.

[6] The DOT's Division of Motor Vehicles would retain 10 cents from each registration for a total of $34,000.

levels and use the additional revenue to shift general purpose revenues that it allocates to transportation costs to non-transportation related needs. A vehicle registration fee would further the City's goal to diversify its non-property tax revenue sources (City of Milwaukee Budget and Management Division, n.d.). We note that adding $20 to the vehicle registration fee following the $20 increase in 2008 to the state vehicle registration fee may meet resistance from City residents.

Flat $20 Fee With Property Tax Offset

Under this alternative, the City of Milwaukee would impose a local vehicle registration fee of $20 and use the revenue to reduce or control the growth of property taxes by an equivalent amount. The $6.8 million in revenue estimated by the Wisconsin Legislative Reference Bureau represents 3.1 percent of the City's 2006 property tax levy (City of Milwaukee Budget and Management Division, n.d.). If the City's 2006 property tax levy had been reduced by $6.8 million, the City's mill rate would have decreased by 28 cents from $8.75 to $8.47. This would translate to a reduction in property taxes of $38 for a property owner with a median home value of $136,700 (Osterman, 2005). This alternative is likely to be more politically acceptable to residents, as the additional revenue from vehicle registration fees would help lower or control the property tax levy.

Methodology

This section describes the methods, data, and assumptions used to evaluate the distributive impacts of the three policy alternatives.

Evaluation by Three Distinct Methods

This report uses three distinct methods – summary statistics, a case study comparison, and regression analysis – to evaluate the three policy alternatives. We used both qualitative and quantitative techniques to reach more reliable conclusions about the distributive impacts of a local vehicle registration fee.

Summary Statistics: First, we used basic statistical information about the City of Milwaukee to predict the distributive impacts of a local vehicle registration fee. Using Census 2000 data, we constructed a snapshot of vehicle ownership among socioeconomic groups in the City of Milwaukee. Then, we analyzed this information to predict how an additional fee would be distributed among the members of these groups.

Case Study Comparison: Second, we compared the City of Milwaukee with other cities that have imposed local vehicle registration fees. The experiences of these cities inform our predictions about the potential impacts of a similar fee in Milwaukee.

Regression Analysis: Third, we conducted a regression analysis to test the extent to which certain demographic characteristics affect the distributive impact of a local vehicle registration fee. Regression analysis is a powerful statistical tool that allowed us to control for the influences of other variables, so that we can better determine the distributive effect of the fee.

Data

We obtained demographic and socioeconomic data for Milwaukee, Indianapolis, and Memphis from the U.S. Census's 2006 American Community Study. In addition to obtaining information on vehicle registration fees for Indianapolis and Memphis, we gathered information from Beloit, the only municipality in Wisconsin that imposes a vehicle registration fee, as of 2008. Indianapolis and Memphis are similar in size to Milwaukee and have long established vehicle registration fees. Each city's experiences provide further insight into the potential fiscal and socioeconomic effects of a local vehicle registration fee in Milwaukee. In addition, we considered information from a University of California, Berkeley study on the distribution of vehicle registration fees entitled *The Incidence of the California Vehicle License Fee* (Dill, Goldman, & Wachs, 1999).

For the summary statistics analysis and regression analysis, we used data from the U.S. Census Bureau's American FactFinder, including the number of occupied housing units, owner-occupied housing units, renter-occupied housing units, number of vehicles for owner-occupied and renter-occupied housing units, income level, and

income per vehicle (U.S. Census Bureau, 2000a). We used ArcGIS software to filter census tracts within the City of Milwaukee. We excluded all tracts within Milwaukee County but not within the City, and we excluded all tracts that were only marginally within the boundaries of the City. This data collection strategy allowed us to concentrate exclusively on the distributive impacts of a vehicle registration fee in the City of Milwaukee. Additionally, we obtained more detailed information regarding vehicle ownership from the 2000 Census Transportation Planning Package.

Assumptions

We based our analysis and findings on the following assumptions.

Number of Vehicles: We assumed that the number of vehicles registered in the City of Milwaukee would not decline due to the imposition of a local registration fee. That is, the imposition of an additional $20 registration fee would not cause City residents to (1) leave and take their vehicles out of the City of Milwaukee; or (2) choose not to register their vehicles. We based this assumption on the fact that that a flat $20 local vehicle registration fee is not large enough to induce significant noncompliance. This assumption is consistent with a Wisconsin Legislative Fiscal Bureau study.[7]

Vehicle Registration Trends: We also assumed an annual growth rate of one percent in the number of vehicles registered in the City of Milwaukee. Appendix C shows the projected revenues for the next ten years. This is a conservative assumption, compared to similar estimates by the Wisconsin Legislative Fiscal Bureau.[8]

Definition of Regressive: For this report, we consider a tax regressive if the average tax rate decreases as income increases. Stated differently, the registration fee remains at the same level, but it decreases as a percentage of income as income increases. With

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[7] A May 2007 report by Jon Dyck, an analyst with the Wisconsin Legislative Fiscal Bureau, assumed that a $20 increase in the state vehicle registration fee would not cause the demand for vehicles to change (Dyck, 2007). Even if an increased fee would not affect the number of vehicles that people decide to own, an increased fee might increase the likelihood that vehicle owners would try to avoid paying the fee. Despite this possibility, for the purpose of this report, we assume that registration compliance is inelastic. Mr. Dyck notes that there is some anecdotal evidence that vehicle emission testing requirements in southeastern Wisconsin have caused some noncompliance, even though the Legislative Fiscal Bureau has not developed a way to measure noncompliance (Dyck, personal communication, March 6, 2008). However, the avoidance associated with emissions testing results from the possibility that failing the test would require expensive vehicle repairs. The cost of these repairs is likely much greater than an additional $20 vehicle registration fee, so we assume that the additional registration fee would not cause significant noncompliance.

[8] The Legislative Fiscal Bureau assumed a 1.7 percent annual growth rate for the number of vehicles statewide for fiscal years 2007-08 and 2008-09, based on factors such as economic growth, the projected price inflation for vehicles, and growth in disposable income. Because some of these factors have been downgraded in economic forecasts, a more realistic approximation of the growth rate in vehicles statewide is 1.5 percent (Dyck, personal communication, March 6, 2008). At the local level, the number of vehicles in Milwaukee is decreasing (Arenz, personal communication, March 18, 2008), while Beloit had an average annual growth rate of 1 percent from 2001 until 2007 (Presny, personal communication, February 25, 2008).

this definition, a flat vehicle registration fee is always regressive. As state law only allows for a flat fee, we focus our analysis on *how* regressive a local vehicle registration fee is on various socioeconomic groups.

Amount of Registration Fee: For simplicity, we assume that the City of Milwaukee would set the local vehicle registration fee at $20 per vehicle. Our client requested that we examine a fee between $12 and $24 per vehicle (Bell, personal communication, February 8, 2008). We found that variations of fee amounts within this range do not alter the distributive impacts of the fee and thus, do not alter our conclusions.[9] With a $20 fee, we can also rely on data compiled by a Wisconsin Legislative Reference Bureau study (Osterman, 2005; Dyck, 2007).

Census Tracts and Aldermanic District: To analyze any geographic effects based on aldermanic district, we had to "assign" census tracts to only one aldermanic district. The method we used was an "all-or-nothing" geographic centroid assignment in ArcGIS. This simple method calculates the geographic centroid (center of mass) of each census tract. The census tract is then "assigned" to the aldermanic district in which its centroid lies. A limitation of this method is that census tracts evenly split between districts are assigned to only one district. More precise methods require technology that was not readily available. Two advantages to this method are its simplicity and ability to replicate.

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[9] Any vehicle fee between $12 and $24 is a negligible percentage of income at any level. Therefore, our conclusions based on a $20 fee are applicable within this range.

Evaluation Criteria

We evaluated each policy alternative based on three equity criteria – socioeconomic equity, homeownership equity, and geographic equity.

Socioeconomic Equity

Socioeconomic equity means that those with greater income pay higher taxes in order to give up the same amount of utility, or enjoyment, as those with less income (Weimer & Vining, 2005). Taxes should distribute burdens based on socioeconomic status or an individual's ability to pay (Rosen, 2005). To determine whether a flat vehicle registration fee achieves socioeconomic equity, we examined the percentage of income the local vehicle registration fee would cost for each census tract and socioeconomic group.

Homeownership Equity

We also examined whether the burden of a local vehicle registration fee differs for renters versus homeowners, particularly where the City would use the revenue from the fee to control or reduce the property tax levy.

Geographic Equity

Finally, we examined whether a local vehicle registration fee has disparate geographic impacts in the City of Milwaukee by aldermanic districts.

Summary Statistics for the City of Milwaukee

This section uses statistical information about the City of Milwaukee to predict the potential distributive impacts of a local vehicle registration fee.

Socioeconomic Equity

We determined the average percentage of income paid toward the fee for various representative households in the City of Milwaukee (Dill, Goldman, & Wachs, 1999). Table 1 shows that for households with incomes of $15,000, the $20 local vehicle registration fee comprises 0.13 percent of income. As household income increases, the percentage of household income the fee comprises decreases. This pattern indicates the regressive nature of the fee because the burden of the fee decreases as income increases.

Table 1:
$20 Local Vehicle Registration
Fee as Percentage of Income

Annual Household Income	Fee as a Percentage of Income
$15,000	0.13%
$30,000	0.07%
$60,000	0.03%
$100,000	0.02%

Source: Author calculations

Using data regarding the number of vehicles owned for various income ranges, we determined the proportion of total revenue from the fee that each income and demographic group in the City of Milwaukee would pay.[10] Table 2 shows this information. From this, we can determine whether any income group pays a larger proportion of the total fee revenue than another group (Dill, Goldman, & Wachs, 1999). Households with incomes less than $30,000 per year would pay 46 percent of the total vehicle registration fees, indicating that lower income residents would pay a large proportion of vehicle registration fees. Table 2 shows that the percentage of households in each income range closely matches the percentage of vehicles owned by households in each income range.

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[10] In this analysis, "vehicle" refers to any vehicle under one-ton capacity that is available for use by members of a household. Also, census data do not report the number of registered vehicles, so these data do not address the possibility that some vehicles would not be registered with the state (U.S. Census Bureau, 2000b).

Table 2:
Number of Vehicles and Number of Households by Income

Income Range	Number of Households	Percentage of Households	Number of Vehicles	Percentage of Vehicles
less than $15,000	51,107	22.00%	51,045	22.02%
$15,000-$29,999	55,962	24.09%	55,945	24.13%
$30,000-$59,999	77,600	33.41%	77,339	33.36%
$60,000-$99,999	36,673	15.79%	36,691	15.83%
$100,000-$124,999	5,517	2.38%	5,489	2.37%
$125,000 or more	5,428	2.34%	5,318	2.29%

Source: U.S. Census Bureau, 2000a

Table 3 shows that households with more vehicles generally have higher median incomes. The data also indicate that as the number of available vehicles increases, the percentage of household income that the $20 fee per vehicle would represent also increases.[11] As a result, we conclude that the flat fee alternative would not exacerbate socioeconomic inequity because it would not impose a disparate economic burden on lower-income vehicle owners. In contrast, if the $20 fee made up a higher percentage of income as median income decreased, we would conclude that the fee is regressive in terms of socioeconomic equity.

Table 3: Average Household Income by Number of Vehicles

	No Vehicles	One Vehicle	Two Vehicles	Three Vehicles	Four or More Vehicles
Average Household Income	$16,252	$27,295	$46,846	$56,544	$55,408
Proposed Fee as Percentage Household Income	Not Applicable	0.07%	0.09%	0.11%	0.14%

Source: U.S. Census Bureau, 2000a

Homeownership Equity

Since one of our policy alternatives includes a potential property tax offset, we considered the proportion of households that rent versus those that own and occupy housing in the City. Renters occupy nearly 55 percent of the occupied housing units in the City, and they represent 42 percent of vehicle owners. The remaining occupied housing units are owner-occupied, and they represent 58 percent of vehicle owners.

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[11] The category "four or more vehicles" includes households with more than four vehicles, but for our calculations we divide by four to get income per vehicle for this vehicle group.

Even though more of the City's housing units are renter-occupied, more than 58 percent of available vehicles belong to owner-occupied housing units (U.S. Census Bureau, 2000b). These data indicate that homeowners would pay a larger proportion of the total registration fee revenue. Thus, we conclude that a majority of the households that would pay vehicle registration fees would also benefit from potential property tax relief.[12] However, nearly 42 percent of vehicle owners would not directly benefit from a property tax offset because they are renters. Appendix D (Tables 9 and 10) provides additional information about renter-occupied and owner-occupied housing for each aldermanic district.

Table 4 shows that owner-occupied households have higher household incomes than renter-occupied households. This indicates that inequities by homeownership parallel inequities in socioeconomic status.

Table 4: Percentage of Households by Income: Owners vs. Renters

Income Range	Number of Renter-Occupied Households	Percentage of Total Renter-Occupied Households	Number of Owner-Occupied Households	Percentage of Total Owner-Occupied Households
Less than $20,000	53,731	42.42%	12,071	14.65%
$20,000 to $49,999	53,066	41.89%	32,770	39.78%
$50,000 to $74,999	13,390	10.57%	20,883	25.35%
$75,000 to 99,000	3,765	2.97%	10,056	12.21%
$100,000 or more	2,721	2.15%	6,595	8.01%
Total Households	126,673	100.00%	82,375	100.00%

Source: U.S. Census Bureau, 2000b

In addition to the disparity a property tax offset would create between homeowners and renters, an offset would benefit non-residential property owners as well. If the City had collected registration fees in 2006 and used it to reduce the tax levy, the City would have used only $4.5 million of the total $6.8 million collected to reduce residential property taxes. The remaining $2.3 million would have benefited commercial and industrial property taxpayers.

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[12] Appendix D (Table 11) illustrates that homeowners with lower property values may not recoup their full registration fee through the property tax offset.

Geographic Equity

We also examined income and homeownership equity at the level of the City's aldermanic districts. Overall, districts with higher percentages of property owners would benefit from a potential tax offset, while those with higher percentages of renters would have many households that would pay a fee and feel no relief through a potential tax offset. Appendix D (Tables 11-16) provides more information by aldermanic district regarding vehicles owned and median income.

Vehicle Distribution: Census 2000 data show that District 3 has the most vehicles of all aldermanic districts. Its more than 26,000 vehicles represent slightly more than 9 percent of the total vehicles in the City. The number of vehicles in District 3 corresponds to the number of households, as District 3 comprises nearly 10 percent of the City's households. District 4 is home to just more than 6 percent of the City's households and less than 4 percent of the City's vehicles. For each of the other districts, the percentage of City households more closely matches the percentage of City vehicles.

Income and Percentage of Renters: Examining median income across aldermanic districts illustrates which districts would contribute the greatest percentage of income toward the vehicle registration fee. District 4 has the second lowest median income of all districts, with $21,053. Only District 6 is lower, with $20,072. District 4 also has the highest percentage of renter-occupied housing units at nearly 89 percent. Thus, Districts 4 and 6 would pay the largest percentage of median income toward a vehicle registration fee. Further, the high percentage of renters in District 4 means that any tax offsets would not benefit a majority of households in District 4. District 13 has the highest percentage of owner-occupied housing units so a majority of households in District 13 would benefit from property tax offsets. District 13 has the third highest median income (behind Districts 5 and 11). Its residents would pay a smaller percentage of income toward the fee than less affluent districts.

Case Study Comparison

This section uses information about other cities with local vehicle registration fees to understand the potential distributive fiscal impacts of such a fee in the City of Milwaukee.

We examined information from Beloit, Memphis, and Indianapolis. Beloit, the only Wisconsin municipality to impose a vehicle registration fee for several years, is the only source of comparative data in the state.[13] Beloit has charged a $10 local vehicle registration fee since 1986 (Wisconsin Legislative Fiscal Bureau, 2007). In addition, we analyzed information from Memphis and Indianapolis because they approximate Milwaukee's size and demographics; both have had local vehicle registration fees for 25 and 16 years, respectively. Refer to Appendix E for more detailed comparisons of Milwaukee and these three cities.

We focused our analysis of the data available from each city on the fee structure, the revenue generated by the fee, and the equity of the fee across each city's socio-economic groups. The comparative data from these cities indicate that a local vehicle registration fee is a reliable source of revenue, though it may have some regressive effects. That said, Indianapolis was able to mitigate some of this burden on lower-income individuals, due to a different fee structure that bases registration fees on the value of a vehicle. Appendix E provides additional comparisons between Milwaukee and these three cities.

To evaluate further socioeconomic equity, we considered information from a California study on the distribution of vehicle registration fees. While the state of California charges a fee based on vehicle value, the study finds that lower income people still pay a higher percentage of income toward vehicle registration fees (Dill, Goldman, & Wachs, 1999).

Comparative Data

Demographic Information: Beloit differs from Milwaukee in size, but it still provides a basis for some comparison due to similarities in household income and poverty rate. Beloit is much smaller than Milwaukee, with an estimated population of 36,348, compared to Milwaukee's population of 602,782. As a result, Beloit's overall revenue and tax collections are also much smaller than Milwaukee's. However, Beloit's estimated median household income of $37,000 is similar to Milwaukee's $33,990, thus allowing for a more accurate comparison on the distributional and revenue trends of a vehicle registration fee in a Wisconsin city. Beloit's estimated poverty rate is

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[13] St. Croix County, Wisconsin, began collecting a vehicle registration fee of $10 per vehicle in December 2007 (Pietrick, personal communication, March 6, 2008), but we did not include St. Croix County in our analysis, due to the lack of historical data. St. Croix County plans to use the vehicle registration revenue to supplement its transportation-related budget. The additional revenue increases the road maintenance budget and helps fund increasing costs related to gas and other petroleum-based products, such as tar (Pietrick, personal communication, April 18, 2008).

14.5 percent, which is below Milwaukee's 26.2 percent, but well above the Wisconsin state rate of 10.1 percent (City-Data.com, 2008a; City-Data.com, 2008b). Beloit residents pay $7.73 per capita and $20.71 per household in local vehicle registration fees, which means Beloit averages just more than two vehicles per household at $10 per vehicle.

Indianapolis has a metropolitan and city population similar to Milwaukee, with 785,597 people living in the city limits and 865,504 in Marion County. Indianapolis had a higher 2006 median household income at $41,520 compared to Milwaukee's $33,990 and a lower poverty rate at 16.3 percent (U.S. Census Bureau, 2006a; U.S. Census Bureau, 2006b).

Memphis has about 68,000 more people than Milwaukee. In addition, Memphis's home county population of 911,438 nearly matches Milwaukee County's 915,097. As a result, Memphis and Milwaukee have similar ratios of urban and suburban populations in their respective counties. Memphis has similar socioeconomic conditions to Milwaukee, as its median household income of $32,594 is barely below Milwaukee's median household income level of $33,990. Memphis's poverty rate of 23.2 percent is similar to Milwaukee's 26.2 percent (U.S. Census Bureau, 2006b; U.S. Census Bureau, 2006c). See Table 5 for a comparison of demographic data.

Table 5: Comparative Demographic Information

	Milwaukee	Beloit*	Indianapolis	Memphis
Population	602,782	36,348	785,597	670,902
Non-white population	55.51%	29.10%	33.37%	70.78%
Median household income	$33,990	$37,000	$41,520	$32,594
Residents in poverty	26.2%	14.5%	16.3%	23.5%
Owner-occupied households	47.86%	61.91%	59.36%	54.92%
Total property taxes collected	$220,100,000	$10,589,095	$297,975,062	$197,740,076
Median home value	$136,700	$84,200	$122,800	$90,900
Property taxes per household	$963.97	$780.73	$927.24	$794.66
Property taxes per household/ median home value/ $1,000	$7.05	$9.27	$7.55	$8.74
Net revenue from vehicle fee	$0	$280,942	$13,252,157	$10,781,333
City vehicle fee per person	$0.00	$7.73	$16.87	$16.07
City vehicle fee per household	$0.00	$20.71	$41.24	$43.33

* Beloit figures imputed based on 2000 U.S. Census and citydata.com, as city is not included in the 2006 American Community Survey.
Sources: U.S Census Bureau, 2006a, 2006b, 2006c; City-Data.com, 2008a, 2008b

Fee Structure: Under Wisconsin state law, Beloit charges a flat local vehicle registration fee of $10 per vehicle. The Wisconsin DOT's Division of Motor Vehicles collects the local fee in addition to the $75 state registration fee. The state retains an administrative fee of 10 cents per registration and remits the remaining funds to the city on a monthly basis. Beloit residents thus pay $85 per vehicle registration in 2008.

Indianapolis's local vehicle registration fee, implemented in 1992, charges 20 percent of the Indiana state vehicle excise tax, which is based on the value and age of an automobile (Goldman, Corbett, & Wachs, 2001). Under this scheme, the owner of a 2007 vehicle valued at $16,000 would pay an Indiana state excise tax of $130 and an Indianapolis local registration fee of $26 (20 percent of $130). Indiana also charges a flat state vehicle registration fee of $20.75 per vehicle, bringing the total fees for this $16,000 vehicle to $176.75 (Indiana Bureau of Motor Vehicles, n.d.). During the 1990s, Indiana cut its state vehicle excise tax by 50 percent in response to complaints about high vehicle registration fees (Goldman, Corbett, & Wachs, 2001).

Memphis charges a flat vehicle registration fee of $30 for all automobiles privately owned by city residents (City of Memphis, 2007). Memphis charges its fee in addition to the state fee of $24 and the Shelby County registration fee of $50 for automobiles (City of Memphis, 2007; Shelby County (Tennessee) Government Web Portal, n.d.). Thus, Memphis residents pay $104 total per vehicle registration.

Revenue: In Beloit, local vehicle registration fee revenue is a stable source of income for the city. From 2001 until 2006, Beloit collected $1,901,231 in vehicle registration fees, averaging $271,604 per year. The annual variation in fees collected ranged from a decrease of 2.2 percent to an increase of 4.5 percent, with an average annual increase of 1 percent over the seven-year period. Beloit's revenues per person have increased slightly, as the city collected $7.34 per resident from the vehicle registration fee in 2001 and $7.73 per resident in 2006 (U.S. Census Bureau, 2000a; City-Data.com, 2008a; Presny, personal communication, February 25, 2008). Beloit uses its vehicle registration fee revenue for capital improvements related to street repair (Presny, personal communication, February 25, 2008).

Indianapolis's vehicle registration fee also provides a steady source of income. From 1998 to 2006, Indianapolis collected between $12.1 million and $13.3 million in registration fees each year.[14] Indianapolis's vehicle registration fee revenue has been consistent, changing by no more than 4.1 percent in any one year (Marion County / City of Indianapolis, 2008). Indianapolis has seen its per-resident vehicle registration fee collections fall by less than 2 percent, from $17.14 in 2000 to $16.86 in 2006

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[14] Indianapolis data include both Indianapolis as well as all of Marion County because its municipal government combines services for the city and the county, under a "Unigov" system. As a result, vehicle registration fees are assigned to both the city and the county. Indianapolis' Unigov system counts unincorporated parts of Marion County as being part of the city of Indianapolis; its city population is about 30 percent more than Milwaukee at 785,587, but Marion County's total population of 865,504 is about 50,000 smaller than Milwaukee County (U.S. Census Bureau, 2006b).

(U.S. Census Bureau, 2000a; U.S. Census Bureau, 2006a; Marion County / City of Indianapolis, 2008). The increases in revenue over time correspond to the fact that the fee is based upon the value of a vehicle. As vehicle prices increase over time, revenue increases as well.

Finally, Memphis's vehicle registration fee has also proven to be a reliable source of revenue. From 1999 until 2006, Memphis collected between $9.9 million and $10.8 million each year in vehicle registration fees (City of Memphis, 2007). Since an annexation in 2000, the changes in revenues from the Memphis vehicle registration fee has varied by no more than 2.6 percent in any given year (City of Memphis, 2007). The amount of city registration fees collected per resident fell just more than 1 percent, from $16.26 in 2000 to $16.07 in 2006 (U.S. Census Bureau, 2000a; U.S. Census Bureau, 2006c; City of Memphis, 2007).

These data indicate that vehicle registration fees are a steady source of income for the cities of Beloit, Memphis, and Indianapolis, with little variation in revenue per resident and in overall revenues since 2000. Beloit, Memphis, and Indianapolis have all seen their populations change by less than 3.1 percent between 2000 and 2006, similar to Milwaukee's population trends in the same period (U.S. Census Bureau, 2000a; U.S. Census Bureau, 2006b). Based on these data, we predict that Milwaukee would see similar consistency in vehicle registration revenues.

Comparative Study Conclusions

Socioeconomic Equity: Memphis and Beloit both charge a flat local vehicle registration fee, which means that lower-income vehicle owners would pay a larger percentage of their income in vehicle registration fees than higher-income individuals who own the same number of vehicles.

Beloit's $10 flat fee accounts for 0.03 percent of median household income. When that fee is combined with the Wisconsin state registration fee of $75, Beloit households pay 0.23 percent of their median income in registration fees.

In Memphis, residents pay slightly more: 0.09 percent of median household income for the local vehicle registration fee. In addition to the $30 flat city registration fee, residents pay a state fee of $24 and a Shelby County registration fee of $50 for automobiles (City of Memphis, 2007; Shelby County (Tennessee) Government Web Portal, n.d.). For Memphis residents, the non-city total of $74 in state and county fees is comparable to the 2008 Wisconsin state automobile registration fee of $75. Combined, these fees make up 0.32 percent of median household income.

By comparison, Indianapolis's vehicle registration fee is likely less regressive because its sliding scale charges the owners of higher value vehicles more, assuming that higher income residents own higher value vehicles. As a result, Indianapolis charges an average city vehicle registration fee of $16.87 per capita and $41.24 per household. Indianapolis' higher median income indicates that a $26 local vehicle registration

fee for a $16,000 vehicle is a similar proportion of household income as a flat $20 fee would be in Milwaukee (Indiana Bureau of Motor Vehicles, n.d.; U.S. Census Bureau, 2006a).

California's study of vehicle registration fees indicated that lower income people paid a higher percentage of income: lower income vehicle owners paid 1.6 percent of income compared to the state average of 0.6 percent (Dill, Goldman, & Wachs, 1999).[15] This was mitigated because lower income residents were less likely to own vehicles. Appendix F contains this data in more detail.

Milwaukee and Memphis have a higher proportion of individuals in poverty compared to Indianapolis and Beloit. Thus, a flat vehicle registration fee likely would have a more regressive impact in Milwaukee or Memphis.

The comparative data indicate that a flat vehicle registration fee in Milwaukee would lead to a regressive outcome, since lower-income individuals would pay a higher percentage of their incomes in registration fees. When the $20 fee is combined with the Wisconsin state fee of $75, the total fee of $95 is 0.28 percent of 2006 Milwaukee median household income. While higher than Beloit, this 0.28 percent level is below the total vehicle registration fee as a percentage of income in both Memphis and Indianapolis.

Homeownership Equity: Beloit, Indianapolis, and Memphis have higher rates of home-ownership than Milwaukee. More than 61 percent of Beloit households own their own homes, as do 59 percent of Indianapolis households and nearly 55 percent of Memphis households (U.S. Census Bureau, 2000a; U.S. Census Bureau, 2006a; U.S. Census Bureau, 2006b; U.S. Census Bureau, 2006c). By contrast, 48 percent of Milwaukee households own their own homes (U.S. Census Bureau, 2006b). This indicates that a higher proportion of Milwaukee renters would pay the flat vehicle registration fee than in other cities.

With a property tax offset, average 2006 property taxes on a median value home in the City of Milwaukee would have dropped by approximately $38. However, the higher proportion of renters in Milwaukee means that fewer people would directly benefit from a property tax offset than they would in Beloit, Indianapolis, or Memphis. Thus, a vehicle registration fee with a property tax offset would be concentrated among fewer Milwaukee residents. Beloit, Indianapolis, and Memphis all pay lower property taxes per household (largely because of lower median home values). The same property tax offset in those cities would represent a larger percentage decrease in property taxes than the same offset in Milwaukee.

Based on the data from Beloit, Indianapolis, and Memphis, we infer that a flat, $20 vehicle registration fee in Milwaukee would likely have a larger regressive effect on

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[15] California's fee structure is similar to Indiana's variable registration fee.

lower-income residents than in these other cities. In Milwaukee, a $20 fee is a larger share of income for lower-income residents relative to higher-income residents. However, the $20 fee represents a small percentage of median household income, resulting in a negligible regressive burden.

Geographic Equity: The amount of land in the cities of Memphis and Indianapolis is significantly larger than Milwaukee, as Indianapolis is 366 square miles and Memphis 256 square miles, compared to Milwaukee's 96 square miles (City-Data.com, 2008b; City-Data.com, 2008c; City-Data.com, 2008d). This means the vehicle registration fees are distributed over more neighborhoods and less-populated areas in Memphis and Indianapolis than in Milwaukee. Despite only measuring 16.2 square miles, Beloit's population density is closer to Indianapolis and Memphis than Milwaukee (City-Data.com, 2008a; City-Data.com, 2008b; City-Data.com, 2008c; City-Data.com, 2008d). Given Milwaukee's higher population density, it is difficult to draw conclusions regarding geographic equity using the comparative data.

We expect Beloit, Memphis, and Milwaukee to have higher revenue from vehicle registration fees in geographic areas with higher concentrations of individuals, where more vehicles would be registered in these areas than in less dense areas. These attributes apply to both the flat registration fee and the fee with property tax offset, but the more geographically dispersed nature of Beloit, Memphis, and Indianapolis suggests that there may be more variety in property values in these communities. A wider range of property values translates into a more uneven distribution of benefits among property owners from a property tax offset.

Regression Analysis

Regression analysis is a statistical method for determining the influence of certain variables on a key variable of interest. In this analysis, we can use the equity measures to assess whether they influence the tax burden under the $20 flat fee alternative. We then complete the same analysis for a $20 flat fee alternative with tax offset. While the qualitative and descriptive statistics presented earlier in the report offer many insights into predicting the distributive impact of a vehicle registration fee, regression analysis can control for the effects of many variables and, therefore, offers more objective, empirical conclusions.

However, we must restrict any conclusions by the limitations of the data, which is available only by census tract, rather than household. Therefore, we only draw conclusions about census tracts. We can infer similar patterns about households, but it is plausible that household-level data would provide different results.

We highlight the conclusions of the regression analysis below. For additional information on the data, variable definitions, full model results, model fit, and supplementary findings, please refer to Appendix G.

Socioeconomic Equity: Socioeconomic equity measures indicate that with or without a property tax offset, the local vehicle registration fee has some regressive effects. Areas with a higher income tend to face a lower proportional net tax incidence, and areas with a lower income face a higher proportional net tax incidence. This is reasonable for a few reasons. First, our dependent variable, proportional net tax incidence, is a ratio. It is not simply the incidence, but the incidence as a percentage of income. As a result, areas with higher median incomes would bear a lower proportional burden. This result holds even greater importance when considered in tandem with the fact that areas with higher income do not necessarily own more vehicles, as discussed earlier. We conclude, therefore, that the flat fee with property tax offset exacerbates disparities along socioeconomic lines, relative to the flat fee with a tax offset.

Homeownership Equity: Homeownership equity measures demonstrate contrasting results in each alternative. The regression analysis for the flat fee alternative without property tax offset indicates that areas with higher homeownership rates face a higher tax incidence. The flat fee with tax offset scenario reversed this trend. This finding is due primarily to the tax offset, which redistributes tax revenue from vehicle-owners to property-owners. Thus, property ownership is rewarded at the expense of areas that have higher rental rates. These areas do not benefit, proportionally, from the tax offset. We conclude that the flat fee with tax offset increases disparities between the census tracts with higher homeownership rates and the tracts with higher rental rates.

Geographic Equity: In the $20 flat fee alternative without property tax offset, few geographic disparities materialized. In fact, only District 4 indicated a disparate

impact. This expected impact was consistent with our data analysis section where we highlighted that District 4 has the fewest vehicles, and the largest gap between number of vehicles and number of households.

The second alternative, the $20 flat fee with property tax offset increased the disparate effects of aldermanic districts. In this alternative, ten aldermanic districts would benefit at the expense of the remaining five. Overall, for geographic equity, we conclude that the flat fee with property tax offset increases disparities among aldermanic districts.

Comparison of Alternatives

Under the status quo, the City of Milwaukee charges no additional local vehicle registration fee. As a result, with no fee, the City does not impose a regressive burden upon any of the City's socioeconomic groups, geographic areas, or renters. However, under the status quo, the City does not capture an estimated $6.8 million in additional revenue for transportation-related expenses, which would be made available upon imposition of a $20 vehicle registration fee.

Under the $20 flat fee without property tax offset alternative, descriptive statistics for the City of Milwaukee indicate that this alternative fee would be regressive. That is, the fee would comprise a higher percentage of income for lower-income residents. However, the regressive effect is negligible. Even for Milwaukee's lowest-income residents, the $20 fee would be 0.067 percent of income per vehicle. For households with incomes over $100,000, the fee would represent 0.02 percent of annual income. The comparative case study data, which show Beloit's flat fee comprises 0.03 percent of household income and Memphis's flat fee comprises 0.09 percent of median household income, confirm that any regressive effect of a flat fee is minimal, at best. Regression analysis also confirms that the flat fee is regressive by income level, but only minimally. For each additional $10,000 in median income, a census tract would expect to pay 0.009 percent less of its income for the fee. We can draw similar conclusions at the household level. Appendix D provides further explanation of this finding. We also found negligible disparate impacts by geographic area or by homeownership under this alternative.

Under the flat fee with property tax offset alternative, again, the imposition of a $20 local vehicle registration fee causes minimal regressive effects by income. However, the accompanying offset in property taxes places more of a burden upon renters than homeowners. Renters would not directly benefit from a decrease in property taxes while renters who own vehicles would still be required to pay the $20 local vehicle registration fee. The descriptive statistics show that aldermanic districts with higher homeownership rates would benefit more from a property tax offset than districts with higher proportions of renters. The regression analysis is consistent with the descriptive statistics. It shows that districts with more renters would pay a higher percentage of household income in registration fees than districts with higher homeownership rates.

Recommendation & Conclusion

We recommend a $20 local vehicle registration fee without a property tax offset. This would represent an improvement over the status quo because it offers a stable revenue stream for the City of Milwaukee. Imposition of such a fee would infuse an estimated $6.8 million into the City's budget for transportation-related costs. While a flat fee is regressive by nature, any regressive burden on socioeconomic groups, on renters, or by geographic area is minimal. Our recommendation also furthers the City's goal to diversify own-source non-property tax revenue.

We do not recommend the City use the additional revenues from the fee to offset property taxes. This would exacerbate the regressive effects by giving the benefit of property tax savings to homeowners thus causing renters to bear a disproportionate share of the vehicle registration fees as a percentage of income. Our recommendation minimizes the regressive effects of vehicle registration fee while providing additional City revenue, meeting both equity goals and budgetary needs.

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Appendix A: Milwaukee Transportation Budget

This appendix contains information about the City of Milwaukee's actual and projected transportation costs and revenue.

Table 6:
City of Milwaukee
Transportation Operating Costs and Revenues

Operating Expenditures*	2006 (Actual)	2007 (Projected)	2008 (Projected)
Streets, Alleys, and Sidewalks**	$12,416,116	$12,755,189	$13,352,659
Street Lighting	$8,644,026	$8,367,069	$7,030,762
Traffic Control	$3,073,748	$2,628,541	$4,457,900
Underground Conduit Program	$139,947	$97,712	$97,613
Snow and Ice Control	$3,873,753	$4,885,314	$4,918,942
Law Enforcement (26% of eligible costs)***	$55,438,963	$55,657,001	$56,026,743
Total Operating Expenditures	**$83,586,553**	**$84,390,826**	**$85,884,619**
Operating Revenues	**2006 (Actual)**	**2007 (Projected)**	**2008 (Projected)**
Local Street Aids	$25,447,972	$25,750,000	$26,320,300
DPW Infrastructure Division Charges	$4,420,004	$3,469,250	$3,764,100
Snow and Ice Control Charges	$2,505,632	$2,400,000	$4,300,000
Total Operating Revenues	**$32,373,608**	**$31,619,250**	**$34,384,400**

*Although street sweeping, leaf collection, and storm sewer costs are considered transportation-related costs, we exclude them from operating expenditures because the City accounts for these costs in the sewer maintenance fund, a self-sustaining fund.

**Costs not specifically allocated to a particular service in the City of Milwaukee's Department of Public Works Infrastructure Division were included in streets, alleys, and sidewalks.

***Net of revenues attributed to the Police Department.

Source: City of Milwaukee Budget and Management Division, n.d.

Appendix B: Milwaukee Street Capital Budget

This appendix contains information about the City of Milwaukee's actual and projected capital funding for street improvements.

Table 7: Street Capital Improvement Budget

Capital Expenditures	2006 (Actual)	2007 (Projected)	2008 (Projected)
Major Streets Plan	$11,770,612	$6,058,190	$7,731,489
Local Street Resurfacing and Reconstruction	$6,363,845	$5,816,378	$9,134,890
Total Operating Expenditures	$18,134,457	$11,874,568	$16,866,379
Capital Funding	2006 (Actual)	2007 (Projected)	2008 (Projected)
City Funding	$14,964,133	$9,551,746	$11,705,085
State Aid	$1,067,445	-	$1,067,445
Assessed to Property Owners	$2,102,879	$2,322,822	$4,093,849
Total Operating Revenues	$18,134,457	$11,874,568	$16,866,379

Source: City of Milwaukee Budget and Management Division, n.d.

Appendix C: Projected Registration Fee Revenue

This appendix projects the revenue the City of Milwaukee would raise from a $20 local vehicle registration fee from 2009 to 2018 during the next ten years, assuming an annual growth rate of 1 percent in the number of vehicles registered in the City of Milwaukee.

Table 8:
Projection of Vehicle Registration Fee Revenue

Year	Number of Vehicles	Fee	Annual Revenue
2006	342,000	n/a	n/a
2007	345,420	n/a	n/a
2008	348,874	n/a	n/a
2009	352,363	$20	$7,047,259
2010	355,887	$20	$7,117,731
2011	359,445	$20	$7,188,909
2012	363,040	$20	$7,260,798
2013	366,670	$20	$7,333,406
2014	370,337	$20	$7,406,740
2015	374,040	$20	$7,480,807
2016	377,781	$20	$7,555,615
2017	381,559	$20	$7,631,171
2018	385,374	$20	$7,707,483
10-Year Revenue Total			$73,729,920

Sources: Osterman, 2005; author calculations

Appendix D: Information by Aldermanic District

This appendix contains information discussed in the report, by aldermanic district.

Table 9:
Percentage of Occupied Housing Units by Renter or Owner Status

District	Total Occupied Units	Owner-Occupied Units	Renter-Occupied Units	Percentage Owner-occupied	Percentage Renter-occupied
1	15,294	7,630	7,664	49.89%	50.11%
2	13,339	7,305	6,034	54.76%	45.24%
3	22,973	5,269	17,704	22.94%	77.06%
4	14,434	1,619	12,815	11.22%	88.78%
5	17,108	11,029	6,079	64.47%	35.53%
6	14,022	4,314	9,708	30.77%	69.23%
7	16,942	8,695	8,247	51.32%	48.68%
8	11,855	5,370	6,485	45.30%	54.70%
9	16,012	7,101	8,911	44.35%	55.65%
10	17,309	9,281	8,028	53.62%	46.38%
11	17,158	10,316	6,842	60.12%	39.88%
12	13,410	3,984	9,426	29.71%	70.29%
13	15,133	10,024	5,109	66.24%	33.76%
14	16,811	9,949	6,862	59.18%	40.82%
15	10,360	3,358	7,002	32.41%	67.59%
City Total	232,160	105,244	126,916	45.33%	54.67%

Source: U.S. Census Bureau, 2000a

Table 10:
Percentage of Vehicles by Renter or Owner Status

District	Total Occupied Units	Owner-occupied Units	Renter-occupied Units	Percentage Owner-occupied	Percentage Renter-occupied
1	20,021	12,725	7,296	63.56%	36.44%
2	18,375	12,315	6,060	67.02%	32.98%
3	19,848	5,912	13,936	29.79%	70.21%
4	14,556	5,428	9,128	37.29%	62.71%
5	26,224	18,442	7,782	70.32%	29.68%
6	17,885	7,009	10,876	39.19%	60.81%
7	20,313	13,015	7,298	64.07%	35.93%
8	15,533	8,736	6,797	56.24%	43.76%
9	20,905	12,218	8,687	58.45%	41.55%
10	17,833	10,414	7,419	58.40%	41.60%
11	25,305	17,238	8,067	68.12%	31.88%
12	14,529	5,955	8,574	40.99%	59.01%
13	22,085	16,547	5,538	74.92%	25.08%
14	23,659	15,994	7,665	67.60%	32.40%
15	12,544	6,776	5,768	54.02%	45.98%
City Total	289,615	168,724	120,891	58.26%	41.74%

Source: U.S. Census Bureau, 2000a

Table 11:
Comparison of Property Tax Benefit
by Aldermanic District Based on Median House Value

District	Median House Value	Property Tax Reduction	Net Gain (Loss)
1	$50,900	$20	$0
2	$69,300	$28	$8
3	$139,700	$55	$35
4	$51,800	$21	$1
5	$93,700	$37	$17
6	$39,300	$16	$(4)
7	$53,500	$21	$1
8	$62,700	$25	$5
9	$51,900	$21	$1
10	$81,750	$32	$12
11	$103,100	$41	$21
12	$42,050	$17	$(3)
13	$99,500	$40	$20
14	$82,800	$33	$13
15	$37,950	$15	$(5)

Sources: U.S. Census Bureau, 2000a; author calculations

Table 12:
Aggregate Vehicles and Households by Aldermanic District

District	Aggregate Vehicles	Percentage of City Vehicles	Number of Households	Percentage of City Households
1	20,015	6.91%	15,242	6.56%
2	18,375	6.35%	13,381	5.76%
3	26,450	9.13%	23,101	9.95%
4	11,280	3.90%	14,454	6.22%
5	25,655	8.86%	17,118	7.37%
6	12,990	4.49%	13,865	5.97%
7	20,060	6.93%	17,000	7.32%
8	14,930	5.16%	11,805	5.08%
9	20,895	7.22%	16,024	6.90%
10	24,075	8.31%	17,351	7.47%
11	25,305	8.74%	17,209	7.41%
12	14,530	5.02%	13,328	5.74%
13	22,075	7.62%	15,084	6.49%
14	23,660	8.17%	16,954	7.30%
15	9,285	3.21%	10,371	4.46%
City Total	289,580	100.00%	232,287	100.00%

Sources: U.S. Census Bureau, 2000a; author calculations

Table 13:
Median Income by Vehicles by Aldermanic District

District	Median Income	No Vehicle	One Vehicle	Two Vehicles	Three Vehicles	Four + Vehicles
1	$30,225	$15,774	$26,373	$46,373	$58,954	$48,920
2	$35,655	$18,074	$28,984	$47,426	$60,898	$69,890
3	$36,526	$20,638	$31,633	$59,962	$56,903	$57,908
4	$21,053	$12,533	$23,014	$34,620	$42,525	$30,613
5	$43,736	$19,656	$32,671	$56,061	$65,369	$78,194
6	$20,732	$12,461	$22,213	$39,152	$50,413	$35,992
7	$29,659	$15,498	$27,734	$43,605	$61,389	$63,506
8	$31,028	$15,851	$26,942	$48,409	$48,987	$67,172
9	$33,434	$19,339	$27,291	$48,378	$61,667	$72,336
10	$36,888	$17,447	$30,217	$51,444	$66,012	$66,810
11	$40,599	$19,287	$31,851	$53,592	$64,908	$81,328
12	$24,222	$13,560	$24,715	$37,298	$53,881	$42,076
13	$40,238	$17,354	$30,826	$55,688	$69,197	$66,445
14	$35,935	$20,214	$29,598	$58,375	$64,034	$50,365
15	$19,557	$11,999	$22,022	$35,174	$40,675	$41,726

Source: U.S. Census Bureau, 2000a

Table 14:
Median Income per Vehicle Available by Aldermanic District

District	Median Income	No Vehicle	One Vehicle	Two Vehicles	Three Vehicles	Four + Vehicles
1	$30,225	$15,774	$26,373	$23,187	$19,651	$12,230
2	$35,655	$18,074	$28,984	$23,713	$20,299	$17,472
3	$36,526	$20,638	$31,633	$29,981	$18,968	$14,477
4	$21,053	$12,533	$23,014	$17,310	$14,175	$7,653
5	$43,736	$19,656	$32,671	$28,031	$21,790	$19,548
6	$20,732	$12,461	$22,213	$19,576	$16,804	$8,998
7	$29,659	$15,498	$27,734	$21,803	$20,463	$15,877
8	$31,028	$15,851	$26,942	$24,204	$16,329	$16,793
9	$33,434	$19,339	$27,291	$24,189	$20,556	$18,084
10	$36,888	$17,447	$30,217	$25,722	$22,004	$16,702
11	$40,599	$19,287	$31,851	$26,796	$21,636	$20,332
12	$24,222	$13,560	$24,715	$18,649	$17,960	$10,519
13	$40,238	$17,354	$30,826	$27,844	$23,066	$16,611
14	$35,935	$20,214	$29,598	$29,187	$21,345	$12,591
15	$19,557	$11,999	22,022	$17,587	$13,558	$10,431

Source: U.S. Census Bureau, 2000a

Table 15:
Number of Vehicles for Ranges of Income by Aldermanic District

The figures below are from U.S. Census data and do not necessarily match the number of registered vehicles in the city. However, they can be used to compare across districts.

Income Range	District 1	District 2	District 3	District 4	District 5
<$30,000	7,334	5,458	10,674	9,517	5,503
$30,000-59,999	5,096	5,076	7,189	3,266	6,716
$60,000-99,999	2,235	2,250	3,250	1,048	3,780
$100,000-124,999	303	305	715	190	530
$125,000+	259	241	1,263	367	536
Total Vehicles	15,227	13,330	23,091	14,388	17,065

Income Range	District 6	District 7	District 8	District 9	District 10
<$30,000	9,094	8,641	5,484	6,940	6,050
$30,000-59,999	3,337	5,400	4,120	5,523	6,848
$60,000-99,999	1,031	2,280	1,770	2,840	3,475
$100,000-124,999	141	323	189	390	578
$125,000+	174	363	208	332	405
Total Vehicles	13,777	17,007	11,771	16,025	17,356

Income Range	District 11	District 12	District 13	District 14	District 15
<$30,000	5,855	8,033	5,129	6,250	7,028
$30,000-59,999	6,775	3,913	5,618	6,391	2,071
$60,000-99,999	3,785	1,122	3,500	3,453	872
$100,000-124,999	554	146	434	558	133
$125,000+	239	136	362	271	162
Total Vehicles	17,208	13,350	15,043	16,923	10,266

Source: U.S. Census Bureau, 2000a

Table 16:
Comparison of Aggregate Vehicle Registration Fee Revenue
and Property Tax Benefit by Aldermanic District

District	Aggregate Vehicles	Vehicle Registration Fees	Percent of Fees Paid	Share of Property Tax Levy*	Property Tax Reduction	Percent of Reduction Benefit	Net Gain (Loss)
1	20,015	$400,300	6.9%	$4,394,657	$180,147	4.9%	$ (220,153)
2	18,375	$367,500	6.3%	$4,992,118	$204,638	5.5%	$ (162,862)
3	26,450	$529,000	9.1%	$8,616,348	$353,203	9.5%	$ (175,797)
4	11,280	$225,600	3.9%	$1,774,820	$72,754	2.0%	$ (152,846)
5	25,655	$513,100	8.9%	$10,771,307	$441,540	11.9%	$ (71,560)
6	12,990	$259,800	4.5%	$2,039,430	$83,601	2.3%	$ (176,199)
7	20,060	$401,200	6.9%	$5,177,755	$212,248	5.7%	$ (188,952)
8	14,930	$298,600	5.2%	$4,028,206	$165,125	4.5%	$ (133,475)
9	20,895	$417,900	7.2%	$5,787,716	$237,251	6.4%	$ (180,649)
10	24,075	$481,500	8.3%	$8,246,214	$338,031	9.1%	$ (143,469)
11	25,305	$506,100	8.7%	$11,201,010	$459,154	12.4%	$ (46,946)
12	14,530	$290,600	5.0%	$2,218,865	$90,956	2.5%	$ (199,644)
13	22,075	$441,500	7.6%	$10,016,553	$410,601	11.1%	$ (30,899)
14	23,660	$473,200	8.2%	$9,403,249	$385,460	10.4%	$ (87,740)
15	9,285	$185,700	3.2%	$1,642,528	$67,331	1.8%	$ (118,369)
City Total	289,580	$5,791,600	-	-	$3,702,040	-	$ (2,089,560)

*Based on aggregate home values for 2000 and the City's tax rate for 2000

Source: U.S. Census Bureau, 2000a; City of Milwaukee Budget and Management Division, n.d.; author calculations

Appendix E: Case Study Comparison Information

This appendix contains additional comparative information for Milwaukee, Beloit, Indianapolis, and Memphis.

Table 17:
Milwaukee and Comparison Cities with Vehicle Registration Fees

	Milwaukee	Beloit ***	Indianapolis**	Memphis*
Population, city 2006	602,782	36,348	785,597	670,902
Non-white population, city 2006	334,612	10,577	262,120	474,886
Non-white population, city 2006	55.51%	29.10%	33.37%	70.78%
County population, 2006	915,097	152,307	865,504	911,438
City's share of county population	65.87%	23.90%	90.77%	73.61&
Housing units, 2006	252,175	14,467	379,176	294,262
Vacant housing units, 2006	23,848	904	57,819	45,426
Vacancy rate, 2006	9.46%	6.25%	15.25%	15.44%
Number of households, 2006	228,327	13,563	321,357	248,836
Owner-occupied households, 2006	109,275	8,397	190,752	136,669
Renter-occupied housing units, 2006	119,052	5,166	130,605	112,167
Owner-occupied households	47.86%	61.91%	59.36%	54.92%
Persons per 2006 household	2.64	2.68	2.44	2.70
Median home value, 2006	$136,700	$84,200	$122,800	$90,900
Poverty rate, 2006	26.2%	14.5%	16.3%	23.5%
City registration fee, for 2007 Toyota Corolla	$0.00	$10.00	$26.00	$30.00
Net revenue from registration fee, 2006	$0	$280,942	$13,252,157	$10,781,333
City registration fee per person	$0.00	$7.73	$16.87	$16.07
City registration fee per 2006 household	$0.00	$20.71	$41.24	$43.33
State vehicle registration fee for 2007 Toyota Corolla	$75.00	$75.00	$150.75	$24.00
Median household income, 2006	$33,990	$37,000	$41,520	$32,594
City registration fee per capita as percentage of household income	0.00%	0.03%	0.07%	0.13%
Registration fee per vehicle as percentage of median household income	0.22%	0.23%	0.43%	0.32%
Property taxes collected, in millions, 2006	$220.1	$10.6	$298.0	$197.7
Property taxes per household, 2006	$963.97	$780.73	$927.24	$794.66
Property taxes per household per median home value per $1,000	$7.05	$9.27	$7.55	$8.74
Number of workers, 16 and older, 2006	245,021	17,727	368,870	268,695
Proportion of workers 16 and older vs. general population	40.65%	48.77%	46.95%	40.05%
Workers who drove to work	198,971	15,795	338,692	244,324
Workers who drove to work	81.21%	89.10%	91.82%	90.93%
Population who drove to work	33.00%	43.46%	43.11%	36.42%
Mean travel time to work, minutes, 2006	21.6	20.0	21.4	21.8

* Memphis total registration taxes include $50 Shelby County registration fee.

** Indianapolis figures combine Marion County and City of Indianapolis fees under Unigov system.

*** Beloit figures imputed based on 2000 U.S. Census and citydata.com, as city is not included in the 2006 American Community Survey

Sources: U.S. Census Bureau, 2006a, 2006b, 2006c; City-Data.com, 2008a, 2008b, 2008c, 2008d

Appendix F: California Comparative Information

This appendix contains additional comparative information for the state of California.

Table 18:
Distribution of California Vehicle Registration Fee

Group	Mean Household License fee	Index of Household License Fee (state average=100)	License fee as % of income	Index of license fee as % of income (state average=100)
California average	$247	100	0.61%	100
Household income under $10,000	$55	22.3	1.05%	172.1
Household income $10,000-$20,000	$114	46.2	0.75%	123.0
Household income $20,000-$30,000	$172	75.8	0.67%	109.8
Household income $30,000-$40,000	$225	91.1	0.63%	103.3
Household income over $100,000	$599	242.5	0.30%	49.2
Single adult, no children	$133	58.6	0.47%	77.0
Two adults, no children	$306	134.8	0.73%	119.7
Single adult, children under 16	$113	49.8	0.33%	54.1
Two adults, all children under 16	$297	130.8	0.64%	104.9
Single adult, youngest child 16-21	$209	92.1	0.69%	113.1
Two adults, youngest child 16-21	$441	194.3	0.82%	134.4
Age under 70	$263	115.9	0.63%	103.3
Age 70+	$118	52.0	0.44%	72.1
White	$252	111.0	0.57%	93.4
Black	$210	92.5	0.61%	100
Hispanic	$205	90.3	0.67%	109.8
Asian	$297	130.8	0.83%	136.1
Urban	$239	105.3	0.61%	100

Sources: Dill, Goldman, & Wachs, 1999

Appendix G: Regression Analysis Detail

This appendix contains detailed information about the regression analysis methodology, findings, and conclusions discussed in the report.

Independent Variables

To test our measures of equity, we use independent variables that capture the three types of equity identified in our report. We used the same 2000 Census data used in our summary statistics section. Table 19 provides our list of independent variables.

Table 19:
Independent Variables

Variable	Equity type measured
Median Income	Socioeconomic Equity
Owner-occupancy Rate	Homeownership Equity
Aldermanic District	Geographic Equity

Source: Author regression analysis

Dependent Variables

The dependent variable differs based on the policy alternative considered. We want to measure not only whether the tax incidence is equal across groups, but also whether the tax incidence is *proportionally* equal across groups (as a percentage of income).

Flat $20 Fee Without Property Tax Offset — Dependent Variable: Our dependent variable is "proportional net tax incidence," which is a ratio of net tax incidence to aggregate household income. In this case, the net tax incidence is simply the tax revenue. It is made "proportional" by dividing by aggregate household income. This measurement best represents tax burden as a proportion of income.

Flat $20 Fee with Property Tax Offset — Dependent Variable: Our dependent variable here is still "proportional net tax incidence," which is a ratio of net tax incidence to aggregate household income. The difference is in how the net tax incidence changes. This measurement calculates the property tax offset and subtracts it from the tax revenue, yielding a different "net tax incidence." This is then divided by aggregate income to represent a "proportional net tax incidence."

Regression Logic

These regression analyses seek to determine whether the independent equity variables hold influence over proportional net tax incidence, as defined for the two alternatives. If there were equity in each of our measurements, we would expect to find the effects of a given variable on proportional net tax incidence to be random. For example, if median income is not related to proportional net tax incidence in a census tract, we would find that this independent variable would not be statistically significant.

We conducted both the regressions with a flat fee of $20 per vehicle. We conducted regressions with different flat fees, but the significance of the variables is identical in each case due to the mathematical logic. The only difference is in the coefficients, which change proportionally. Thus, we found no difference in the rate of the fee in terms of our evaluation, so we only reported the regressions for a $20 fee.

In short, in an equitable situation the effects of our independent variables should be random (i.e., statistically insignificant). The model, moreover, would have a lower adjusted R-square value. If variables are found to be statistically significant, this is evidence to suggest that the vehicle registration fee alternative is not equitable with respect to that variable.

Results – Flat $20 Fee Without Property Tax Offset

Table 20 shows our results, using a 90 percent confidence level, when we conducted a regression in the flat fee situation.

Table 20:
Regression Output for Flat $20 Fee
Without Property Tax Offset

Regression statistics	
R-Square	0.224
Adjusted R-Square	0.163
Number of Observations	221

Variables	Coefficient	Standard Error	T-Stat	P-Value
Intercept	**7.70 E -4**	**3.94 E -5**	**19.5**	**0.000**
Median Income	**-5.41 E -9**	**1.02 E -9**	**-5.32**	**0.000**
Owner-Occupancy Rate	**1.66 E -4**	**6.21 E -5**	**2.68**	**0.008**
District 2	-1.54 E -5	4.28 E -5	-0.360	0.719
District 3	-7.06 E -5	4.30 E -5	-1.64	0.102
District 4	**-1.02 E -4**	**4.13 E -5**	**-2.47**	**0.014**
District 5	-2.80 E -5	4.16 E -5	-0.673	0.502
District 6	-5.54 E -5	3.84 E -5	-1.44	0.151
District 7	-6.90 E -5	3.90 E -5	-1.77	0.078
District 8	-3.42 E -5	4.48 E -5	-0.800	0.425
District 9	-1.18 E -5	4.53 E -5	-0.261	0.794
District 10	-3.77 E -5	4.02 E -5	-0.938	0.349
District 11	-1.16 E -5	4.33 E -5	-0.267	0.790
District 12	7.915 E -6	4.13 E -5	0.192	0.848
District 13	-2.53 E -5	4.17 E -5	-0.606	0.545
District 14	-5.04 E -5	3.82 E -5	-1.319	0.189
District 15	-7.59 E -5	3.77 E -5	-2.02	0.045

Bold typeface indicates variable is statistically significant at 90 percent confidence.

Source: Author regression analysis

The R-square value of 0.224 suggests that approximately 22.4 percent of the variation in a census tract's proportional net tax incidence can be explained by the combined linear effects of median income, owner-occupancy rate, and the aldermanic district.

Variable Coefficient Interpretation

Median Income: For every additional $10,000 in a census tract's median income, we would expect the proportional net tax incidence to decrease by 0.00541 percent. This assumes holding all other variables constant. This means that areas with higher median income would expect to pay a *lower* share of their income in vehicle registration fee than areas with lower median incomes.

Owner-Occupancy Rate: For every 1 percent increase in a census tract's owner-occupancy rate, we would expect the proportional net tax incidence to increase by 0.166 percent. This assumes holding all other variables constant. This means that areas with higher owner-occupancy rates would expect to pay a *greater* share of their income in the vehicle registration fee than areas with lower owner-occupancy rates.

Aldermanic District: District 4 would expect to find its proportional net tax incidence to be lower by 0.0102 percent, relative to District 1. This assumes holding all other variables constant. No other districts had statistically significant effects relative to District 1. This means that District 4, home to the second lowest median income of all districts and the highest percentage of renter-occupied housing units, pays a disproportionately lower share of its income in the registration fee than other districts, relative to District 1. All other districts were not statistically significant.

Thus, we would only expect to find geographic disparities in District 4.

Conclusion – Flat $20 Fee Without Property Tax Offset: We conclude that the flat $20 fee without property tax offset is regressive with respect to income. It is actually progressive with respect to owner-occupancy rates in that areas with higher owner-occupancy rates pay *more* of their income in the fee. The fee without the offset also is slightly disproportionate with respect to aldermanic district in that District 4 pays less its income in the registration fee than other districts. The absolute effects are minimal, however, as we see in the interpretations of the coefficients.

Results – Flat $20 Fee With Property Tax Offset

We conducted a second regression with the flat fee with property tax offset alternative. We found the following results, in Table 21, using a confidence level of 90 percent.

Table 21:
Regression Output for Flat $20 Fee With Property Tax Offset

Regression statistics	
R-Square	0.792
Adjusted R-Square	0.775
Number of Observations	221

Variables	Coefficient	Standard Error	T-Stat	P-Value
Intercept	8.62 E -4	5.45 E -5	15.8	0.000
Median Income	-9.88 E -9	1.41 E -9	-7.02	0.000
Owner-Occupancy Rate	-7.21 E -4	8.59 E -5	-8.40	0.000
District 2	-2.24 E -5	5.91 E -5	-0.379	0.705
District 3	-2.68 E -4	5.94 E -5	4.50	0.000
District 4	-1.91 E -4	5.71 E -5	-3.34	0.000
District 5	-1.53 E -4	5.75 E -5	-2.66	0.000
District 6	-1.43 E -4	5.62 E -5	-2.68	0.008
District 7	-7.81 E -5	5.39 E -5	-1.45	0.149
District 8	-1.02 E -4	5.92 E -5	-1.72	0.086
District 9	-6.92 E -5	6.26 E -5	-1.10	0.270
District 10	-1.13 E -4	5.56 E -5	-2.31	0.022
District 11	-2.62 E -4	5.99 E -5	-4.38	0.000
District 12	-6.24 E -5	5.71 E -5	-1.09	0.275
District 13	-2.34 E -4	5.78 E -5	-4.05	0.000
District 14	-2.07 E -4	5.29 E -5	-3.92	0.000
District 15	-1.44 E -4	5.21 E -5	-2.78	0.006

Bold typeface indicates variable is statistically significant at 90 percent confidence.

Source: Author regression analysis

The results in Table 21 indicate to us how well this model fits. First, the R-square value of 0.792 suggests that approximately 79.2 percent of the variation in a census tract's proportional net tax incidence can be explained by the combined linear effects of median income, owner-occupancy rate, and the aldermanic district.

Variable Coefficient Interpretation

Median Income: For every additional $10,000 in a census tract's median income, we would expect the proportional net tax incidence to decrease by 0.00988 percent. This assumes holding all other variables constant. This means that areas with a higher median income would expect to pay a *lower* percent of their income in vehicle registration fees than areas with lower median incomes.

This coefficient is higher than in the previous regression, where there was only a decrease of 0.00541 percent for every $10,000 in median income. Thus, the regressive effects of median income are greater in this scenario.

Owner-Occupancy Rate: For every 1 percent increase in a census tract's owner-occupancy rate, we would expect the proportional net tax incidence to *decrease* by 0.721 percent. This assumes holding all other variables constant. This means that areas with higher owner-occupancy rates would expect to pay a *lower* share of their income in the registration fee than areas with lower owner-occupancy rates.

This number is starkly different from the previous 0.166 coefficient in the flat fee with no offset scenario. This suggests that the flat fee with tax offset reverses the effects of owner-occupancy rates. Without the offset, areas with higher owner-occupancy rates pay more of their income in the fee; with the offset, these areas pay less. This increases the burden on areas with high rental rates.

Aldermanic District: In the flat fee with property tax offset scenario, ten aldermanic districts were statistically significant. Table 22 ranks the aldermanic districts by coefficient. For example, District 3 can expect to find its proportional net tax incidence to be lower by 0.027 percent, relative to District 1. All coefficients, again, are relative to District 1 in this regression.

Table 22:
Statistically Significant
Aldermanic Districts
and Interpreted Coefficients

District	Interpreted Coefficient
3	-0.027
11	-0.026
13	-0.023
14	-0.021
4	-0.019
5	-0.015
15	-0.014
6	-0.014
10	-0.013
8	-0.010

Source: Author regression analysis

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Districts 2, 7, 9, and 12 were not statistically significant relative to District 1.

This means that the ten aldermanic districts in Table 22 pay a disproportionately lower share of their income in the registration fee than the remaining districts. Thus, we would expect to find more geographic disparities in the flat fee with property tax offset scenario.

Conclusion – Flat $20 Fee With Property Tax Offset: We conclude that the flat fee with property tax offset is regressive with respect to income and owner-occupancy rates. It is also is disproportionate with respect to aldermanic districts in that ten districts pay less of their income in the registration fee than the remaining districts. The absolute effects are still minimal, as can be seen in the interpretations of the coefficients. What is important is that these effects are greater with the property tax offset than without it.