**Methodology for the Tax Burden Report**

The Sycamore Institute staff analyzed the estimated tax burden on the household level for the average family of three using publicly available data on the county level. Methodology was based their tax burden methodology on the DC report “Tax Rates and Tax Burdens in the District of Columbia – A Nationwide Comparison,” and the “Local Tax Burdens on Tennessee Households by County,” by the TACIR Staff. Due to data limitations, there were changes made to the tax burden report for estimating housing values, family expenditures, and automobile data.

**Data Sources**

For estimation of tax burden on the county level, the staff used the following

1. Tennessee Comptroller – 2017, 2018 in progress
2. American Community Survey – 5 Year Estimates 2013-2017
3. Consumer Expenditure Survey – 2016-2017
4. IRS Individual Tax Return Data– 2016
5. Tennessee State Board Equalization Appraisal Ratios
6. US Energy Information Administration estimate for gasoline prices

**Breakdown of Tax Burdens**

**We will be using three measures of estimating taxes on the county level for Tennessee**

1. **Property Tax –** will be a mix of mortgage payment data and rent data depending on the income level
2. **Sales Tax –** will include the Local Option Sales tax as well as groceries as approximation of the tax burden.
3. **Automobile Tax –** will include estimates for gas, fuel, and motor taxes to reflect all burdens of having a car.

**Limitations and Data Restrictions**

1. **Inclusion of a wider range of lower and higher income households.** We included these households with disclaimers on some characteristics that would normally make these households incomparable to middle class homes. Disclaimers include the use of rent data to supplement the calculations of property taxes for lower income homes and limited number of higher income homes in the rural counties. Mazerov (2002) reasoning is outdated. He does not believe that TN should try to construct a tax incidence model
2. **Exclusion of incomes under $1 for calculation purposes**
3. **Exclusion of social characteristics in county comparison.** Only estimated tax burdens at the county level are included in this report.
4. **Housing values will be similar for counties in the same PUMA code regardless of the level of family income.** The calculation will not capture the full variation in housing values, but approximate median. As with the TACIR Analysis
5. **Gasoline tax will be calculated using a regional gasoline price of 2.67** as of 2017 sourced from the Energy Administration’s gasoline prices for the Midwest. This gasoline price has been standard in the calculation of the gasoline prices in the Midwest and TN’s state gasoline price is not statistically different.
6. **Some counties do not collect a wheel tax**, so they will receive a 0 for that tax and only used the estimate for gasoline tax. The total automobile tax will contain some variations among counties that was not in the original TACIR report.
7. **Some counties in the IRS data set do not report a value for number of returns and amounts for the state and local general sales tax because you can identify the person in the county**. We assumed 0 for these values and continued with the analysis. The amount of missing data was not so large that the analysis was disrupted for sales tax. However, this must be disclosed somewhere in the report.

**Methods**

The following sections are recommended calculations based on the DC Report and the TACIR Analysis as well as sections to include in the report as well. The following are recommendations and intended to be adjusted as the project continues on.

**Income Levels**

The Sycamore Institute staff limited the income ranges to 5 different ranges to reflect majority of the income levels in the state. These ranges are: 1-24,999, 25,000-49,999, 50,000-74,999, 75,000-99,999, 100,000-199,999, and over 200,000. Lower income households were included with disclaimers on their estimated tax burdens despite questions of whether they were comparable to households in the middle income ranges. Higher income households were also included because to account for all ranges of income as used in the DC study.

The income split used in the report is based on the DC study as well. A 70/30 was carried over from the DC study because that study bases their income split on the Belgium tax model for international compliance recommended by the OECD. For our purposes, it is considered a conservative split for household income for TN but compliant with the DC standard.

**Table:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 24,999 | 49,999 | 74,999 | 99,999 | 199,999 |
| Spouse 1 | $ 17,499.30 | $ 34,999.30 | $ 52,499.30 | $ 69,999.30 | $ 139,999.30 |
| Spouse 2 | $ 7,499.70 | $ 14,999.70 | $ 22,499.70 | $ 29,999.70 | $ 59,999.70 |

\*\*\* This is only a projection for the income split. There is no calculation involved using the ACS survey for county level data.

**Order to complete the Report:**

1. Find Median Family Income
2. Find Median Household Income
3. Find Grocery Tax
4. Find Sales Tax
5. Sum Sales and Grocery Tax
6. Find Number of Cars per county per income level
7. Find Gasoline Tax
8. Multiply Gasoline Tax by the Number of cars
9. Find Wheel Tax
10. Sum Wheel and Gasoline tax
11. Create line item for the county for the income level

**Variable Definitions**

**ACS**

1. ADJHSG – variable to adjust HINCP and VALP for the selected year. However, you will find that for 2017, it’s unnecessary
2. ADJINC - variable to adjust FINCP for the selected year
3. FINCP – unadjusted family income
4. VEH – number of vehicles
5. VALP – value of Property
6. RNTP – monthly rent paid by household
7. MRGP – first mortgage paid for by the household

**State Comptroller Data**

1. Wheel Tax – total wheel tax collected in the county for 2018

**CES Data:**

1. Total Food Expenditures – total annual food expenditures for the 2016-2017 period
2. Fuel, and gasoline costs – total fuel and gasoline costs for the 2016-2017 period.

**IRS Data Set:**

1. State and local general sales tax – sales tax on the state and local level

**Median Income – Estimated Burden of Local Major Taxes for Family of 3**

Median would be more descriptive of the actual income value of the income level and it would be more standard across the board.

Calculate median income:

Access ACS/PUMS data set for TN for 5 Year Estimates: https://www.census.gov/programs-surveys/acs/data/pums.html

1. Download the 2013-2017 ACS 5-Year PUMS CSV File and import into STATA. Create Do file and start recording your code. Sort by PUMS ID and duplicate observations for counties that contain an overlap (Knox, Sullivan, etc). Use the geocorr2018 file to help you duplicate the observations
2. Use the PUMA codes and line them up with the Counties
3. Find following variables: ADJINC, FINCP, VEH, VALP
4. Use the Data dictionary to adjust FINCP using the multiplier for 2017.
5. Use the Excel spreadsheet geocorr2018 to define counties by their PUMA Code. Aggregate and separate counties by PUMA Code by recoding the variables. Please see the Do file as reference.
6. Create income brackets using the adjusted family income variable. There should be six brackets in total.
7. Find Median by income brackets defined in the previous section by using the svyset commands outlined in the do file after aggregating counties. Export your results into Excel.

**Housing Values:**

Housing values are based off of the American Community Survey Data for 2017. In this, you will be using the VALP variable to approximate the median housing value for each county by their PUMA code using the method in the TACIR Analysis.

**Calculation:**

1. In the same STATA file, Repeat step 7 in previous section to obtain housing values using the VALP variable for each income level.

**Property Tax as Equivalent to Rent**

Property taxes are still the largest local tax faced by the 5 income levels and account for majority of the variation of the income tax burden. Since estimates for property taxes are difficult to estimate, we will be using a mix of rental and mortgage data as a supplement. We assumed that for lower income households (1-24,999), their estimated burden on property tax would be calculated using rent data as a substitute. All other households will have their calculations done using the mortgage data as a proxy for property tax. All data sources in this section are derived from ACS.

This method is a modification of the TACIR Method. The TACIR method only used the mortgage payment and excluded lower income households. Here, RNTP is substituted to create a fair estimation of property tax for the 1-24,999 income bracket.

We will be using the variables RNTP and MRGP to approximate the property tax and then use the county’s appraisal ratio set by the TN State Board of Equalization.

**Property Tax Calculation**

**Find Property Tax**

1. Find Median household income for each income bracket using the svy: command in the do file.

**Sales Tax and Grocery Tax**

We will be using the Local Option sales tax that is available on the county level using the State Comptroller data. If you go to their website: <https://apps.cot.tn.gov/TAG/> they have a collection of the amounts for the Local Option Sales Tax in the county. Scrap that number for each county available. Note that the 2018 numbers are still under calculation as of 3.18.19.

We will also be using the Consumer Expenditure Survey in conjunction with PUMS Microdata files to derive tax burden amounts for grocery taxes. In the CES data set, there is a variable for annual food expenditures by the urban population. This is the methodology used in the TACIR Report.

Methodology used outside of these two reports now include lower income and higher income households. For Lower income households, please use SNAP information sourced from this link: <https://www.tn.gov/humanservices/for-families/supplemental-nutrition-assistance-program-snap/snap-statistical-information.html> . For 200,000 plus, assume that these households spent half of their grocery budget on food away from home and then sum their food away from home number with their food at home number.

**For Grocery Tax:**

**Middle Income Households:**

1. Identify the county that you would like to obtain the tax on groceries for and observe their population count using the geocorr2018 excel file.
2. Look at the CES data and find the annual food expenditures row. Then use the population estimate to find the correct food expenditures for the county (ex, if population is 30,000, you would be looking at the column for under 100,000 urban consumer units in conjuncture with the annual food expenditures)
3. Multiply number found in Step 3 by the tax rate for the state. 2018 tax rate is 4% on the state level and record number

**For Lower Income Households:**

1. Look Up Snap Issuance for 2018 and take the average of the year for each county
2. Multiply the average by 4%

\*\*\*\*You are assuming that all people in 1-24,999 all receive SNAP

**Higher Income Households:**

1. Identify the county that you would like to obtain the tax on groceries for and observe their population count using the geocorr2018 excel file.
2. Look at the CES data and find the annual food expenditures row. Then use the population estimate to find the correct food expenditures for the county (ex, if population is 30,000, you would be looking at the column for under 100,000 urban consumer units in conjuncture with the annual food expenditures)
3. Divide number found in the Data set and divide by two because higher income households now spend half of their grocery budget on food away from home.
4. Sum number found in 3 and food at home together. Multiply sum by 4%

\*\*\*\*You are assuming that higher income households spend more eating out on average

**For Sales Tax:**

1. Download the IRS Tax Return Data set from this link: https://www.irs.gov/statistics/soi-tax-stats-county-data-2016
2. Open data set and look for the column “State and Local general sales tax”. You want to capture the number of returns and the amount for each county for each level of income
3. Copy and paste columns A, B, BP and BQ in the IRS file into a new excel sheet
4. Aggregate the income levels by summing relevant number of returns and amounts per row for each county. (EX Sum rows 1 to under 10,000 and 10,000 to under 25,000 for both number of returns and amounts to get the $1-24,999 income level for the report)
5. Divide number of returns and by the amounts for each county. This should be the sales tax

**Total Sales Tax:**

1. Sum the grocery tax and the sales tax for each county and record it for the estimated burden table

**Automobile Taxes**

Automobile taxes include gas, fuel and motor over the wheel tax estimates. The Consumer Expenditure Survey in conjunction with the American Community Survey and the State Comptroller Data will allow you to estimated tax burden on the county level. For automobiles, you must include the number of cars per household and then add the tax liability per car for each household.

Wheel tax is only collected in some counties and as of 2018, all counties are set on their wheel tax amount. All counties without a wheel tax is assumed to have 0 in the total. Automobile gasoline prices are sources from the 2017 US Energy Administration website for the Midwest region. This is a mixed method of the DC Report and the TACIR Analysis.

For each income level, calculate the average number of vehicles and then use the following:

**Number of Cars Calculation:**

1. Using the ACS Excel spreadsheet created when calculating Median Property Values, use =Average() formula on the VEH variable for each income level by the county. Leave as a decimal for calculation purposes

Tax Burden of the Car Calculation:

**Gasoline Tax:**

1. Look at residence per county
2. and obtain urban consumer unit estimate and match to CES survey
3. Match up the row for the Motor oil with the population count in the same manner as you did with the food expenditures and take the estimate
4. Divide that estimate with the 2.67 price for gasoline. This will give you the number of gallons of gasoline per household.
5. Multiply estimate in Step 4 with the rate for gasoline in the state, which is 0.24 per gal in 2017. This is the tax burden for gasoline

**Wheel Tax:**

1. Scrap the Wheel Tax Amount for the County using the Comptroller Website for each county: <https://apps.cot.tn.gov/TAG/CountyMatrix.aspx?RevExp=R> . Note that some counties do not collect a wheel Tax.
2. Divide the sum of the wheel tax per county by the population per county. Population per county can be found in the geocorr2018 file
3. Multiply the wheel tax amount by the average number of cars for the income level for the county

**Total Automobile Tax**

1. Take the gasoline tax amount and sum with the wheel tax amount. For any county without a wheel tax, sum gasoline tax with 0

**Constructing Estimated Burden Table**

**Estimated Tax Burden Tables – For Each Individual Income Level**

1. **Median Income** – Median Income for the county for that specific income level
2. **Housing Value** – housing value for the county for that specific income level
3. **Property Tax** – rent/mortgage of the property at the household level for family of three
4. **Sales Tax** – Groceries and Sales taxes summed for household family of three
5. **Automobile Tax** – gas, motor, and vehicle fees summed for the household
6. **Total Burden** – total of the taxes calculated
7. **Percent of Median Income** – Total tax/median income

**Ex. Mini table for PUMA 100, 1-24,999, for Gibson County**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **County** | **Median Income** | **Median House Value** | **Property Tax** | **Sales Tax** | **Automobile Tax** | **Tax Total** | **Tax Burden (%) Income** |
| Gibson | 16,482.38 | 60,000.00 | 392.60 | 266.70 | 244.88 | 904.18 | 5.49% |

**Data Visual:**

**Progressivity/Regressivity Index**

1. Tax burden percentage of lowest group/tax burden percentage of highest group for each county (EX, Gibson lowest income level/Gibson highest Income level)

Distributions of the Income Variables – STATA Graphs







