

Wisconsin's sales tax regressivity

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Executive summary

It is widely believed that sales taxes are regressive: The total sales tax paid by a low-income household represents a greater share of its income compared with a high-income household. We show, however, that **sales tax burdens are essentially equalized across income levels** when computed over the household's lifetime. The lowest-income Wisconsin households pay 2.1 percent of lifetime income in sales tax and the highest-income households pay 1.6 percent.

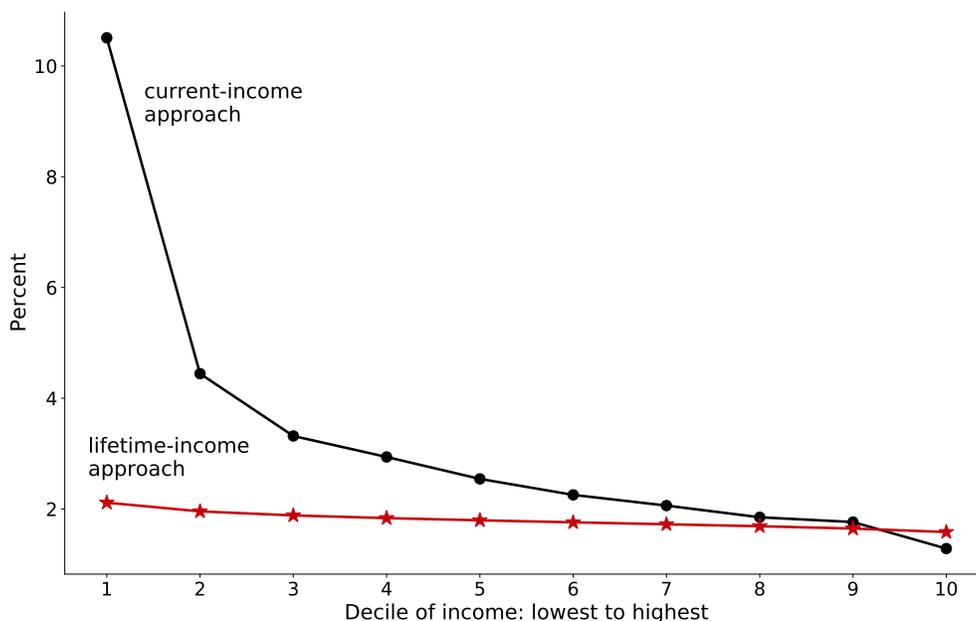
The lifetime tax burden is flatter because, regardless of income level, most after-tax income is consumed over the household's lifetime. A household can do two things with its after-tax income: spend it (consumption) or save it. Over the household's life, most after-tax income is spent (average: 83 percent) and this does not vary much with lifetime income. The lowest-income households spend 94 percent of lifetime post-tax income on consumption compared with 75 percent for households with the highest post-tax income. What is not spent nor taxed away at the household's end is left as a bequest. Since the sales tax rate does not vary by income, households end up paying similar shares of lifetime income as sales taxes.

State governments have several options to raise revenue, and some states have lowered or eliminated income taxes in favor of other taxes, such as the sales tax. A potential concern is that governments can craft a progressive income-tax policy but have less control over consumption-tax policy because it is not income-based.

It is widely believed that sales taxes are regressive: The total sales tax paid by a low-income household represents a greater share of its income compared with a high-income household. This belief is the result of a myopic approach to the issue that ignores the dynamic considerations at the core of modern economic theory. In this brief, we demonstrate that the sales tax is essentially flat—or slightly regressive—when measured over the household’s lifetime.

Figure 1 summarizes the two approaches. The current-income approach computes a household’s total sales tax paid in a year divided by the household’s income in that year. We average this *tax burden* over all the households in each income decile and plot the result. Households in the lowest decile pay more than 10 percent of their income in sales taxes, while households in the highest decile pay less than two percent of income. This is the measurement people have in mind when they declare sales taxes to be regressive.

Figure 1: Sales tax burdens by current and lifetime income



Notes: *Current-income approach* is total sales tax paid divided by total income in the current year. *Lifetime-income approach* is total sales tax paid divided by total income over the household’s lifetime. We report the average value for each income decile. Data are from 2018–2019.

The lifetime-income approach, in contrast, considers the sales tax burden over not just one year, but over the household’s entire lifetime. The life-time approach computes a household’s total sales tax paid over its life divided by the household’s income earned over its life. Again, we average this tax burden over all households in each lifetime-income decile. This approach yields a tax burden that is flat—the lowest-income households pay a bit more than two-percent of lifetime income and

the highest-income households pay a bit less than two percent.

Intuitively, the lifetime tax burden is flatter because, regardless of income level, most after-tax income is consumed over the household's lifetime. A household can do three things with its income. The government can take it (taxation), the household can spend it (consumption) or the household can save it. By saving when income is relatively high, and dissaving when income is low, the household smooths out its consumption from year to year. Over the household's life, most after-tax income is spent (average: 83 percent) and this does not vary much with lifetime income. The lowest-income households spend 94 percent of lifetime post-tax income on consumption compared with 75 percent for households with the highest post-tax income. What is not spent nor taxed away at the household's end is left as a bequest.¹

Measuring the tax burden over a household's lifetime accounts for the reality that households save and borrow to shift resources for consumption across time, making any one year's measurement unrepresentative of lifetime income and consumption. This idea is at the heart of the life-cycle theory originating from Nobel Laureate Franco Modigliani's work (Modigliani, 1966). Academic studies include Poterba (1989), which finds less regressivity in excise taxes when measured over longer time periods. Our empirical measurements build off the work in Barro and Hamilton (2018).

Why are they different?

The current-income and lifetime-income approaches differ because a household's income changes over its lifetime, while consumption changes by less. To see the implication of this fact, we write the sales tax burden (T , the amount of tax paid, divided by Y , income) as

$$\frac{T}{Y} = \underbrace{\frac{T}{C}}_{\text{sales tax rate}} \times \underbrace{\frac{C}{Y}}_{\text{consumption-income share}} \quad (1)$$

where C is consumption expenditure. The first term on the right-hand side of the equation is the tax rate, the tax paid divided by consumption expenditure. In Wisconsin, the statutory sales tax rate is 5.5 percent.² About 50 percent of consumption expenditure is excluded from sales taxes, however, so the average effective tax rate is about 2.5 percent. This term does not vary with income, as can be seen in Figure 2.

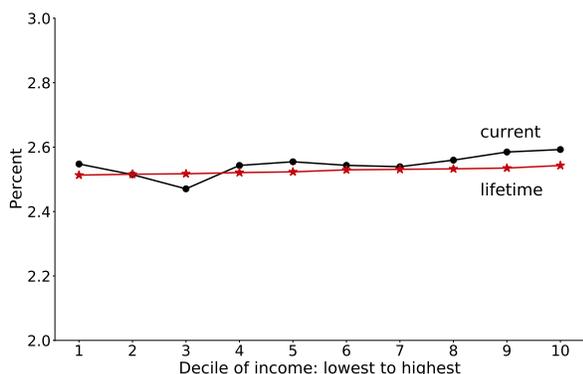
The differences in the tax burden across income groups are driven by the second term on the right-hand side of (1), the consumption-income share, which is plotted in Figure 3. Lifetime consumption as a share of lifetime income changes much less than current consumption as a share of current

¹These figures are estimates and subject to error. Income and consumption data are from the Consumer Expenditure Survey, which is subject to mismeasurement and imputation. Lifetime income and consumption are modeled from this data and are dependent on modeling assumptions. See the appendix for details.

²The state sales tax is 5 percent and the county sales tax rate is 0.5 percent in all counties except Manitowoc, Racine, Waukesha, and Winnebago counties.

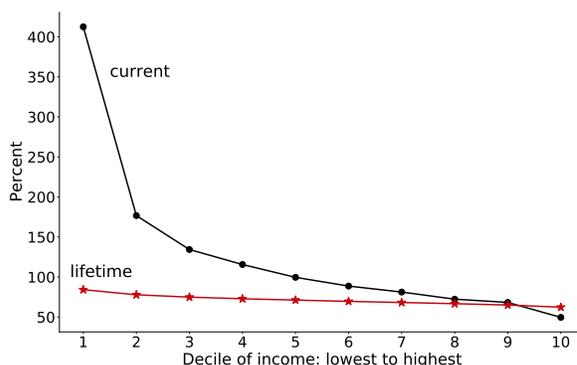
income. When measured by current consumption and income, the lowest-income households consume much more than they earn. These are households using saving or borrowing to increase consumption when income is low.³ Since these households are consuming so much more than they earn, the consumption tax burden in current income is high.

Figure 2: Sales tax rate



Notes: *Current* is total sales tax paid divided by total consumption expenditure in a given year. *Lifetime* is total sales tax paid divided by total consumption expenditure over a household's lifetime. Data are from 2018–2019.

Figure 3: Consumption-income share



Notes: *Current* is total consumption expenditure divided by total income in a given year. *Lifetime* is total consumption expenditure divided by total income over a household's lifetime. We discuss the construction of these measures in the appendix. Data are from 2018–2019.

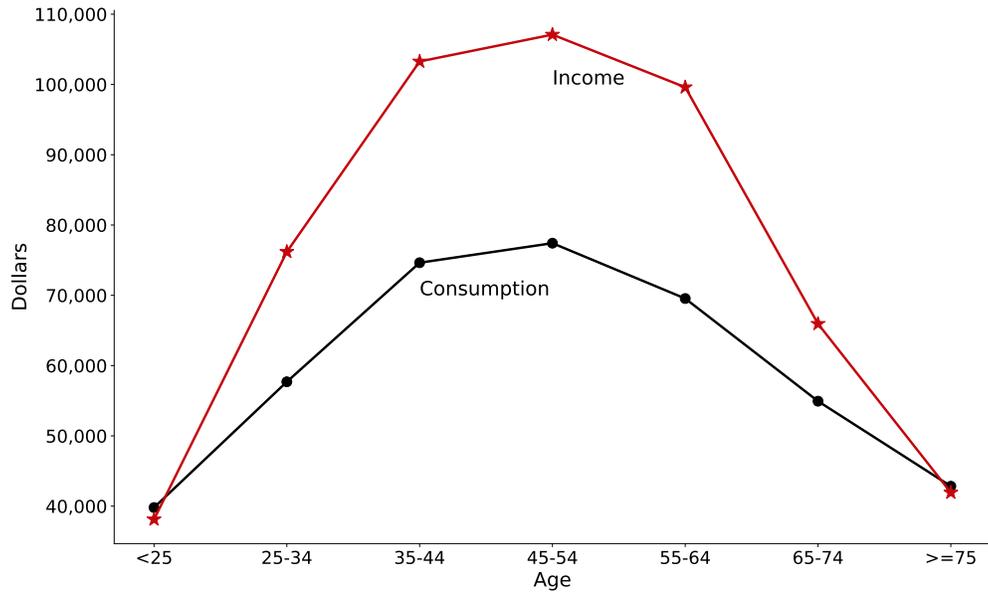
The variation by income in the current consumption-income share is largely washed out in the lifetime consumption-income share. On average, the lowest-income households consume 78 percent of their (pre-tax) lifetime income and the highest-income households consume 62 percent of their (pre-tax) income. This is because all households experience similar changes in income and consumption over their life cycle. In Figure 4, we plot the average annual household income and consumption expenditures by age of the household head.⁴ The red line displays the well-known evolution of income by age: The young earn less, but income grows until ages 45–54 and then begins to fall as older households move into retirement.

The black line shows a similar qualitative pattern for consumption, but, consumption varies much less with age compared with income: The average income at age 45–54 is over 2.5 times the average income of those below 25 and above 75 years old, while the ratio for average consumption is less than 2. In the current-income approach, this would imply households aged 45–54 are richer but pay a smaller share of their income as sales tax, while both the very young and the very old households are poorer but pay a larger share of their income as sales tax, leading to a significantly negative association between current income and the sales tax burden (Figure 5). Since all households move through this pattern over their lifetimes, the lifetime tax burden does not vary much by income.

³There is also a possibility of underreporting income.

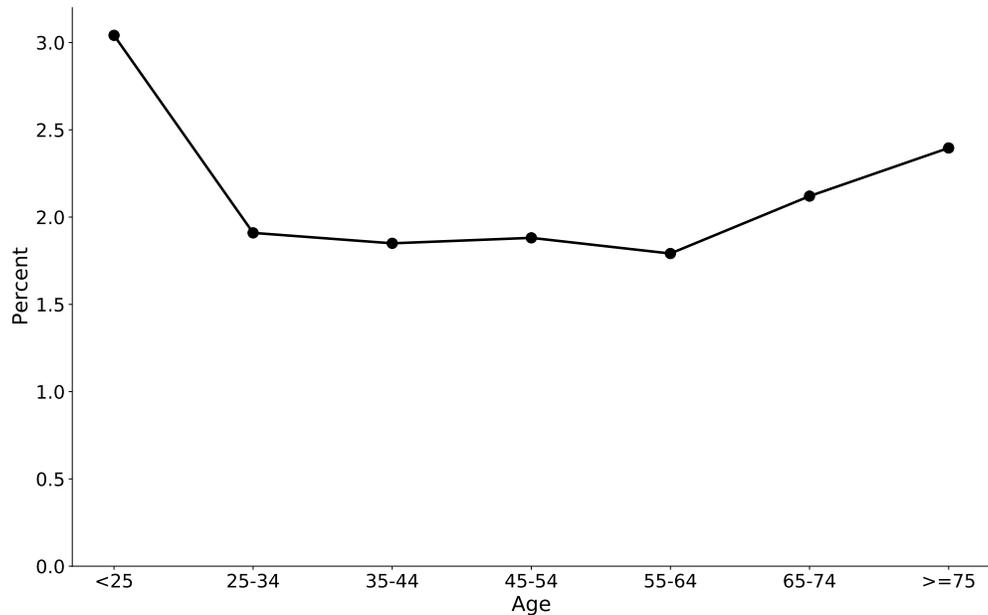
⁴Technically, it is the age of the reference person. As described in the appendix, for each household, the reference person is the first member mentioned by the respondent when asked “[T]he name of the person or one of the persons who owns or rents the home.”

Figure 4: Life-cycle income and consumption



Notes: *Income* is average pre-tax income by age group. *Consumption* is average consumption expenditure by age group. Data are from table 4 of the Consumer expenditures report 2019 by the U.S. Bureau of Labor Statistics.

Figure 5: Wisconsin sales tax burdens by age of the household head



Notes: This figure plots the average sales tax burden in each age group. The sales tax burden is the total sales tax paid divided by pre-tax income. As described in the appendix, the calculation uses the Wisconsin sales tax code and accounts for exemptions to the sales tax.

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Data Appendix

All figures in this report are based on data from the Consumer Expenditure Surveys (CE) conducted by the U.S. Bureau of Labor Statistics (BLS). The surveys are the only federal government data collection that gathers information on the complete range of consumers’ expenditures, income, and demographic characteristics, in the same survey, directly from consumers. BLS publishes 12-month estimates of consumer expenditures annually, with the estimates summarized by income levels and demographic characteristics. BLS also produces annual public use microdata files and an online database to help researchers analyze the data in more detail.

Due to the small sample size, we cannot generate reliable estimates for Wisconsin using only Wisconsin households sampled in the survey. Instead, we assume the national income and consumption patterns are representative of Wisconsin households. Essentially, we treat all households in the survey as Wisconsin households, and calculate their sales taxes by applying the Wisconsin sales tax code to their consumption expenditures.

Consumption expenditures in the CE survey include sales taxes. Let C be the consumption expenditure, and τ be the sales tax rate. We calculate the sales tax as $\frac{\tau}{1+\tau}C$.

The CE survey provides two measures of annual household income, one before tax and one after federal and state income taxes. BLS uses an internal version of the National Bureau of Economic Research’s TAXSIM software in estimating tax liabilities for each household. Tax liabilities reflect only what TAXSIM estimates is owed, but not necessarily the actual amount that each household paid. We focus on the pre-tax income unless noted otherwise.

The current-income approach

Specifically, all figures related to the current-income approach (the black lines in Figures 1–3) are based on Table 2 of the Consumer expenditures report published by the BLS for 2019 (U.S. Bureau of Labor Statistics, 2020). For consumer units in each (current) income decile, the table reports average income before taxes and average annual expenditures on different consumption categories. The table is based on survey responses of respondents across the United States. Again, we assume that the national income and consumption patterns are representative of Wisconsin residents. We apply a sales tax rate of 5.5 percent (5 percent state plus 0.5 percent local), and use the “Summary of Tax Exemption Devices” data (State of Wisconsin Department of Revenue, 2019) to identify the consumption categories that are exempt from the sales tax.⁵

If we ignore the local sales tax by setting the sales tax rate at 5 percent, we find sales taxes account for 2.3 percent of consumption expenditures. In comparison, according to the Wisconsin Department of Revenue, the state sales tax revenue in 2019 was \$5,695 million, which is 2.3 percent of the state’s personal consumption expenditures (\$244,555 million) reported by the U.S. Bureau of Economic Analysis. This suggests that our categorization of consumption expenditures by exemption status are reasonable.

The lifetime-income approach

Figures 4 and 5 are based on Table 4 of the “Consumer Expenditures Report 2019” (U.S. Bureau of Labor Statistics, 2020). For each age group, the table reports average income before taxes and the average annual expenditures on different consumption categories. The age of a household is defined as the age of the reference person, which is the first member mentioned by the respondent when asked “[T]he name of the person or one of the persons who owns or rents the home.”

To simulate the lifetime income, consumption and sales taxes used for the red line in Figures 1–3), we first use the “Annual Social and Economic Supplement” to the Current Population Survey (March CPS) 2018–2019 (U.S. Census Bureau, 2018, 2019) to calculate the Markov matrix of income transitions by age and income quintile. Using the transition matrix, we simulate the income of 10,000 individuals at each age between 25 and 74. Next, we use the CE public use microdata (U.S. Bureau of Labor Statistics, 2022) for 2019 to calculate the average income, consumption and sales tax by age and income quintile, and assign these averages to the simulated individuals

⁵Manitowoc, Racine, Waukesha, and Winnebago counties have no county sales tax. The remaining 68 Wisconsin counties levy a 0.5 percent sales tax.

based on age and income. With the income, consumption, and sales taxes at each age, we calculate the lifetime income, consumption and sales taxes for each individual from age 25 to 74.