

Estimating Income and Payroll Tax Rates for SAGE

Outline

1. SAGE Model Overview
2. Why tax rates matter?
3. Effective Marginal Tax Rate Estimates
4. Marginal Tax Rates and Incidence Analysis
5. Ongoing Development

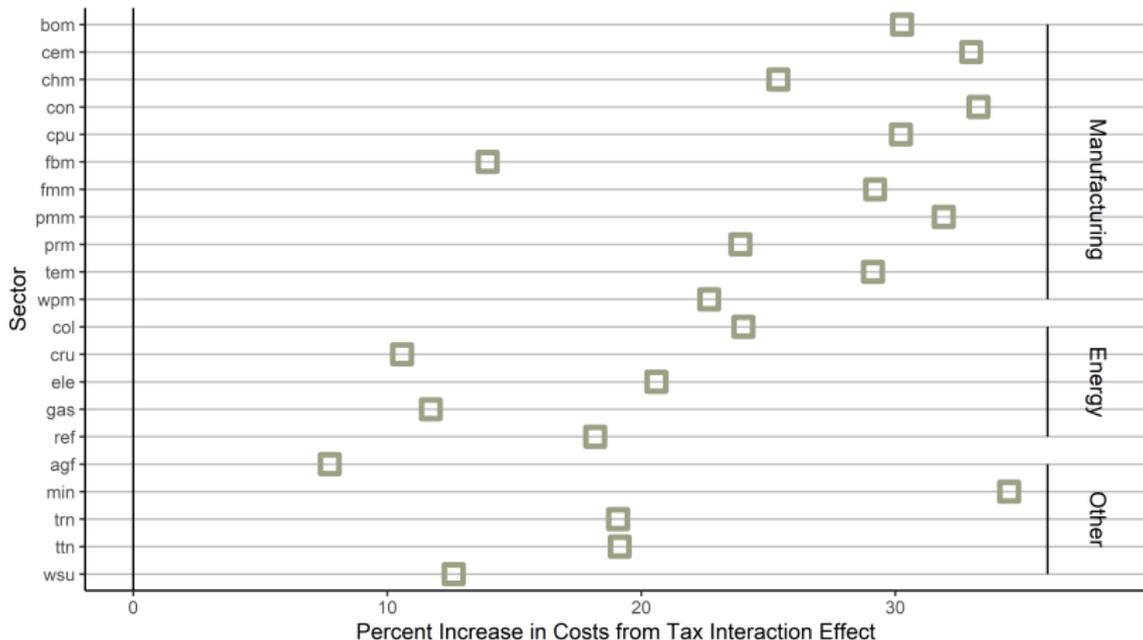
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SAGE Model

- ▶ SAGE is an Applied General Equilibrium model of the U.S.
 - ▶ Dynamic model with nine regional representations and five representative households in each region based on income
- ▶ Developed by EPA/NCEE to improve our capabilities to estimate the economic impacts of environmental regulations
 - ▶ Focus on estimating social costs, but could provide information on incidence and other impacts of concern

<https://www.epa.gov/environmental-economics/cge-modeling-regulatory-analysis>

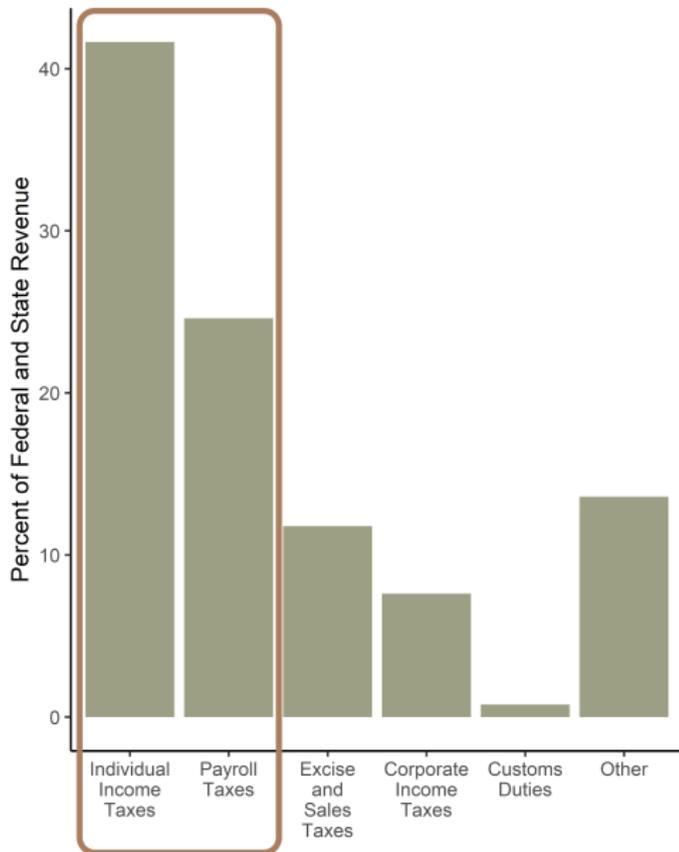
Estimating Regulatory Costs: Tax Interaction Effect



Adapted from Marten, Garbaccio, and Wolverton (JAERE, 2019)

First Stage of Tax Calibration Work

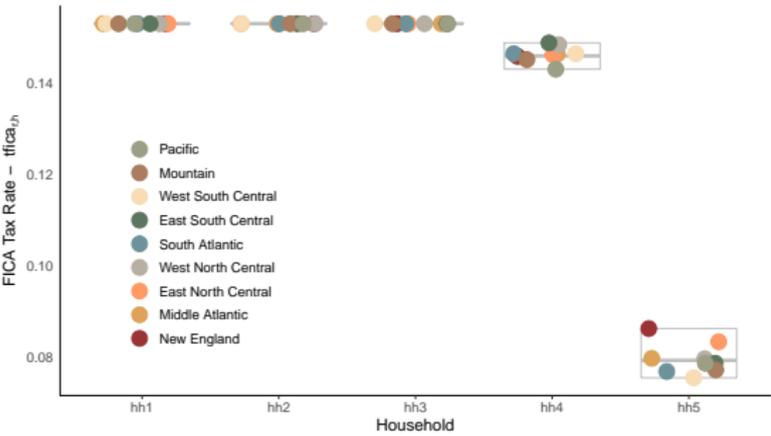
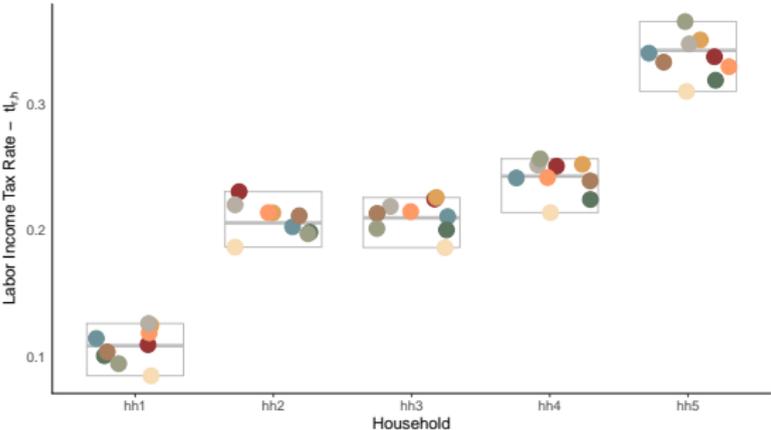
- ▶ Initial focus on:
 - ▶ Individual income taxes
 - ▶ Payroll taxes
- ▶ 2/3 of federal and state revenue
- ▶ Capture differences across regions and household incomes



Estimating Effective Marginal Tax Rates

- ▶ Process for estimating effective marginal tax rates
 1. Create a sample of individual tax returns from the Current Population Survey (CPS) Annual Social and Economic Supplement (ASEC)
 2. Run NBER's TAXSIM model with the sample returns to estimate effective marginal tax rates for each filer in the sample
 3. For each region and household, calculate source specific income (and survey) weighted effective marginal tax rates for:
 - ▶ Wage income (state + federal)
 - ▶ FICA payroll taxes (federal)
 - ▶ Investment income types (state + federal)

Effective Marginal Tax Rates on Wage Income



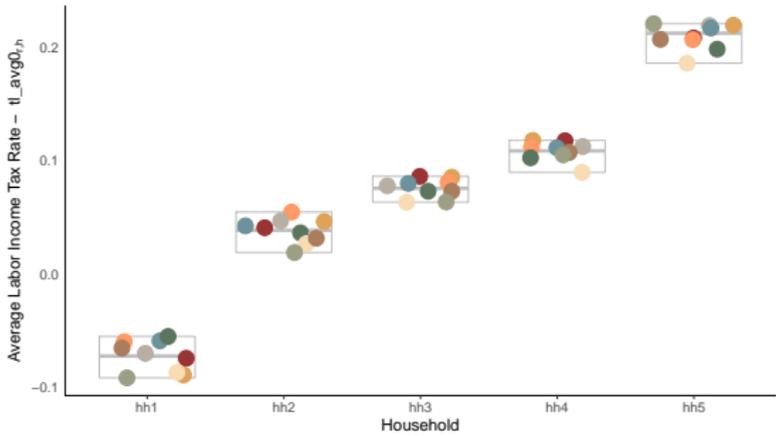
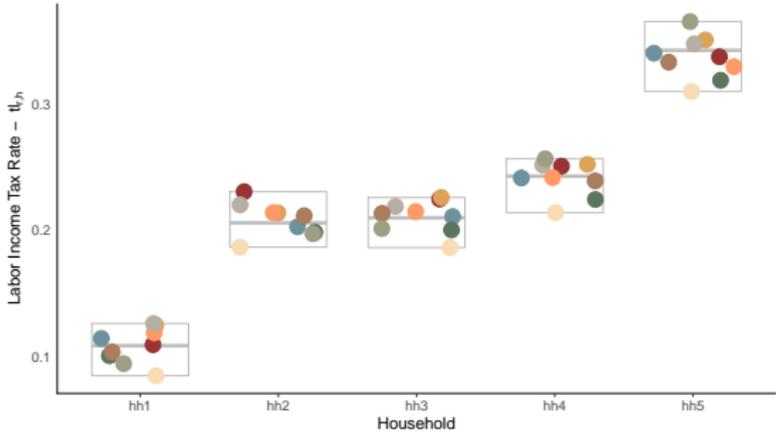
Marginal vs. Average Tax Rates

- ▶ Marginal tax rates are important for defining incentives
- ▶ Straightforward implementation of marginal tax rates leads to modeled transfers that are notably larger than in practice
 - ▶ Model needs to “refund” households taxes collected in excess of the average rate
- ▶ In the U.S., over 90% of transfer payments are indexed for inflation (Fullerton et al., 2011)
 - ▶ In SAGE, all transfers are indexed to the CPI

Indexing of Tax “Refunds”

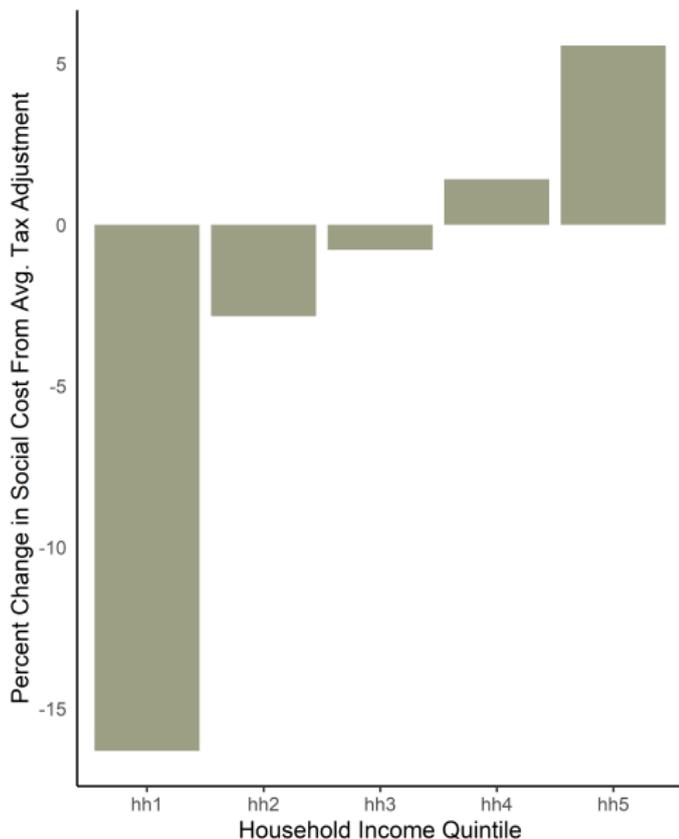
- ▶ Repricing labor income from the wage rate to the CPI through the refund process can impact the incidence estimates for regulatory costs
 - ▶ Effect on aggregate welfare is small due to government closure
- ▶ Need to ensure excess taxes paid by using the marginal tax rate are “refunded” at the appropriate wage rate
 - ▶ With EITC refunded closer to CPI to more closely match reality
- ▶ Repeat CPS/TAXSIM procedure to estimate region-household specific average tax rates to identify the tax “refund”

Marginal vs. Average Tax Rates on Wage Income



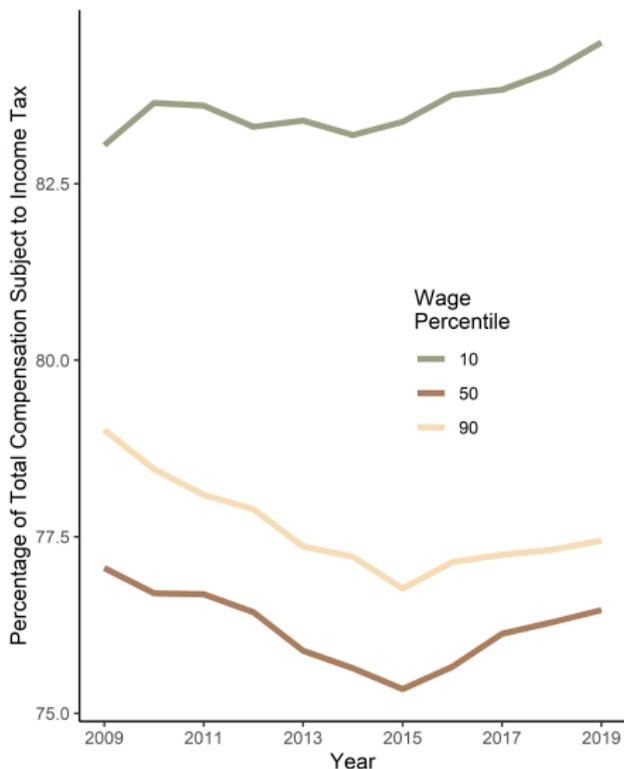
Effect of Average Tax Adjustment on Incidence

- ▶ Effect on cost incidence from refunding tax overpayments at wage rate vs. CPI
 - ▶ Stylized version of Clean Air Act through 2011
- ▶ Non-trivial difference for incidence in many cases



Ongoing Development: Adjusting the Tax Base

- ▶ SAM has total compensation
- ▶ Taxable base is lower than total compensation
- ▶ Taxable base differs across taxes
- ▶ Adjustments based on national average is easy
- ▶ Addressing benefit heterogeneity across incomes is challenging



Ongoing Development: Other Taxes

- ▶ Corporate tax rate
 - ▶ Effective rate pre TCJA: 19% (CBO)
 - ▶ TCJA rate: 21% + other changes
- ▶ Disaggregating “production” taxes
 - ▶ WiNDC improves customs duties
 - ▶ Working on regional sales, excise, and property tax rates

