Historical Evidence on Soda and Tobacco Taxation

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Very brief history of soda taxation

- Adam Smith in *The Wealth of Nations*:
  - “Sugar, rum, and tobacco are commodities which are nowhere necessaries of life, which have become objects of almost universal consumption, and which are therefore extremely proper subjects of taxation.”

- Soda taxes existed in the U.S. as early as the 1920’s
Very brief history of soda taxation

- 1970’s and 1980’s bottle deposit laws (beginning in Oregon)
- Early 1990’s saw a spurt of state level soda taxes (recession revenue mechanism)
- Over one third of U.S. states today have some form of tax on soda (net of taxes on other food)
  - Excise and sales taxes
  - Average tax over the 1990’s and 2000’s ~3%
Summary of earlier work (average effects)

- Using survey and exam data from the National Health and Nutrition Examination Survey (NHANES)

- Consumption effects of a higher soda tax rate among children and adolescents:
  - (Statistically) significantly fewer grams of total soft drink consumption
  - Significantly fewer calories of soda
  - Significantly greater calories of whole milk
  - Insignificant changes in juice and juice drink consumption
Summary of earlier work (average effects)

- Using NHANES and survey data from the Behavioral Risk Factor Surveillance System (BRFSS)

- Obesity effects of a higher soda tax rate:
  - No detectable changes among children and adolescents
  - Significant but marginal reduction among adults
Current project: Non-linear effects

Goals and preliminary results

- Estimate polynomials in the tax rate (NHANES)
  - Linear models fit best and no non-linear results besides
- Estimate “salience” effects by comparing sales and excise taxes (NHANES)
  - Mixed and difficult to interpret results so far
- Conduct comparative “case studies” using large, sudden increases (BRFSS)
    - No significant results
  - Bottle deposit changes: California or Hawaii?
Example: Ohio BMI changes

Figure 1. Average Annual State-level BMI: Sample States, Ohio, and its Synthetic Control

Note: the synthetic control includes a weighted average of New York (20%), Texas (16.4%), and West Virginia (63.6%).
Comparison with tobacco taxes

- **Mechanisms of tax influence:**
  - Tax $\rightarrow$ Price $\rightarrow$ Consumption $\rightarrow$ Health

- **Tax $\rightarrow$ Price (Pass Through)**
  - Soda: Δ$1$ Tax = Δ$1.29$ Price (Besley and Rosen, 1999)
  - Cigarettes: Δ$1$ Tax = Δ$0.52$ Price (Chiou and Muehlegger, 2010)
Comparison with tobacco taxes

- **Price → consumption**
  - Soda: Elasticity of between -0.15 (Zheng and Kaiser, 2008) and -1.90 (Dharmasena and Capps, 2009)
  - Cigarettes: Much smaller accepted range, around -0.6 or -0.7

- **Consumption → health**
  - Soda: consumption doesn’t cause obesity per se, particularly if caloric or sugar consumption completely offset through substitution
  - Cigarettes: known to increase risk of lung cancer, and there are no readily available substitutes that do the same
Conclusions

Do soda taxes, as currently practiced, have an effect on weight outcomes?

- I’m confident that the answer is no
- Likely explanations:
  - Low visibility or response to small taxes
  - If modest consumption effects, then full substitution and no weight change
Conclusions

- Do current “big” taxes even have an effect?
  - We can’t find any evidence that they do
- Would larger taxes be more effective?
  - Perhaps, the largest we’ve studied amount to only \(\sim 12\%\)
  - Recent proposals on the order of \(\sim 20\%\)
- Maybe tax sugar as Adam Smith suggested?