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 are 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)

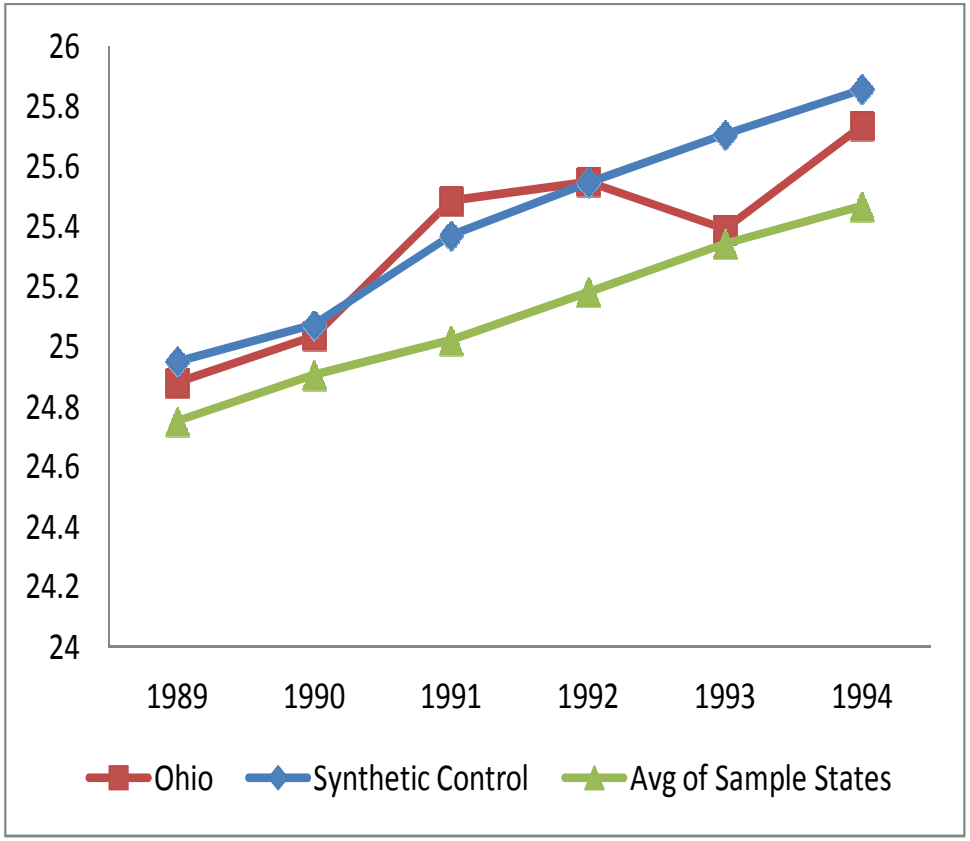
- Obesity effects of a higher soda tax rate:
  - No detectable changes among children and adolescents
  - Significant but marginal reduction among adults

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)
    - Direct tax law changes: Ohio (1993-1994)
      - 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→ Price→ Consumption→ Health

- Tax → 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 ~12%
  - Recent proposals on the order of ~20%
- Maybe tax sugar as Adam Smith suggested?