Scientific Questions Ctd

Starting question: What impacts do beverage taxes have?

What do we mean by "impacts"
- price
- consume behavior - calories purchased

Data collection

Philadelphia n=58
Baltimore n=63

Jan 1st 2017

What were our two primary outcomes:

Price analysis — cents per fluid oz

Consumer analysis: mean calories from sweetened beverages & high sugar foods — mean fluid oz

Paper methods are described below.

Comment on the analysis. What is the model used for oz purchased?

Statistical Analysis

For each study outcome, we used a difference-in-differences approach, using generalized linear mixed effects modeled with a normal distribution and identity link. Robust standard errors and random intercepts for stores were used to estimate changes in mean beverage price and purchase volume and calories purchased. Each model included a binary indicator for the posttax vs pretax period, location, and their interaction (the difference-in-differences estimate of the tax effect size). The main analyses compared Philadelphia with Baltimore. We also compared change in beverage prices between the counties bordering Philadelphia and Baltimore. To test the balance in sample composition during the study period, models were adjusted for characteristics identified a priori to influence purchases at small, independent stores including gender, race, ethnicity, education, who the purchase was for, frequency visiting the store, city residency, and total reported spending. Unadjusted results are presented throughout because adjusted results were not meaningfully different (eAppendix 3 in the Supplement). All analyses were 2-sided tests using an $\alpha = .05$, and beverage price and volume *P* values were adjusted using Bonferroni corrections to account for 2 comparisons of the tax by beverage types and 4 comparisons of the tax by customer demographic characteristics and store location. Sugar and calorie *P* values were Bonferroni corrected to account for 2 comparisons of purchases by customer characteristics and store location demographics. We examined whether income and education moderated tax effect sizes with interactions by indicators for posttax vs pretax period and location (the triple difference-in-difference estimate of the tax effect size between the 2 groups). Because differences by income and education are of great public health interest, we also conducted exploratory stratified analyses with these variables. Sensitivity and subgroup analyses appear in the eAppendices 2, 3, and 4 in the Supplement. Analyses were conducted using Stata 15.1 (StataCorp) and replicated by a second analyst (J.Y.).

oz purchased =

$$\alpha_{store} + \beta_1 \text{location} + \beta_2 \text{time} + \beta_3 \text{location} \cdot \text{time} + \epsilon$$

$$\alpha_{store} \sim N(0, \sigma^2_{store})$$

$$\epsilon \sim N(0, \sigma^2_{ind})$$

Exercise: Take a look at the supplement to the paper. What is included here that is not given in the main text?

- What assumptions does this approach make? Do you think the data meets those assumptions?
- What are the limitations?
- Overall, what is your evaluation of this paper?

Osteoarthritis Pain — "Changes in Barometric Pressure and Ambient Temperature Influence Osteoarthritis Pain" McAlindon et al.

Longitudinal study patients with knee osteoarthritis.

	Day 1	15	20	30	60	75
Temp						
Humidity						
Pain (WOMAC) 1-20	→	4	5	6	8	5

Question: Are cooler temperatures associated with higher pain scores?

Exercise: We will treat this like our own "many analysts, one data set". Load in the data and answer the question above. Describe and motivate your approach.