Item #6

Email reviewing a published paper (Colchero et. al., 2016)

Email with summary and critique of paper Colchero et. al., (2016) 'Beverage purchases from stores in Mexico under the excise tax on sugar sweetened beverages: observational study', prepared for internal use only, sent 11 February 2016

Sent By: ███████████ on 11/02/2016 2:21:59 p.m.
To: Bronwyn Croxson/MOH
Copy To:
Subject: *please print* Sugar tax *Done*

Hi Bronwyn,

Other day you asked me to evaluate the paper 'Beverage purchases from stores in Mexico under the excise tax on sugar sweetened beverages: observational study'.

It seems that the method they used is not difference in difference. Because, we do not have the difference in the pre-tax period to compare with that in the post-tax period.

Their graph looks more similar to regression discontinuity (RD). RD allows us to evaluate the causal effects of interventions by assigning a cutoff above or below which an intervention is assigned. The assumption is the characteristics of people just above the cutoff is similar to those just below the cutoff except for exposure to treatment. Thus, the reason for any difference in subsequent mean outcomes is due to the intervention.

However, RD is not appropriate in this research because one condition to provide unbiased impact estimate is there are no other relevant ways in which observations on one side of the cut-point are treated differently from those on the other side (link-http://www.mdrc.org/sites/default/files/regression_discontinuity_full.pdf). In this situation, observations in the post tax period may be impacted by many other factors such as an increase in awareness, health promotion and increasing availability of safe drinking water.

As seen in figure 1 in the paper, the consumption of taxed beverage and untaxed beverage decreased after the introduction of tax (January 2014). It is the distance between the blue line and the green line.
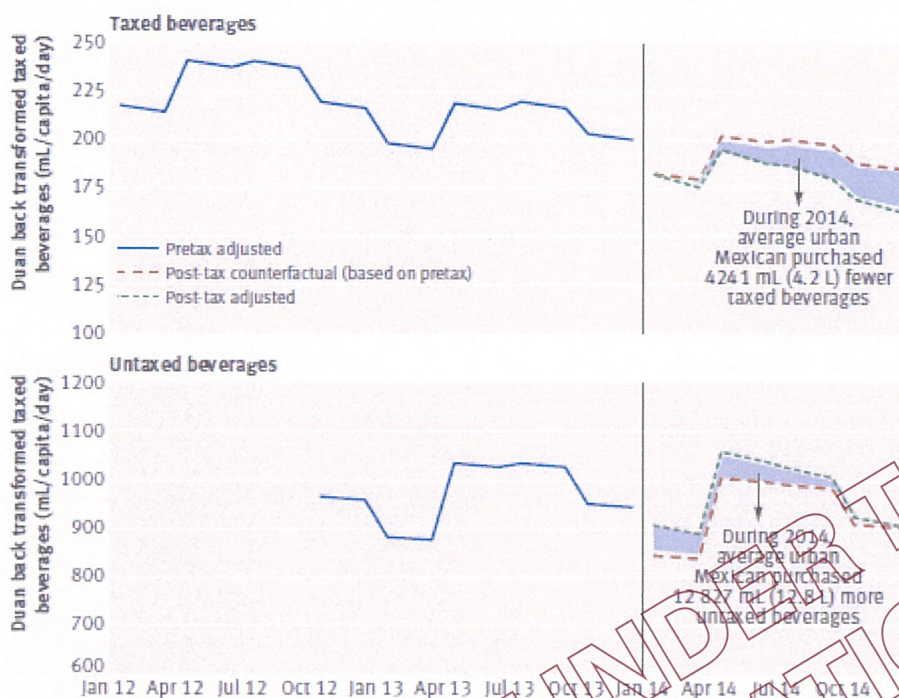
Fig 1 | Monthly predicted purchases of beverages comparing counterfactual with post-tax from full sample models (to show seasonal trends in beverage purchases, predictions do not adjust for quarter). Total 2014 changes calculated using only months with significant differences (P<0.001) by taking summation of product of difference for month and number of days in month. Source: authors' own analyses and calculations based on data from Nielsen through its Mexico Consumer Panel Service for food and beverage categories, January 2012 to December 2014

The green line is the post tax trend, the blue line is the pre tax trend and the red line is the post tax counterfactual based on pretax trend. You can see there is a decrease in the untaxed beverage purchased after the sugar tax in the cutoff.

I am not sure the dummy variable T, posttax period, only captures the impact of sugar tax. If it only captures the impact of tax, it will be surprising that the tax on sugary drink will decrease the amount of untaxed beverages purchased. If it captures all other factors happening at the same time the tax introduction such as the health campaign and water fountain, the green line is not a good comparison with the red line. In this case the green line presents the pretax trend without the impact of other health promotions while the red line presents the post tax trend with the impact of other health promotions. They are not comparable.

The supplemental materials of the paper has a typo. In table 2, the result of posttax dummy in log(volume purchased taxed beverages) should be statistically significant (p<0.001)

Supplemental Table 2. Coefficient estimates from DinD model results, β (P value)

Beverage outcome	Pretax trend			DinD in trends			Posttax dummy		
	β_M	P		β_{TM}	P		β_T	P	
log(volume purchased taxed beverages)[a]	-0.007	(0.000)	**	-0.015	(0.000)	**	0.254	(0.000)	
log(volume purchased taxed carbonated drinks)[a, b]	-0.009	(0.000)	**	-0.005	(0.001)	**	0.131	(0.005)	*
log(volume purchased taxed noncarbonated drinks)[a,b]	-0.003	(0.000)	**	-0.028	(0.000)	**	0.583	(0.000)	**
log(volume purchased untaxed beverages)[a, d]	-0.004	(0.001)	**	-0.006	(0.000)	**	0.258	(0.000)	**
log(volume purchased untaxed water)[a, b]	0.003	(0.000)	**	-0.011	(0.000)	**	0.383	(0.000)	**
log(volume purchased untaxed other)[a, d]	-0.004	(0.000)	**	-0.011	(0.000)	**	0.327	(0.000)	**
Pr(any untaxed carbonated drinks)[c]	-0.003	(0.002)	*	-0.004	(0.116)		0.115	(0.143)	

[a] Fixed effects model that uses the log(*BEV* volume) = f(mthyr, posttax, posttax*mthyr, quarter, contextual measures, household composition, household SES) clustered by household. Unless otherwise noted, 36 months of data, n = 205,112 observations from 6,253 households.
[b] Due to >10% nonpurchasing household month observations, the model also accounts for time-varying inverse probability weight for probability of purchasing said beverage in given month with fixed effects in Stata using -areg, absorb-.
[c] Random effects model of the probability of purchasing untaxed carbonated drinks.
[d] Limited to October 2012–December 2014 (27 months of data only); n = 153,387 observations from 6,239 households.
* Statistically significant at p <0.01; ** statistically significant at p <0.001.
Source: Authors' own analyses and calculations based on data from Nielsen through its Mexico Consumer Panel Service (CPS) for the food and beverage categories for January 2012 – December 2014. Copyright © 2015, The Nielsen Company. Nielsen is not responsible for and had no role in preparing the results reported herein.

Another concern is that the authors may categorise sweeten dairy beverage as untaxed beverage. As part of the law, dairy and alcoholic beverages with added sugar are not taxed. Thus after the tax, a person can substitute flavoured milk to coke. The mislabel in the study may lead to the overstated decrease in sugary drink purchased. It is also possible that the authors exclude sweeten dairy beverage in the study. They did not mention it in any categories (taxed and untaxed beverages).

One weakness of the study is that they cannot investigate the impact of the policy on the number of caloric intake due to data limitation.

Another weakness of the paper is that it is possible that people substitute their sugary drinks to juice and diet coke. It is true that diet soda has less calorie. However, it has artificial sweetener and there is not evidence that it is healthier. Additionally, fruit juice is untaxed because it is not added sugar. However, fruit juice has a high sugar content. Both diet soda and fruit juice are untaxed.

Additionally, I am not sure why dont they compare the differences in differences between taxed and untaxed beverage consumption before and after the introduction of sugar tax. A hypothesis will be the consumption of taxed beverage increase and the consumption of untaxed beverage decreases, which make the gap between two group bigger.

I am also not sure about the Duan smearing factors. I think it makes the calculation more complex.

Cheers,

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