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Price and Sales Tax Changes: New Evidence from Retailer-Customer Linked Panel Data

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Proposal

We study the behavior of households and retailers to exogenous changes in sales taxes and wholesale prices using scanner panel data that links customers to retailers.

We conducted a preliminary analysis using a limited set of sales tax changes. Our analysis reveals that annual/long-run spending behavior is not significantly affected by sales tax changes–consistent with earlier results by Chetty et al (2009)–suggesting that sales taxes are not salient and hence ignored by households. However, focusing on monthly changes in spending reveals that spending sharply increases in the months prior to a sales tax increase and temporarily decreases in the months after the tax increase. This intertemporal substitution pattern strongly suggests that sales tax changes are in fact salient, but that intertemporal substitution is short-lived such that the behavioral response is not detectable at annual frequency. We also measure the frequency of news articles that mention sales taxes across several thousand US newspapers, finding suggestive evidence that higher levels of reporting on sales tax changes drive increases in the intertemporal substitution, but little change in long-run response.

To further investigate the salience of tax changes, we analyze Google searches for the term "sales tax" around state and local sales tax changes by users in that location. The searches increase markedly in the months prior to the tax change and remain high for two months after the tax change, consistent with sales tax changes being salient.

We currently analyze several interpretations of our initial results, in particular:

- *Salience and information*: We study whether our results are driven by households learning about sales taxes whenever there is a sales tax change (i.e., they ignore sales tax rates otherwise as suggested by the field experiment in Chetty et al.) or whether it is caused by households responding to the increase in sales taxes. Consistent with salience and rational inattention, we find that the response is stronger when tax changes are large. In order to study the salience of sales tax changes, we analyze whether spending decreases around failed sales tax ballot proposals, i.e., around times when sales tax changes were proposed but were rejected by voters. During those periods we would expect sales taxes to become more salient, without having an actual change in the sales tax itself, similar to the treatment in the field experiment carried out by Chetty et al. (2009). We do not find any effect of such ballots on spending behavior. Similarly, we do not find any spending response in times of high newspaper article coverage of sales tax changes (away from

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actual changes), which typically track the legislative process of such changes and hence predate the Google searches by users. These results are more consistent with rational inattention than with pure non-salience of sales taxes.
To investigate this issue further, we plan to use the national-level component of wholesale price changes at the UPC level from a second data source as an instrument for changes in posted prices, which are presumably more salient that sales tax changes. We plan to contrast the dynamic response to such posted price changes with the dynamic response to sales tax changes.

- *Intertemporal substitution and durability*: Our results are consistent with household bringing spending forward, but the effect is short-lived since most retail products have limited durability. Hence, in the medium run households revert back to the same spending behavior even at the higher tax rates. We test this explanation, we plan to compare the response of more durable goods (e.g., household supplies) with less durable but non-exempt goods (e.g., heated or prepared meals, soft drinks and soda, health supplements).

- *Intratemporal substitution*: In our preliminary analysis we find two intratemporal margins of adjustment to the tax changes. First, spending on *tax-exempt goods* responds much less, and the fact that it does respond could be explained by income effects and by the increase in the shopping trips observed before a sales tax increase. We plan to investigate both channels. Second, we find that households living close to a state border are more likely to shop in the neighbouring state if the tax differential becomes more favorable, i.e., engage in *spatial arbitrage*. At the same time we observe that his response is also concentrated in the month after a tax change and is more muted in the long run, consistent with a recent study by Davis et al. (2015) based on credit card transactions. This suggests an initial overreaction to the sales tax changes, with subsequent learning about the pecuniary and nonpecuniary costs of such trips.

- *Retail price response*: Our results might also be driven by prices adjusting in the long run to the new tax rates. In particular, posted (non-inclusive) prices might be sticky in the short-run but decrease in the long-run in response to a sales tax increase. Hence, intertemporal changes in the incidence of the tax might also explain the observed reversal of the short run effect on household spending. To investigate this channel we plan to analyze the pricing response of the retailers in our data by delving more deeply into the individual good price data from Nielsen.

References

Chetty, Raj, Adam Looney, and Kory Kroft, "*Salience and Taxation: Theory and Evidence*", American Economic Review, 2009.

Davis, Trevor, Dan Knoepfle, Stephen Teng Sun, and Constantine Yannelis, "*Greener on the Other Side: Estimating Consumer Sensitivity to Local Sales Tax Changes*", working paper, August 2015.

Budget

The grant would be use to purchase additional sales tax data from various data vendors, in particular from Reuters ONESOURCE Indirect Tax Rates (expanded+), https://tax.thomsonreuters.com/products/brands/onesource/indirect-tax/rates/. The data contain exact dates of sales tax changes at the local and state level, as well as information about tax exemptions. Each year costs about $1,400 and they have data spanning from 2008-2015. Our Retailer-Customer Linked Panel data starts in 2004. Depending on data availability from data vendors, we would also use the grant funds to hire research assistants to hand collect sales tax rate changes in the earlier years of the sample.

Estimated budget: $20,000

- $12,000 for sales tax data purchase for years 2008-2015
- $ 8,000 for hiring a graduate research assistant for helping to analyze and incorporate detailed product data and gather additional tax data.

Any sales tax rate data produced by the research assistant will be made public. We will also try to make a version of the purchased sales tax rate data publicly available subject to license agreement constraints.