

## The 'Soda Tax' is Unlikely to Make Mexicans Lighter: New Evidence on Biases in Elasticities of Demand for Soda

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### Extended Abstract

In response to a growing burden of non-communicable diseases such as obesity, several countries have imposed, or are debating, a 'soda tax' on drinks with added sugar. The WHO has called on governments to use such fiscal measures, and argues that taxes that raise sugary drink prices at least 20% will lead to proportional reductions in consumption. Discussion of the efficacy of such taxes often alludes to Mexico, which imposed a nationwide tax of one peso per liter (equivalent to about nine percent of pre-tax average prices) on sugar-sweetened drinks from January, 2014.

Grogger (2016) estimates that this tax was more than fully passed through to higher soda prices. To go from these price effects to body weight effects, he uses extant studies from Mexico that suggest an own-price elasticity of quantity demand for soda of between  $-1.0$  and  $-1.3$ . Based on this range of elasticities, Grogger calculates that the tax could cause a two to four pound (0.9 to 1.8 kg) fall in the average weight of Mexicans, which is enough to have meaningful health benefits.

The elasticity estimates are the weak link in this chain of reasoning. Some use household survey data on budget shares and lack plausible estimates of how quality responds to price. This is a major omission because, prior to the soda tax, *Coke* sold at a 15% price premium over *Pepsi* and a 20% premium over some other brands (based on city-level prices for a 600 ml bottle). The price gradient due to container size was even sharper, with a 55% premium for buying *Coke* in 355 ml cans rather than in 600 ml bottles and about the same premium for 600 ml bottles over two liter bottles. The soda tax is specific rather than *ad valorem* so gradients flattened slightly after 2014 but still gave great scope for consumers to buffer quantity by sliding down the quality scale as prices rose. Ignoring this quality variation will overstate quantity responses and effects on bodyweight. Some elasticity estimates also are biased by correlated measurement errors since soda quantity is regressed on unit values (expenditures over quantity), creating a spurious negative relationship.

In this paper we combine Mexican household budget survey data for 2014 with city-level soda price data to estimate unrestricted demand models that allow consumer responses on both the quality and quantity margins. If methods from previous Mexican studies are used, the own-price elasticity of quantity demand for soda is between  $-1.2$  and  $-1.3$ . These estimates conflate quantity and quality responses and some also are biased by correlated measurement error. If more appropriate methods are used with these same data, elasticities range from  $-0.2$  to  $-0.4$ . Thus, responses of soda quantity demand to price may have been exaggerated by three-fold or more in the existing literature. If the correct elasticities are applied to Grogger's results on tax-induced soda price increases, expected weight reductions are less than 0.5 kg, which is too small to make any difference to health.

JEL Codes: D12, I10

Keywords: Demand, Household surveys, Quality, Price, Soda taxes, Unit values

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Acknowledgements: We are grateful to Bonggeun Kim for assistance, to the Marsden Fund for financial support, and to helpful comments from seminar audiences at Monash and Motu.