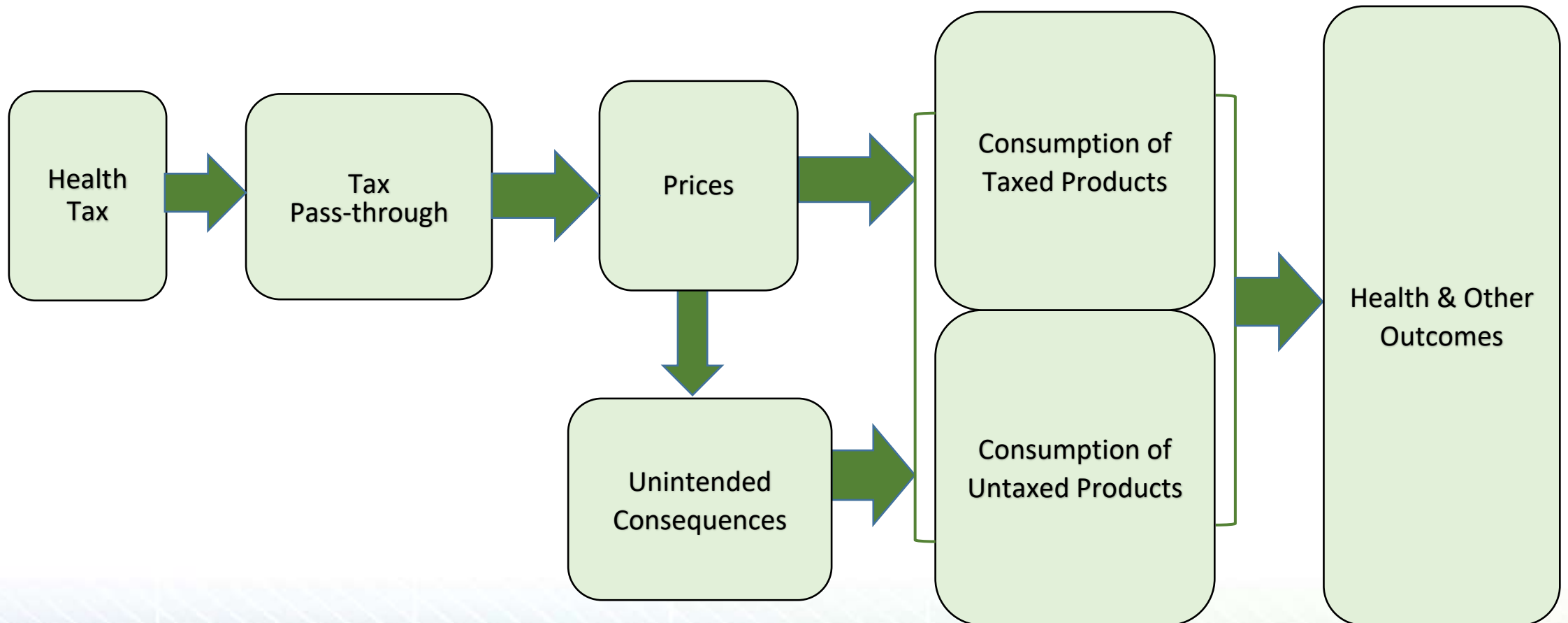


# Tax Impact on Demand and Health Outcomes

Frank J. Chaloupka, PhD  
Lisa M. Powell, PhD

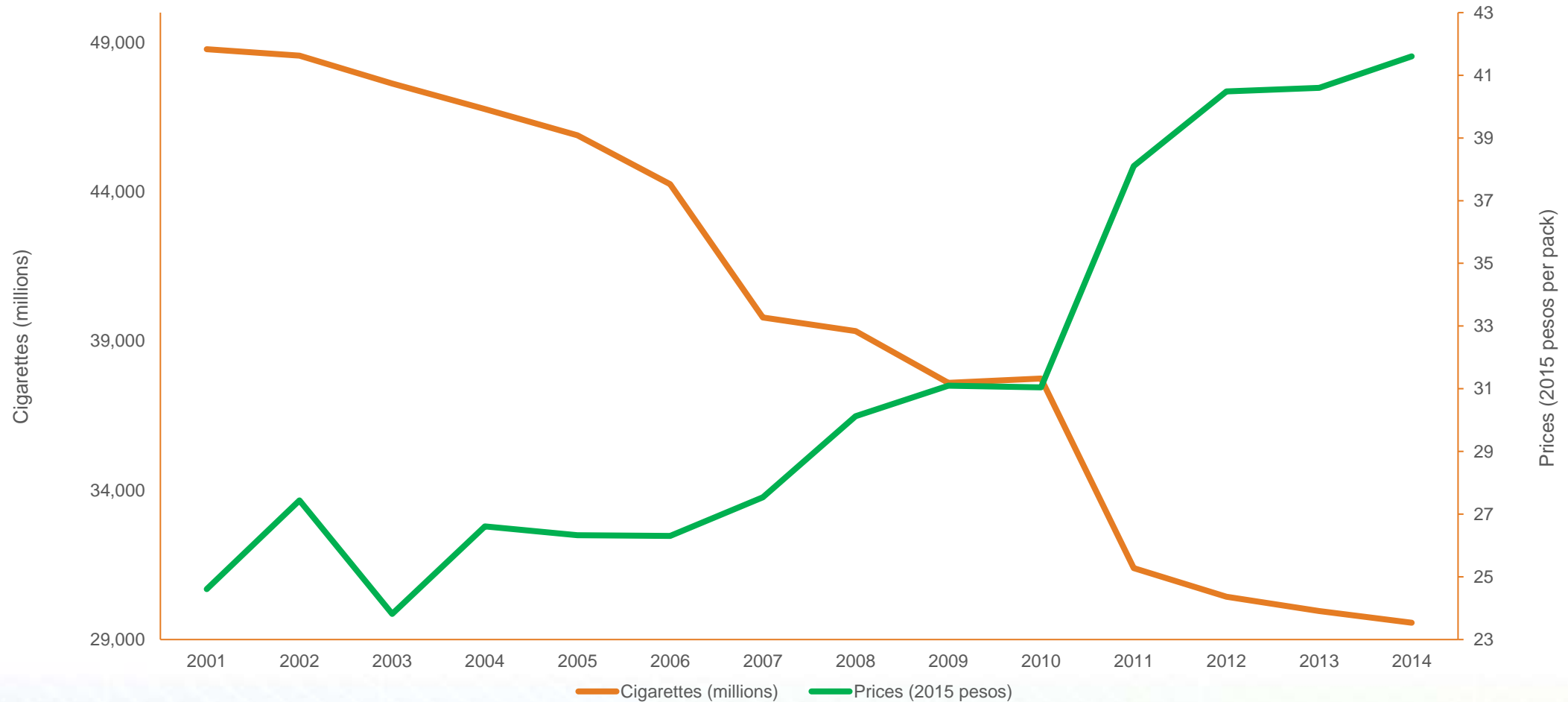
Health Taxes: Policy and Practice  
Global Tax Umbrella Program  
The World Bank  
Washington, D.C.  
November 7<sup>th</sup>, 2022

# Impact of Health Taxes on Consumption & Health Outcomes



# Cigarette Price & Consumption

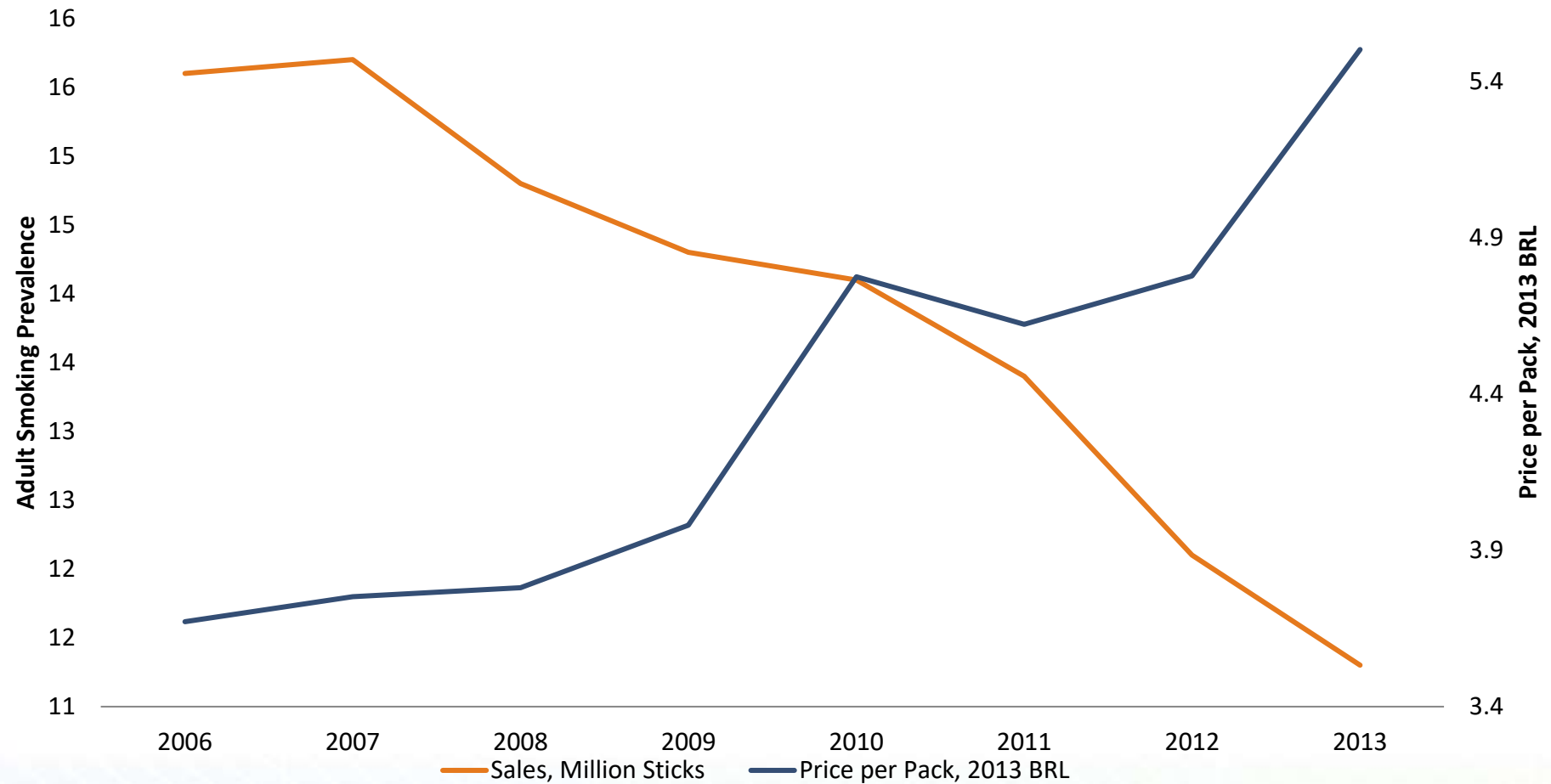
## Mexico, 2001-2014, Inflation Adjusted



Sources: EIU, Euromonitor, and World Bank

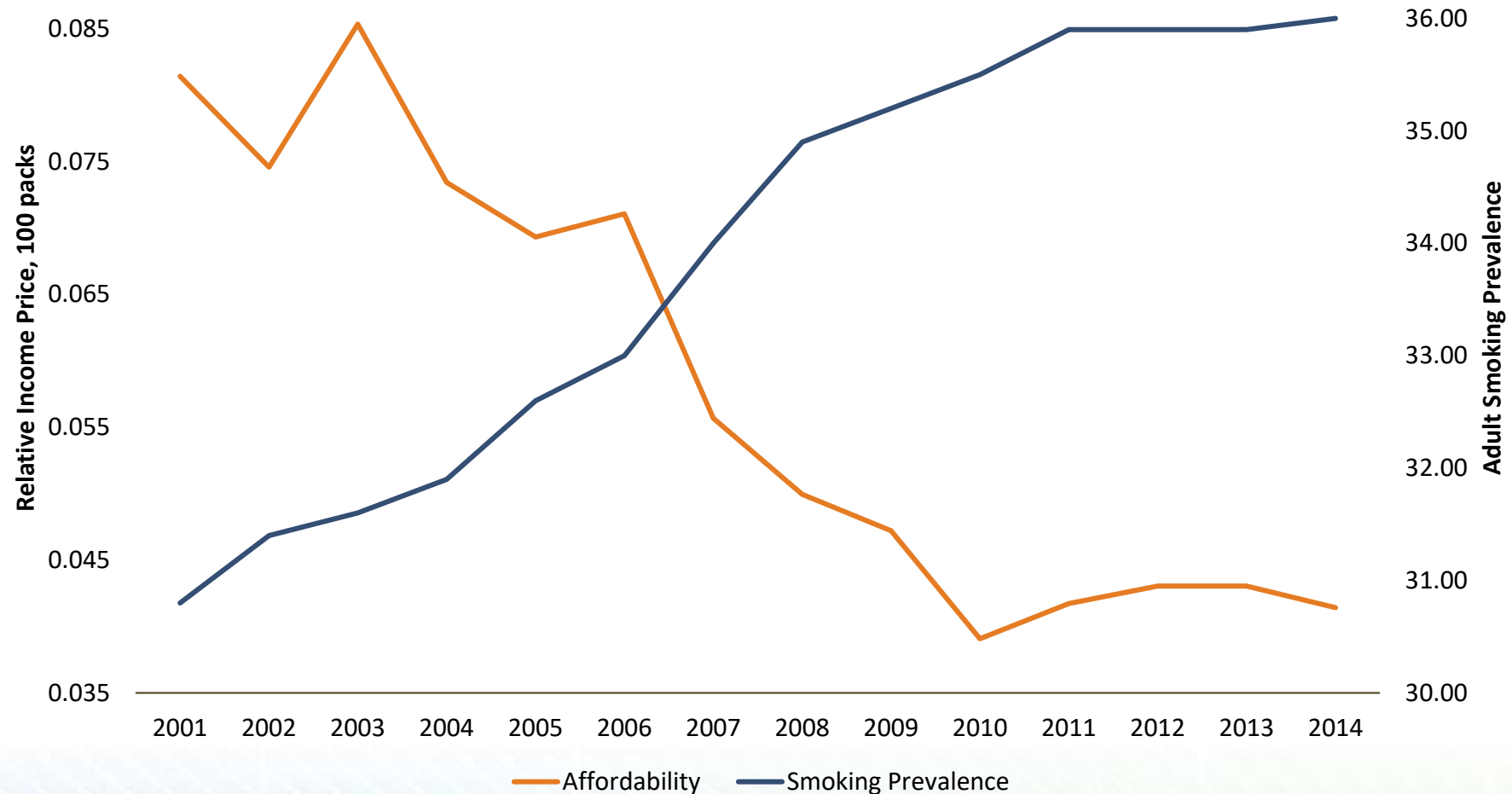
# Adult Prevalence & Price, Brazil

## Inflation Adjusted, 2006-2013



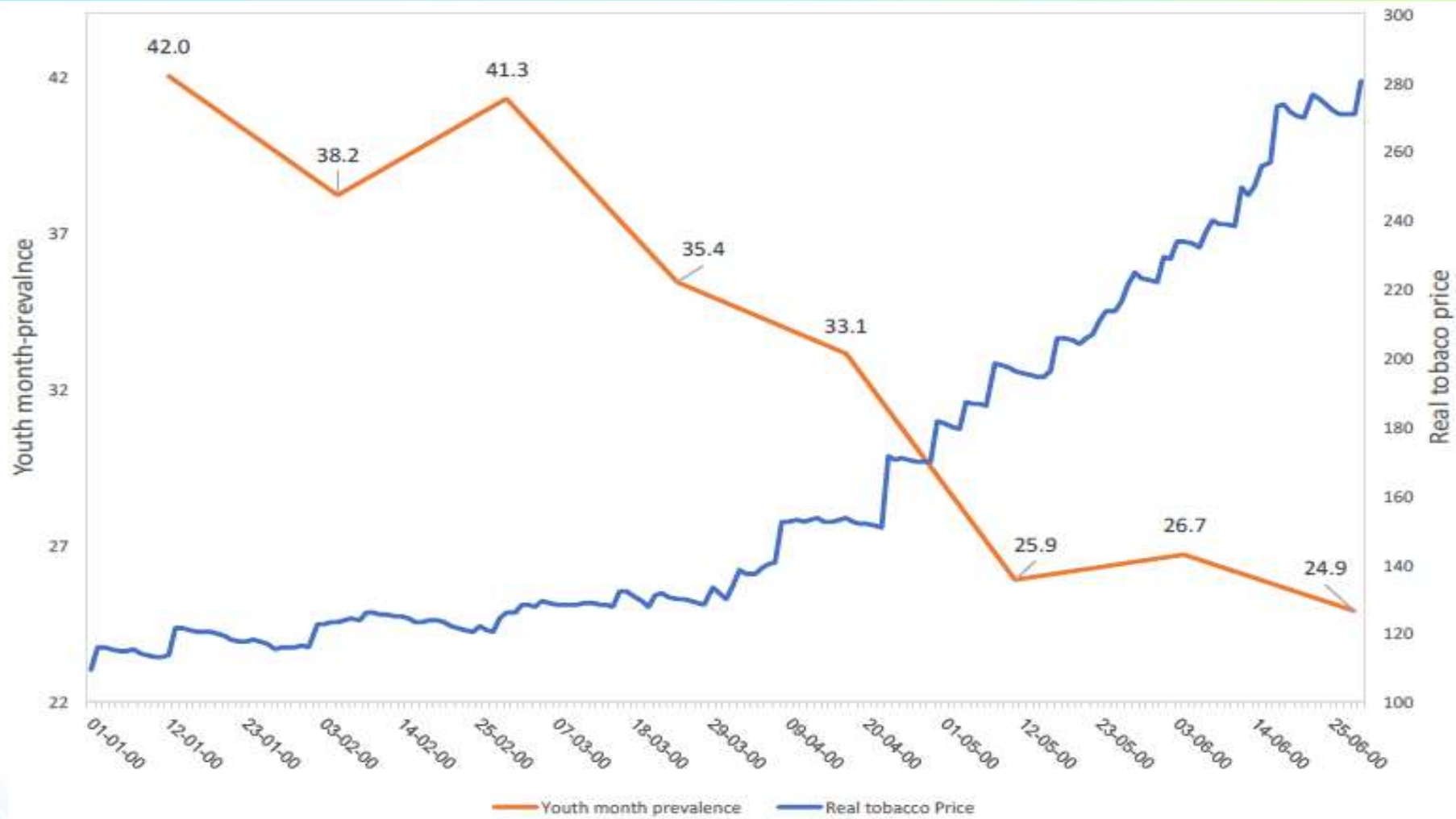
Sources: Ministry of Health, Brazil; EIU; World Bank

# Affordability & Adult Prevalence, Indonesia 2001-2014



Sources: Euromonitor, EIU, World Bank

# Cigarette Price & Youth Smoking Prevalence, Chile 2000-2015



Source: Paraje, 2017

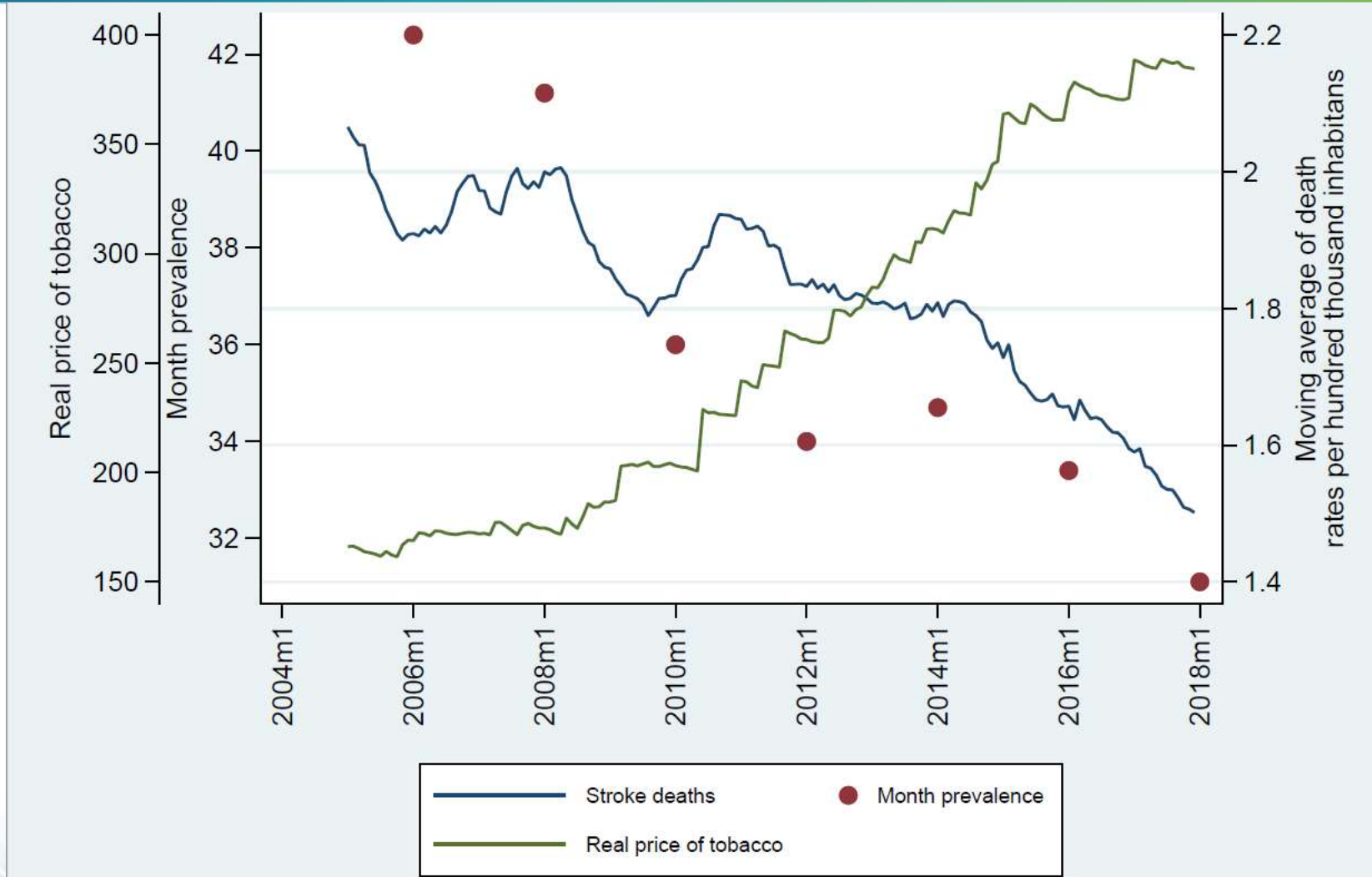
# Price & Other Tobacco Product Use

- Consistent evidence on own-price effects
  - Generally find demand for OTP and vaping products more responsive to price than cigarette demand
- Mixed evidence on substitution among various products
  - Greater substitution among more similar products (e.g., cigarettes and other combustibles)
  - Some evidence of substitution between cigarettes and vaping products
  - Weak evidence of complementarity between combustibles and other non-combustibles



# Tobacco Price, Prevalence & Stroke, Chile

## Inflation Adjusted, 2004-2018

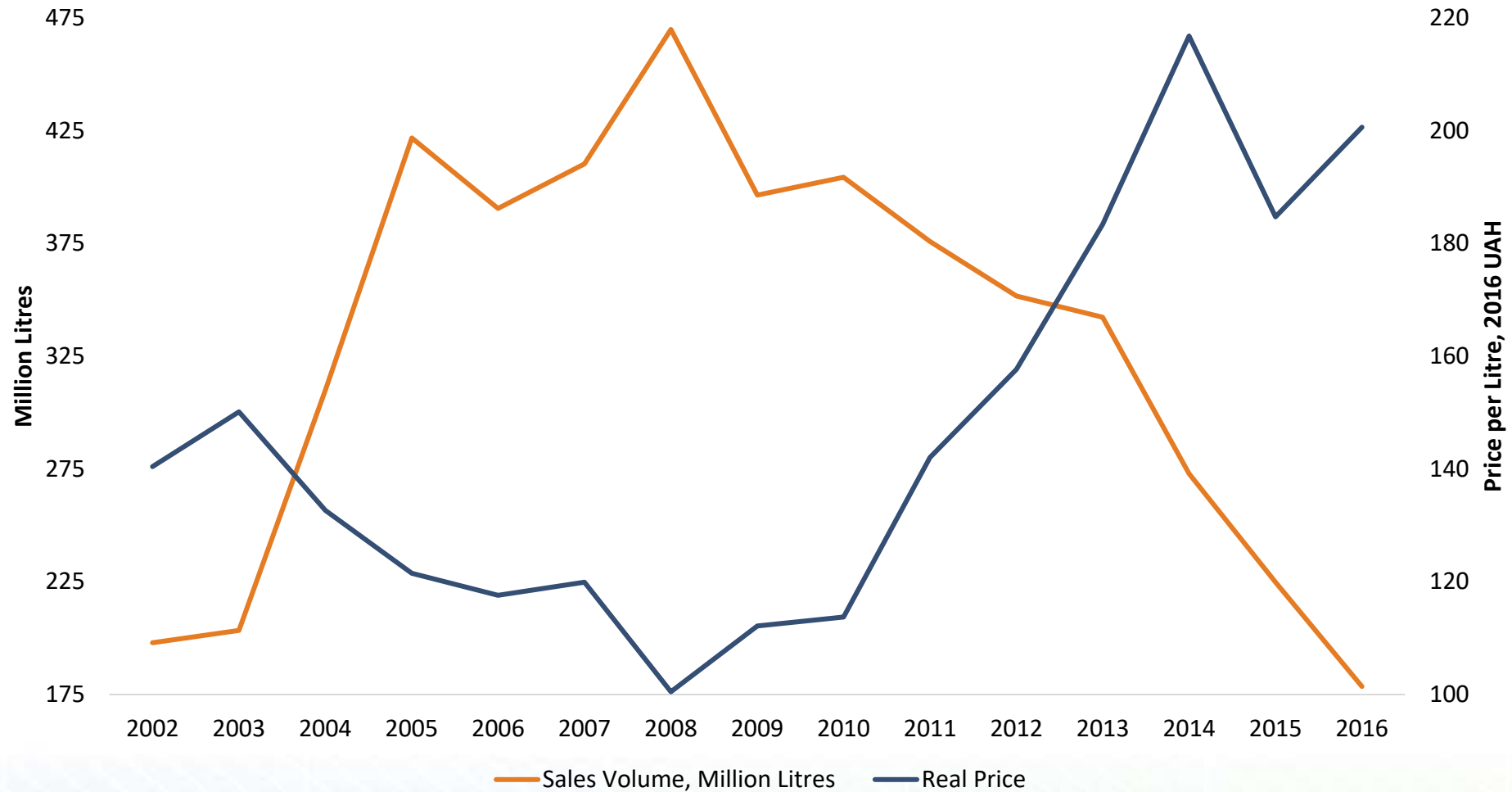


Source: Paraje, 2022



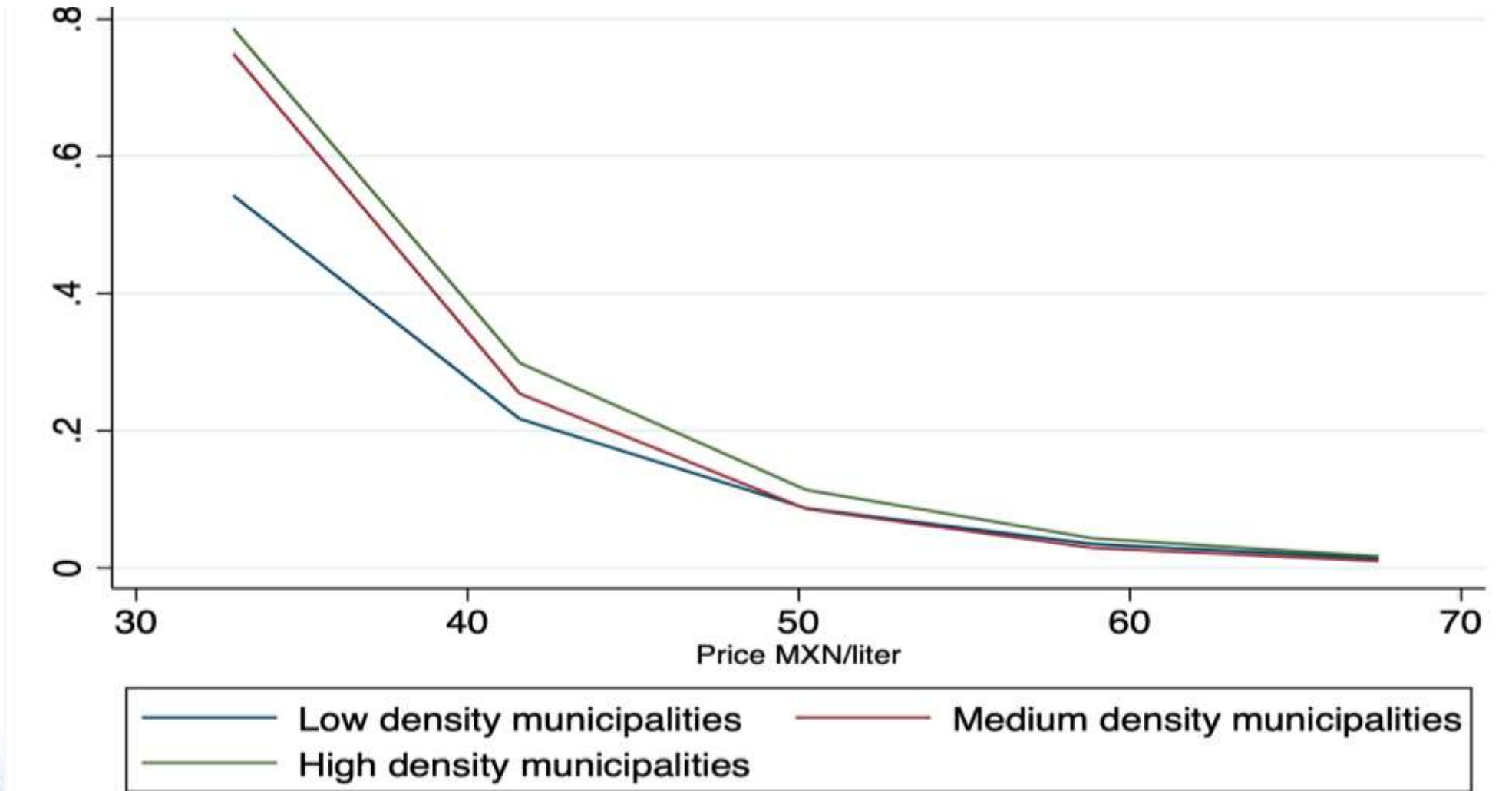
# Distilled Spirits Prices & Sales, Ukraine

## Inflation Adjusted, 2002-2016



Source: Chaloupka et al., forthcoming

# Alcohol Prices & Binge Drinking Mexico, 2016



# Alcohol Taxes, Prices & Consequences

- Econometric and other research shows that higher prices for alcoholic beverages significantly reduce:
  - Drinking and driving, traffic crashes, and motor-vehicle accident fatalities
  - Deaths from liver cirrhosis, acute alcohol poisoning, alcohol-related cancers, cardiovascular diseases, and other health consequences of excessive drinking
  - Violence (including spouse abuse, child abuse, and suicide) and other crime
  - Other consequences of drinking, including work-place accidents, teenage pregnancy, and incidence of sexually transmitted diseases

Sources: Xin & Chaloupka, 2012; Wagenaar et al., 2010

# Tax Pass-through: Selected examples from the Region of the Americas

## **Under-shifting (partial pass-through):**

Barbados  
Berkeley, CA  
Chile  
Oakland, CA  
Philadelphia, PA  
Seattle, WA

## **Full pass-through (or close to full):**

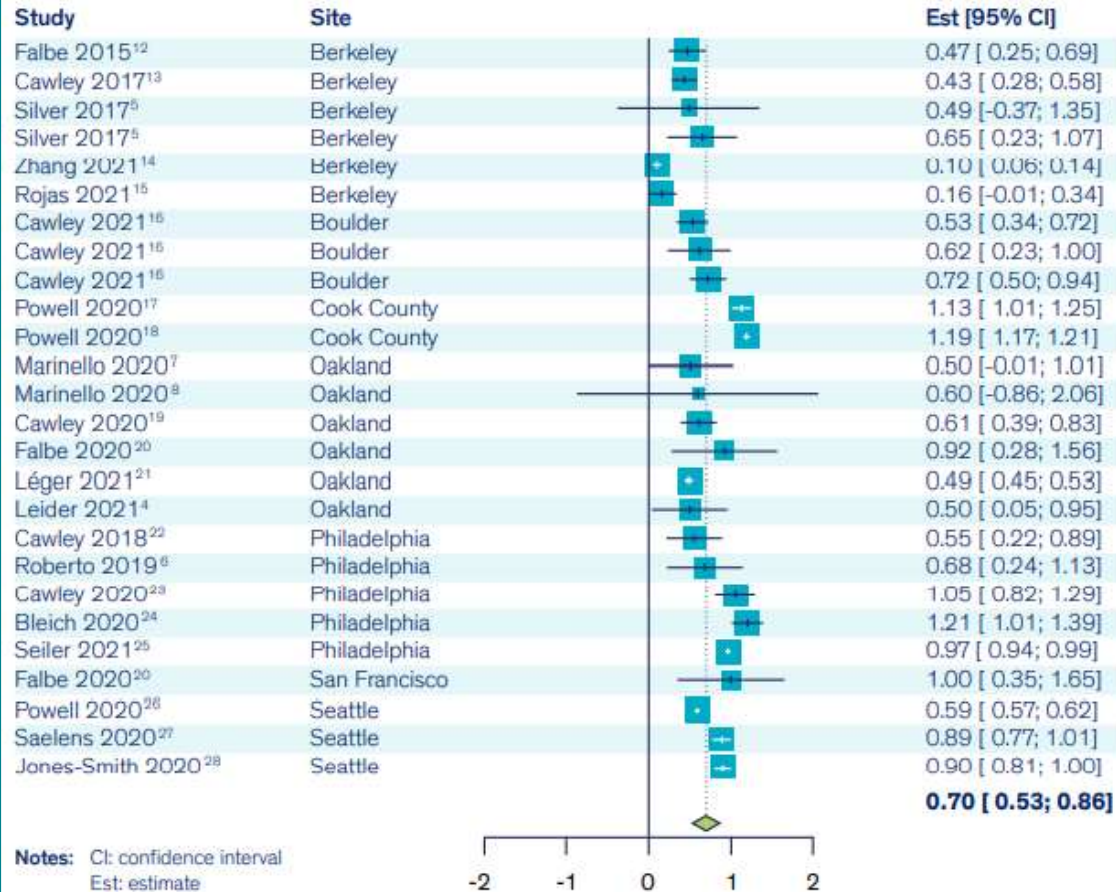
Mexico  
Seattle, WA  
Philadelphia, PA

## **Over-shifting (> 100% pass-through):**

Cook County

# Summary of SSB Tax Pass-through in U.S.

FIGURE 1 Tax Pass-through Estimates and Meta-analysis Results



## SSB taxes increase prices:

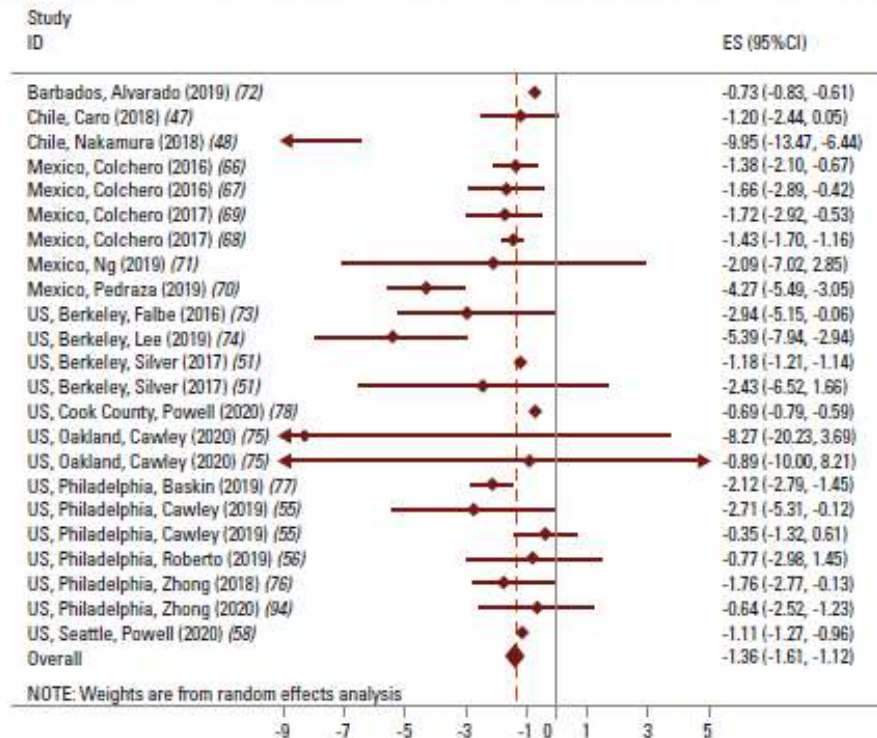
- On average, tax pass-through of local U.S. SSB taxes has been 70%, although there has been substantial heterogeneity across studies.
  - Estimates of tax pass-through were similar, on average, in jurisdictions with lower (i.e., 1¢/oz) compared to higher (i.e., > 1¢/oz) tax rates.



# Consumption, Purchases and Volume Sold: Evidence from the Region of the Americas

## Price elasticity of demand for SSBs

Adjusted for local policy pass-through and cross-border shopping



**SSB taxes reduce demand:**  
 Estimated price elasticity of demand based on tax evaluations in the Region of the Americas is -1.36.

➤ A tax that raises SSB prices by 25%, for example, is expected to reduce demand for SSBs by 34%.

Source: Prepared by Keith B. Marple (Brandeis University), Lisa M. Powell (University of Illinois at Chicago) and Tatiana Andreyeva (University of Connecticut).

# Comparison with Impact of SSB Taxes Demand in the U.S.: Evidence on Consumption, Purchases and Volume Sold

FIGURE 1 Change in Demand Estimates and Meta-analysis Results

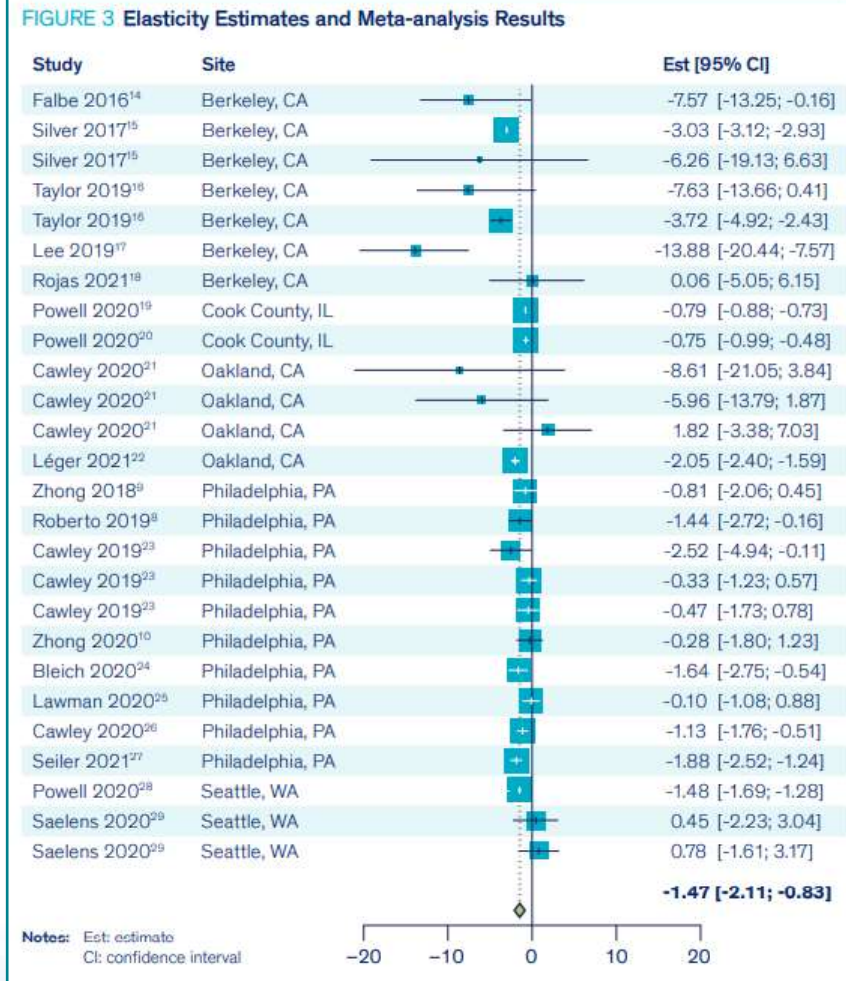


## SSB taxes reduce demand:

- On average, following the implementation of local U.S. SSB taxes, demand for SSBs fell by 20%, with substantial heterogeneity across studies.



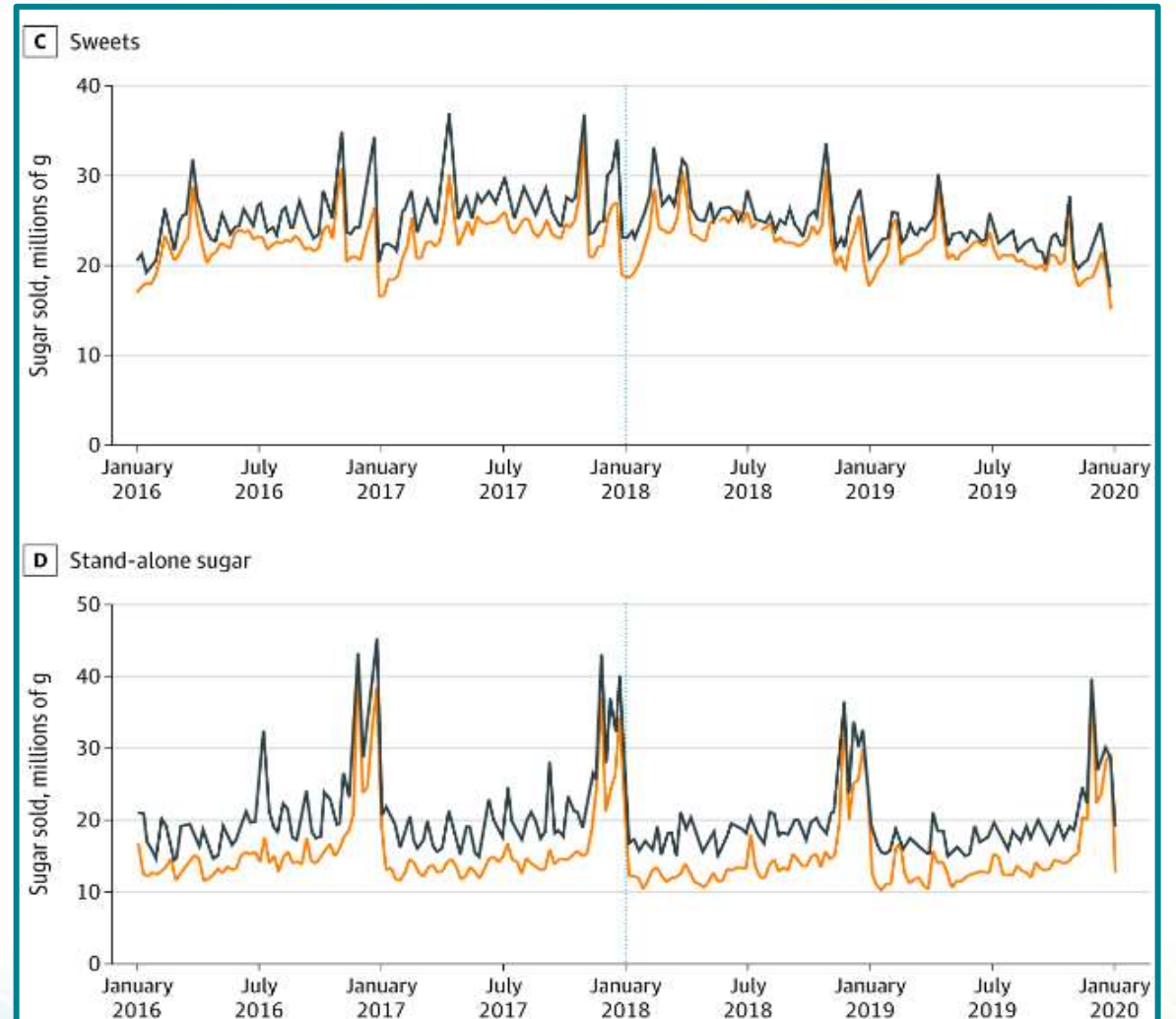
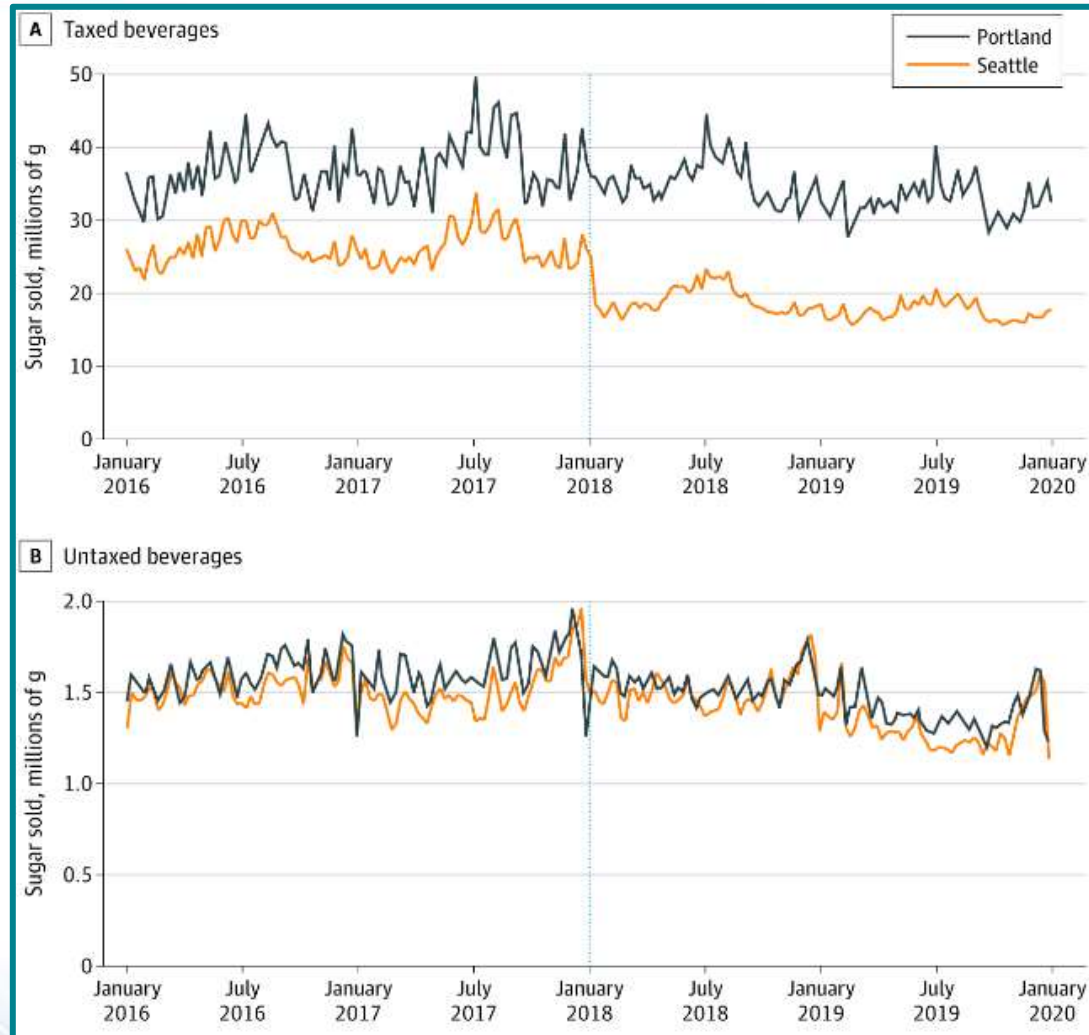
# Impact of SSB Taxes on Demand in the U.S.: Estimates of Price Elasticity of Demand



## SSB taxes reduce demand:

- On average, estimated price elasticity of demand based on evaluations of local U.S. SSB taxes is -1.47.
  - A tax that raises SSB prices by 25%, for example, is expected to reduce demand for SSBs by 37%.
- Based on a subset of 5 studies, **one quarter of the estimated reduction in demand was offset by cross-border shopping.** After accounting for cross-border shopping, the average estimated price elasticity of demand was -1.1

# Evidence of Seattle SBT on Changes in Grams of Sugar Sold



Source: Powell, L.M., Leider, J. and Oddo, V.M., (2021). Evaluation of changes in grams of sugar sold after the implementation of the Seattle sweetened beverage tax. JAMA Network Open, 4(11), pp. e2132271-e2132271. Available online: <https://doi.org/10.1001/jamanetworkopen.2021.32271>

# Evidence on Impact of Changes in Sugar Sold from SSBs

## Seattle SBT Impacts

	Year 1 Post-tax	Year 2 Post-Tax
Change in grams of sugar sold from taxed SSBs	-23%	-23%
Change in grams of sugar sold from untaxed beverages	+4%	0%
Change in grams of sugar sold from sweets	+4%	+4%
Change in grams of sugar sold from stand alone sugar	0%	4%
Net change in grams of sugar sold from SSBs accounting for substitution	-18%	-19%

### Impact on Sugar sold from SSBs:

- 19% net reduction 2-years post-tax in sugar sold from taxed SSBs after accounting for substitution to sweets as well as standalone sugar and untaxed beverages.

Source: Powell, L.M., Leider, J. and Oddo, V.M., (2021). Evaluation of changes in grams of sugar sold after the implementation of the Seattle sweetened beverage tax. JAMA Network Open, 4(11), pp. e2132271-e2132271. Available online: <https://doi.org/10.1001/jamanetworkopen.2021.32271>

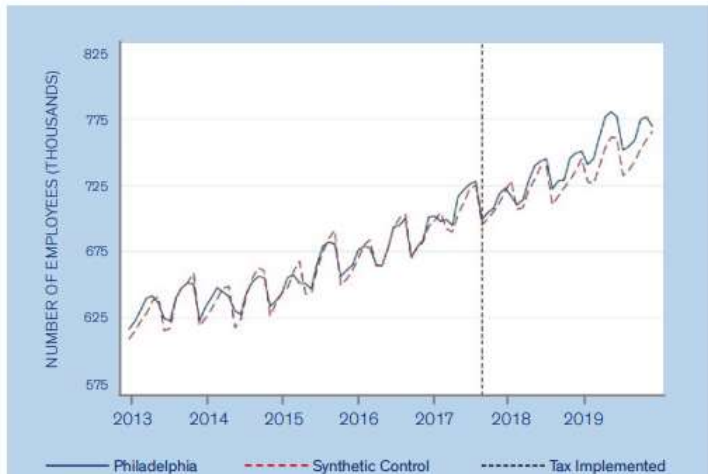


# Evidence on Concerns about Job Loss

**FIGURE 1** Unadjusted new monthly unemployment benefit claim filings in Philadelphia, PA, and surrounding counties for all industries, January 2015 through February 2018.<sup>12</sup>



**FIGURE 2** Total number of persons employed in Philadelphia, PA, and its synthetic control, monthly, January 2012 through June 2019.<sup>13</sup>



**FIGURE 3** Total number of persons employed in San Francisco, CA, and its synthetic control, monthly, January 2013 through December 2019.<sup>14</sup>



- **Industry argues**
  - Tobacco, alcohol, and SSB taxes will lead to job losses, but models need to account for income and substitution effects and tax revenue.
- **Evidence from SSB tax evaluations:**
  - **Mexico:**
    - No change in employment in the manufacturing industry and commercial sector.
    - No increase in the national unemployment rate.
  - **Philadelphia:**
    - No change in unemployment claims.
    - No reduction in overall employment.
  - **San Francisco:**
    - No reduction in overall employment.

# Gaps in the Literature

- Tobacco: limited evidence for emerging products such as electronic-cigarettes and no evidence to date for heated tobacco products.
- Alcohol: limited available evidence for alcohol from low and middle-income countries.
- SSBs: limited evidence that links SSB prices and taxes to health outcomes.

# Key Messages

- Evidence from both demand models and tax evaluations show that higher prices/taxes on products such as tobacco, alcoholic beverages, non-alcoholic sugar-sweetened beverages (SSBs) and other selected foods reduce the consumption of these products.
  - The evidence for tobacco and alcohol, along with other selected foods, reveals that demand is price responsive but generally inelastic (price elasticity less than one), whereas the demand for SSBs is, on average, more price responsive (price elasticity equal to or greater than one).
- The extent to which demand responds to prices/taxes varies by demographic and socioeconomic characteristics.
  - For tobacco, SSBs and other selected foods the evidence suggests that lower-income populations are relatively more price sensitive compared to their higher income counterparts, whereas for alcohol there does not appear to be a consistent differential pattern in price sensitivity by SES.
  - There is consistent evidence that youth smoking is more sensitive to higher prices, and that increased tobacco taxes are effective in reducing smoking initiation.
- Evidence shows that it is important for policy makers to be aware of tax avoidance behaviors. Studies have found that higher prices and taxes for tobacco, alcohol and SSBs are associated with some degree of cross-border shopping.
- Evidence shows that higher cigarette prices and taxes are associated with lower levels of cancer and respiratory disease and overall mortality and higher prices/taxes for alcoholic beverages are associated with reduced health risks (e.g., liver cirrhosis) and other harms (e.g., accidents, violence); there is limited evidence that links SSBs and other food prices/taxes to health outcomes although some studies have demonstrated associations with reduced body mass index

# Chapter and Contact Information

Chapter 3

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## Protecting and Promoting Health Through Taxation: Evidence and Gaps

Lisa M Powell\* and Frank J Chaloupka\*