Prices, Taxes and the Demand for Electronic Nicotine Delivery Systems

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Overview

• Demand for E-Cigarettes
  – Effects of prices on e-cigarette demand
  – Cross-price, other effects

• ENDS Taxation – Options
  • Potential e-cigarette tax revenues
Disclosures

• National Cancer Institute, State and Community Tobacco Control Initiative, 5U01-CA154248
• Centers for Disease Control and Prevention, Office on Smoking and Health
• American Cancer Society, Cancer Action Network

• Conflicts of Interest – none declared
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E-Cigarette Demand
Reusable ENDS

Sales Volume (Thousands of Pieces)

Sales Price (Real 2014 Q4 Dollars)

Real Price
Volume
E-Cigarette Prices & Sales

• Huang, et al., *Tobacco Control*, 2014
  • 2010-2012, quarterly e-cigarette sales data
  • Overall sales of e-cigarettes are sensitive to price changes
  • A 10% increase in price reduces sales of disposable e-cigarettes by approximately 12%, and by about 19% for reusable e-cigarettes.
  • Sales of disposable e-cigarettes were higher in markets with stronger smoke-free air policies.
  • No consistent relationship between cigarette prices and e-cigarette sales.
  • Increasing reusable e-cigarette price will lead to an increase in disposable e-cigarette sales.
E-Cigarette Prices & Sales

• Gwarnicki, et al. (under review)
  • 2010-2014, quarterly e-cigarette and other nicotine product sales data
  • Overall sales of e-cigarettes are sensitive to price changes
  • 10% increase in price reduces sales of disposable e-cigarettes by between 9% and 16%.
  • 10% increase in price of rechargeable e-cigarettes reduces sales by between 14% and 24%
  • Generally positive associations between cigarette prices and e-cigarette sales, implying substitution from cigarettes to e-cigarettes in response to increases in the relative price of cigarettes
Number of Nielsen Markets with E-cigarette Sales

Number of Markets

|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
E-Cigarettes and NRT Sales

• Diaz, et al. (in progress)
  • 2009-2014, quarterly e-cigarette and nicotine replacement product sales data
  • Assess the entry of e-cigarettes into Nielsen markets, e-cigarette prices, and e-cigarette sales on sales of NRT products

• Preliminary findings include:
  • E-cigarette entry associated with reduced sales of NRT patches and gum
  • Greater e-cigarette sales volume generally associated with reduced NRT sales
  • Evidence of substitution based on positive cross-price effects
E-Cigarette Prices & Sales

• Stoklosa, Drope & Chaloupka (2016)
  • 2011-2014 monthly Nielsen data on e-cigarette sales in six EU countries (Estonia, Ireland, Latvia, Lithuania, Sweden, and UK)
  • Own price elasticities range from -0.83 to -0.87: 10% price increase reduces sales by 8-9%
  • E-cigarette sales generally positively associated with cigarette prices, but mostly not statistically significant
Impact of Price on E-cigarette Use

• Huang, et al. (under review)

Methods:

• Nationally representative 2013 online survey
  – 7,522 U.S. adults from GfK’s Online Knowledge Panel.

• Survey data linked with Nielsen e-cigarette retail prices
  – separately for disposable and reusable e-cigarette

• Weighted survey logistic regression analysis
  – ever use and current use
  – Control for cigarette price, demographics, and socioeconomics

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Impact of Price on E-cigarette Use

• Huang, et al. (under review):
  – Higher disposable e-cigarette prices correlated with lower odds of ever use
    • estimated own price elasticity ranges from -0.81 to -0.98, implying 10% price increase reduces likelihood of trying e-cigs by 8-10%
  – Neither rechargeable e-cigarette price nor combustible cigarette price was found associated with e-cigarette ever use
  – No significant interactions between e-cigarette or cigarette price and e-cigarette current use.
Youth E-Cigarette and Cigarette Use
Middle & High School Students,
Use in past 30 days, 2014-2015

Source: Monitoring the Future, 2015

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Impact of Price on E-cigarette Use

Pesko, et al. (in progress):

– 2014 & 2015 Monitoring the Future data on youth use of e-cigarettes
– Nielsen scanner price data
– Preliminary estimates:
  • Prevalence elasticity: -0.6, so 10% price increase reduces likelihood of youth use by 6%
  • Intensity elasticity: -1.0, implying 10% price increase reduces frequency of use among users by 10%
  • Cigarette price insignificant

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Impact of Price on E-cigarette Use

Research Needs:

– Better measures of the costs of using e-cigarettes:
  • initial fixed costs on devices
  • recurring costs on e-juices

– Better measures of e-cigarette use:
  • frequency, intensity, device type, etc.
ENDS Taxation
Rationale for ENDS Taxation

• Improve Public Health
  • Encourage switching from combusted to potentially less harmful products
  • Prevent youth initiation

• Raise Revenue
  • Replacement revenue source as revenues from cigarettes and other tobacco products fall
ENDS Taxation in the US

- Minnesota, North Carolina, Louisiana and DC currently tax ENDS
  - 95% of wholesale price in MN; 67% in DC; 40% in PA
  - 5 cents per ml in NC, LA; 7.5 cents/ml in WV; 20 cents/ml in KS
- Local ENDS taxes:
  - Petersburg AK (45% of wholesale price)
  - Mat Su Borough, AK (55% of wholesale price)
  - Chicago (80 cents per unit, plus 55 cents per ML)
- Many others have proposed or are considering
ENDS Taxation Globally

- Togo: 45% of retail price
- Republic of Korea: 1799 won/ml (US$1.65/ml)
- Italy:
  - Mid-2013: 58.5% of retail price
  - Late-2014: 50% of retail price
  - Early 2015: €3.73 per 10 mls
  - May 2015: eliminated
- Portugal: €0.60/ml
- Others have proposed or are considering
  - European Union proposal to tax like cigarettes
Mechanics of ENDS Taxes

- How to tax?
  - Specific vs. *ad valorem*?

- What to tax?
  - All products/components vs. e-juice?
  - Only products that contain nicotine?
  - All nicotine vs. nicotine derived from tobacco?

- Where to collect tax?
  - Distributor vs. retailer?
  - Need for licensing
ENDS Taxation

- Low tax relative to cigarette, OTP taxes
  - Little impact in reducing use, uptake
  - Encourages dual use
  - Maximize incentives to switch from combustibles to ENDS
  - Minimal new revenue

- ENDS tax equivalent to cigarette tax
  - Significant impact on use, uptake
  - Little incentive to switch from combustibles to ENDS
  - Modest new revenue
Optimizing ENDS Taxation

- Significant tax on ENDS coupled with increased taxes on cigarettes and other combustible tobacco products
  - Maintain or increase relative price of combustibles
  - Maximize switching while discouraging initiation and dual use
  - Generates significant new revenues
Potential ENDS Tax Revenues

- Assume own-price elasticity of -1.5 based on published Nielsen data analysis
- Assume same elasticity in other market segments
- Calculate new sales and tax revenues
  - CA:
    - 20% tax – revenues around $18.7 million
    - 40% tax – revenues around $21.4 million
    - $1.00 cigarette tax increase (almost 20% price increase) generates nearly $550 million in new revenue
Summary

- Taxes on disposable and rechargeable e-cigarettes will reduce sales
- Taxes on disposable e-cigarettes likely to reduce e-cigarette ever use (trial use and experimentation)
- Cigarettes and e-cigarettes increasingly appear to be substitutes for one another
- E-cigarettes appear to be substitutes for nicotine replacement products
- ENDS taxes will generate new revenues, but relatively modest (at least in the short term)
- Differential taxes and cigarettes and ENDS have potential to significantly improve public health

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