The Experimental Tobacco Marketplace: Contemporary Status

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The Challenge

• The type and number of tobacco/nicotine products has and continues to expand.

• Tobacco control would benefit from estimates of the impact of new policies and products prior to implementation.
Virginia Tech’s Tobacco Control Mission

- Develop a method to prospectively examine potential policies and forecast the effects on tobacco purchases.
- Employ our 30 years of experience using behavioral economics to study tobacco products. *

*Bickel, DeGrandpre, Hughes, & Higgins, (1991) JEAB
Today’s goal

• Describe a challenge of tobacco regulatory science
• How a experimental method may address that challenge
• Illustrate the method
• Review curated selection of our research
The Experimental Tobacco Marketplace (ETM)
Experimental Tobacco Marketplace
Experimental Tobacco Marketplace

- Assessment session
- ETM session
- Follow up session
- Sampling period
- Purchased product use
Method

Key Measures

- Demand intensity
- Demand elasticity
- Substitution

Why an Experimental Tobacco Marketplace?

Type and number of products in a marketplace alters demand elasticity and substitution.

Why an Experimental Tobacco Marketplace?

Quisenberry, Koffarnus, Hatz, Epstein, & Bickel, 2016, NTR
ETM: Parameter Space

Behavioral Economics Indicators

- Substitution across products
- Demand
- Substitution across markets

Manipulations

- Bans/Introduction
- Messages/Narratives
- Product composition
- Restraint
- Taxes

User type, Population
ETM 2: E-cigs Nicotine Strengths on Substitution

- 25 smokers (within-subject)

- Different e-Liquid strengths; 0, 6, 12, & 24mg/mL

- Purchased across 5 prices of conventional cigarettes
ETM 2: key findings

A

Conventional Cigarette Demand

B

E-Liquid Substitutability

Nicotine Purchased (mg)

Nicotine Purchased (mg)

Cigarette Unit Price ($)

Cigarette Unit Price ($)

0 mg/mL e-liquid Cond.

6 mg/mL e-liquid Cond.

12 mg/mL e-liquid Cond.

24 mg/mL e-liquid Cond.

0 mg/mL e-liquid Cond.

6 mg/mL e-liquid Cond.

12 mg/mL e-liquid Cond.

24 mg/mL e-liquid Cond.

0.12 0.25 0.50 1.00 2.00

0.12 0.25 0.50 1.00 2.00

0 50 100 150

0 50 100 150

ETM 2: Conclusion

- Cigarette purchasing decreased as a function of cigarette price
- E-Liquid purchasing increased as a function of both cigarette price and e-liquid strength
- The 24 mg/mL e-liquid appears to function as the better substitute
ETM 3: Taxes and Subsidies

• Policies that could promote substitutability
  1. Tax conventional cigarettes (0%, 12.5%, 25%, & 50%)
  2. Subsidize e-Liquid (i.e., 0%, 12.5%, 25%, & 50%)
ETM 3: Taxes and Subsidies

**Taxes**

- Cigarettes (0% Tax)
- Cigarettes (25% Tax)
- Cigarettes (12.5% Tax)
- Cigarettes (50% Tax)

**Subsidy**

- Cigarettes (0% e-Liq Sub.)
- Cigarettes (25% e-Liq Sub.)
- Cigarettes (12.5% e-Liq Sub.)
- Cigarettes (50% e-Liq Sub.)
ETM 3: Taxes and Subsidies

Taxes

Subsidy
Experiment 2: Results

ETM Purchasing: Cigarette Taxation
ETM 3: Taxes and Subsidies

• Cigarette price decreased cigarette and increased E-liquid purchasing
• Cigarette Taxes decreased cigarette purchasing marginally increased E-liquid purchasing
• E-liquid subsidy had no effect on cigarette purchasing and increased E-liquid purchasing at the 50% subsidy
Taxes are effective in decreasing cigarette smoking
Taxes across states are heterogeneous
Several have suggested integrated tax policies
- Tobacco Parity Tax (WHO, Campaign for Tobacco-Free kids)
- Harm Reduction Tax (Chaloupka & Warner)
ETM 4: Integrated tax policy

ETM 4: Integrated tax policy

ETM 4: Conclusion

• Tobacco-Parity
  • decreased purchasing of all tobacco products
  • increased purchasing of medicinal nicotine

• Harm-Reduction
  • decreased purchasing of combustible products
  • resulted in greater purchases of ENDS and smokeless tobacco.

• Total nicotine(mg) purchased was not significantly different between proposals
  • Higher taxes yielded lower demand
ETM 5: Narratives

Bickel et al., Toward Narrative Theory:...2017, Nebraska Symposium on Motivation
Methods

• Narratives
  • Positive
  • Jesse, your best friend ... smokes about as many cigarettes as you do in a day. She called to tell you that she has not been feeling very well. Jesse tells you she went to the doctor ... the doctor drew blood for some tests ... she received her results and it was only the flu and that she is feeling much better. She is extremely happy ...
Methods

• Narratives cont’d

• Negative

• She tells you she received her results ... she has a high level of toxins in her blood as a result of cigarette smoking. Jesse now has to undergo expensive treatment and may face a lower life-expectancy and has a greater likelihood of having high blood pressure, heart attacks, or blood cancers.
Methods

Delay Discounting
Tasks:
- Money
- Cigarettes
- Money Now/Cigarettes Later
- Cigarettes Now/Money Later

Positive

Negative

Negative w/Regret

Negative w/Change

ETM:
- Cigarettes
- Electronic Cigarettes
- Snus
- Chew
- Gum
- Lozenges

Delay Discounting
Tasks:
- Money
- Cigarettes
- Money Now/Cigarettes Later
- Cigarettes Now/Money Later
ETM 5: Narratives

Positive

Negative

Negative w/Regret

Negative w/Change

Proportion of Total Spent vs. Cigarette Price (Log Scale)
ETM 5: Narratives

• Narratives describing negative outcomes with regret or change were more effective in producing substitution.
• Narratives can be used to alter the relative preference of conventional cigarettes and E-cigarettes.
Illegal Experimental Tobacco Marketplace

- Illicit trade in tobacco products is ongoing
- Available via internet purchase
- Products may contain adulterants not found in commercial products
- The efficacy of mitigation strategies is unknown
- Absence of empirical models
ETM 6: Effects reduced nicotine standards on Illegal Purchases

• 52 online smokers (between subjects)
• Very low nicotine cigarette x control
• Marketplace preference across 5 price trials
ETM 6: Effects reduced nicotine standards on Illegal Purchases

ETM 6: Effects reduced nicotine standards on Illegal Purchases

- Price and product standards can alter substitutability between legal and illegal marketplaces and products.
ETM 7: Effects of Vaping Bans on Illegal Purchases

• 150 online smokers, e-cigarette users, and dual users (within-between subjects)

• No ban, vaping ban, and flavored vaping ban

• Monetary fines
ETM 7: Effects of Vaping Bans on Illegal Purchases

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ETM 7: Effects of Vaping Bans on Illegal Purchases

• Bans increased illegal purchases
  • Exclusive e-cigarette smokers largest effect
• Increasing cigarette price increased illegal purchasing
  • Exclusive cigarette smokers and dual users
• Vaping ban > flavor ban
• Monetary fines suppressed illegal purchasing
  • Exclusive e-cigarette users being the most resistant
ETM 8: Vaping Bans on Illegal Purchases: comparison across countries

• 452 smokers, e-cigarette users, and dual users from the US, CA and EN (ITC project)
• No ban, vaping ban, total flavor vaping ban and partial flavor ban
• Marketplace preference
ETM 8: Vaping Bans on Illegal Purchases: comparison across countries

EN  US  CA

Predicted Probability of Choosing Illegal Marketplace

Price per Legal Cigarette (multiplicative factor)

Cigarette smokers  Dual users  E-cigarette users

Price per Legal Cigarette (multiplicative factor)

Cigarette smokers  Dual users  E-cigarette users

Price per Legal Cigarette (multiplicative factor)

Cigarette smokers  Dual users  E-cigarette users

NoBan  Partial Flavor Ban  Total Flavor Ban  EcigBan

The Experimental Tobacco Marketplace

• Nicotine dose
• Taxes & Subsidy
• Integrated Tax Proposals
• Narratives/Messaging

• VLNC standard on illegal purchase
• Flavor bans on Illegal purchase
• E-cig ban on Illegal purchase
• International comparison of bans on illegal purchase
Conclusion

• The ETM is a robust highly flexible methodology for the study of the interaction of diverse tobacco products.
Conclusions

• The ETM is a robust highly flexible methodology for the study of the interaction of diverse tobacco products.
  • Policy impact on tobacco purchasing
  • Can be adapted to address a variety of questions
  • Assesses generality of policy across different countries
  • Tool for tobacco control and regulatory science
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