Elasticities of Demand for Cigarette and Waterpipe Tobacco Products in Three Eastern Mediterranean Countries

Presented by:
Dr. Ali Chalak
DECLARATIONS

• This research presentation is a part of a series of research papers produced by the Eastern Mediterranean Consortium on the Economics of Waterpipe Tobacco Smoking (ECON-WTS).

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• The presenter declares no conflict of interest.
• Waterpipe tobacco smoking is a traditional tobacco use method that originated in the Eastern Mediterranean Region and has had a global resurgence in recent years.

• Waterpipe smoking rates in the region are among the highest worldwide, with the lowest prices of tobacco products among all WHO regions.

• Tobacco product prices are an important factor when considering that decreasing affordability is the most effective measure to reduce the uptake of smoking among young people.
The WHO Framework Convention on Tobacco Control (FCTC) recommends that taxation policy should take into account price elasticity of demand in order to reduce consumption and prevalence of tobacco use.

The FCTC also recommends that all tobacco products should be taxed comparably to avoid unintended consequences, such as product substitution or increases in illicit trade.

Available estimates in the EMR of adult demand elasticities for smoking products are poorly understood and often limited to cigarette smoking.
AIM

• Present recent and comprehensive own- and cross-price elasticities of demand for cigarettes and Waterpipe tobacco products in three Eastern Mediterranean Region (EMR) countries:
  • Lebanon
  • Jordan
  • Palestine

• Discuss the implications of these results to taxation and other fiscal policies aimed at tobacco control in the EMR
STUDY POPULATION

• Study based on survey that included:
  • HH questionnaire
  • Volumetric Choice Experiment (VCE) – core exercise
• Data were collected using nationally-representative household samples of adults (18+ years old) in Lebanon, Jordan, and Palestine
• Participants were selected using a multistage cluster sampling approach with probability-proportional-to-size random selection method.
• In each country, the sample of households was chosen in two stages:
  1. selecting well-defined geopolitical clusters within each governorate
  2. selecting housing units within each cluster.
• Participants were enrolled from all 8, 12 and 9 governorates in Lebanon, Jordan the West Bank, Palestine, respectively
STUDY PROCEDURES

• Study staff consented participants and used electronic tablets to administer the survey.
• The HH questionnaire:
  • Assessed sociodemographic characteristics + cigarette and WP smoking behaviors
  • Based on prior validated surveys
• Questionnaire pre-tested using cognitive interviews to ensure respondent comprehension.
• Study protocols were approved by the IRB’s of the:
  • American University of Beirut (Lebanon)
  • Jordan University of Science and Technology (Jordan)
  • Birzeit University (Palestine).
• VCEs offer the advantages of:
  • understanding demand for products in the lack/absence of actual market data
  • avoiding endogeneity problems inherent in actual market data when available through the randomization of attribute levels
• By simultaneously offering multiple distinct volumetric choices b/w competing products, VCEs allow for the estimation of a complete set of:
  • own-price elasticities
  • cross-price elasticities
Based on the following prices, think about the number of cigarettes and waterpipe products you would purchase?

<table>
<thead>
<tr>
<th></th>
<th>(1) Cigarettes premium</th>
<th>(2) Cigarettes discount</th>
<th>(3) WP tobacco premium</th>
<th>(4) WP tobacco discount</th>
<th>(5) Non-flavored WP tobacco</th>
<th>(6) WP home delivery</th>
<th>(7) WP café session premium</th>
<th>(8) WP café session discount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price</td>
<td>LBP2,500</td>
<td>LBP750</td>
<td>LBP13,500</td>
<td>LBP10,250</td>
<td>LBP20,000</td>
<td>LBP7,500</td>
<td>LBP15,000</td>
<td>LBP7,500</td>
</tr>
<tr>
<td>Quantity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

8-way choices

Each product varied according to 4 price levels, the base price reflecting current average market prices in each country, each price level reflecting a 50% incremental increase

Was replaced with Roll your own cigarettes in Palestine

EXAMPLE CHOICE SET
ECONOMETRIC ANALYSIS

• Zero-Inflated Poisson (ZIP) regression to account for excess of zero counts/censoring

• For any tobacco product, the model has two parts
  • Logit model for predicting excess zeros
    \[ f\{ \text{sociodemographics} + \text{current smoking status} \} \]
  • Poisson count model
    \[ f\{ 1 \times \text{own-price} + 7 \times \text{cross-prices} + \text{income} \} \]

• In each country \( \rightarrow \) 8 x ZIP models corresponding to the 8 products under examination

• Log(price) coefficients \( \rightarrow \) coefficients interpreted as own- and cross-price elasticities
• The survey was completed by a total of:
  • 1,680 respondents in Lebanon (50% female)
  • 1,925 in Jordan (44.6% female)
  • 1,679 in Palestine (50% female).

• Substantially larger % of current general smokers in Lebanon (70.9%) vs. Jordan (40.2%) or Palestine (36.8%)

• Pattern most pronounced in current WP smoking:
  • Lebanon (39.5%) more than 3x Jordan (11%) and Palestine (12.9%)
SAMPLE CHARACTERISTICS (cont’d)

• Age distribution exhibited similar patterns in all three countries:
  • nearly 2/3 of respondent aged 45 or less

• Lebanon stood out in terms of its higher proportion of full-time employment:
  • 44.5% compared to 34.4% in Jordan and 34.0% in Palestine

• As for education, the proportion of respondents with high education was highest in Jordan (25%) followed by Lebanon (20.7%) and Palestine (16.1%)
MONTHLYIZED STATED PURCHASES OF TOBACCO PRODUCTS

<table>
<thead>
<tr>
<th>Tobacco product</th>
<th>Lebanon (N=13,440)</th>
<th>Jordan (N=15,400)</th>
<th>Palestine (N=13,432)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Premium cigarettes</td>
<td>Mean: 4.98% Null: 89.6%</td>
<td>Mean: 3.90% Null: 90.7%</td>
<td>Mean: 3.67% Null: 92.8%</td>
</tr>
<tr>
<td>Discount cigarettes</td>
<td>Mean: 14.24% Null: 75.6%</td>
<td>Mean: 6.11% Null: 86.4%</td>
<td>Mean: 1.85% Null: 96.4%</td>
</tr>
<tr>
<td>Roll-your-own cigarettes</td>
<td>Mean: -% Null: -</td>
<td>Mean: -% Null: -</td>
<td>Mean: 0.56% Null: 99.5%</td>
</tr>
<tr>
<td>Premium waterpipe tobacco</td>
<td>Mean: 7.16% Null: 83.6%</td>
<td>Mean: 1.03% Null: 96.6%</td>
<td>Mean: 1.13% Null: 97.0%</td>
</tr>
<tr>
<td>Discount waterpipe tobacco</td>
<td>Mean: 6.30% Null: 86.3%</td>
<td>Mean: 0.54% Null: 97.6%</td>
<td>Mean: 0.11% Null: 99.4%</td>
</tr>
<tr>
<td>Non-flavored waterpipe tobacco</td>
<td>Mean: 0.81% Null: 98.6%</td>
<td>Mean: 0.02% Null: 99.5%</td>
<td>Mean: -% Null: -</td>
</tr>
<tr>
<td>Waterpipe tobacco home delivery</td>
<td>Mean: 1.89% Null: 94.6%</td>
<td>Mean: 0.01% Null: 99.5%</td>
<td>Mean: 0.08% Null: 99.5%</td>
</tr>
<tr>
<td>Premium waterpipe café</td>
<td>Mean: 0.40% Null: 89.4%</td>
<td>Mean: 0.08% Null: 98.4%</td>
<td>Mean: 0.12% Null: 97.7%</td>
</tr>
<tr>
<td>Discount waterpipe café</td>
<td>Mean: 0.45% Null: 90.1%</td>
<td>Mean: 0.16% Null: 98.1%</td>
<td>Mean: 0.21% Null: 96.2%</td>
</tr>
</tbody>
</table>

Lebanon stated larger purchases of all 8 cigarette and waterpipe products.

This was driven by the fact that respondents in Lebanon exhibited the lowest proportion of null stated purchases across all products.
## OWN- PRICE ELASTICITIES

<table>
<thead>
<tr>
<th>Tobacco product</th>
<th>Lebanon</th>
<th>Jordan</th>
<th>Palestine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Premium cigarettes</td>
<td>-1.157***</td>
<td>-1.080***</td>
<td>-1.042***</td>
</tr>
<tr>
<td>Discount cigarettes</td>
<td>-0.639***</td>
<td>-0.719***</td>
<td>-1.209***</td>
</tr>
<tr>
<td>Roll-your-own cigarettes</td>
<td>-</td>
<td>-</td>
<td>-0.065</td>
</tr>
<tr>
<td>Premium WP tobacco</td>
<td>-1.949***</td>
<td>-0.601***</td>
<td>0.196*</td>
</tr>
<tr>
<td>Discount WP tobacco</td>
<td>-1.700***</td>
<td>-0.915***</td>
<td>-0.650**</td>
</tr>
<tr>
<td>Non-flavored WP tobacco</td>
<td>0.095</td>
<td>0.816***</td>
<td>-</td>
</tr>
<tr>
<td>WP tobacco home delivery</td>
<td>-1.869***</td>
<td>0.104</td>
<td>-0.379</td>
</tr>
<tr>
<td>Premium WP café</td>
<td>-2.312***</td>
<td>-0.674***</td>
<td>-1.120***</td>
</tr>
<tr>
<td>Discount WP café</td>
<td>-1.699***</td>
<td>-0.335**</td>
<td>-0.291**</td>
</tr>
</tbody>
</table>

*** p < .01; ** p < .05; * p <0.10.
LEBANON

Compared to previous estimates (Salti et al., 2015):

- Price elasticity for premium cigarettes (-1.2) > published elasticity for imported (i.e., typically premium) cigarettes (-0.2)
- Price elasticity of discount cigarettes (-0.6) < published elasticity for local (i.e., typically discount) cigarettes (-1.5)
- Price elasticity of premium WP (-1.4) ≈ published elasticity for WP tobacco (-1.9)
- Cross-price elasticity estimates between WP and cigarettes were ≈ 0, consistent with Salti et al.

JORDAN

Compared to Sweis and Chaloupka (2014):

- Sweis and Chaloupka do not differentiate between premium and discount cigarettes
- Price elasticity for discount cigarettes (-0.7) ≈ to published elasticity for cigarettes (-0.6)
- Price elasticity for premium cigarettes (-1.1) > published elasticity for cigarettes (-0.6)

IN GENERAL

- Cross-price elasticities between store-purchased WP tobacco and WP café smoking sessions is weak and inconsistent → not close substitutes
- Estimates in this study are broadly consistent with previous ones but differences may be attributed to differences in methodology and temporal contexts
CONCLUSION

• First study to offer robust information on the economic relationship between cigarette and WP smoking in EMR countries where both products are highly-prevalent

• Strong evidence that raising tobacco taxes could significantly reduce tobacco use in the EMR while increasing government revenues.

• Timely policy-relevant data to evaluate the potential effects of taxes and other fiscal tools in the 3 countries + potentially extrapolate to other countries in the region:
  • Tobacco consumption
  • Public revenues
  • Substitution between cigarettes and WP products under price increases
REFERENCES


