Association between Tax Structures and Price Variability – Evidence from a Large Number of Countries

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Introduction

- A variety of tobacco tax structures are used globally.
- Types of excise tax system:
  - Specific (e.g. per pack or by weight, a minimum tax).
  - Ad valorem (e.g. % of retail prices).
  - Mixed (specific & ad valorem).
  - Tax rates can be uniform or vary across price tiers.
- Economic theory predicts that tax structures other than specific uniform are associated with greater price variability and tax avoidance opportunities.
- Recent studies (Chaloupka et al. 2014; Shang et al. 2014, 2015) present empirical evidence that supports this theory.
- However, those studies are based on data from a limited number of countries.
- Studies that encompass all common tax structures and a large number of countries are needed.

Aim

To analyze the association between tax structures and price variability using data from many countries in order to provide evidence that can be generalized worldwide.

Data

- Dependent variable: Price variability.
  - Constructed using price information from the Economist Intelligence Unit (**EIU**) city data.
  - EIU gathered price data for Marlboro and local cigarettes form supermarket and mid-priced stores in 140 cities worldwide.
  - Price data from 85 countries between 2008 and 2011 were linked to tax structure data.

Data (continued)

- Independent variable: Tax Structure.
  - Tax information during 2008-2011 was obtained from Table 9.1.0 of the 2013 WHO Report on the Global Tobacco Epidemic.
- Contextual control: **MPOWER** data controlling for tobacco control environment.
  - The WHO/MPOWER monitors the implementation of six proven tobacco-control measures in 196 participating countries during 2007-2012.
  - Data between 2008 and 2011 were linked to tax structure and price data using year and country identifiers.

Measures

- Three price variability measures.
  - Market price variability= price difference between high-priced Marlboro and low-priced local brand divided by the average price of mid-priced Marlboro and local brands.
  - Marlboro or global brand variability=price difference between high-priced and low-priced Marlboros divided by the price of mid-priced Marlboro.
  - Local brand variability=price difference between high-priced and low-priced local brands divided by the price of mid-priced local brand.
- Tax structure measures.
  - an indicator of the tiered structure (uniform as reference) and the share of the specific component among total excises (ranges from 0 -1).

Method

- Generalized Estimating Equations (GEE), with an identity link, Gaussian (normal) family, and exchangeable correlations, were used to estimate the association between tax structures and price variability.
- Controls: year fixed effects in Model 1; and year fixed effects and 6 MPOWER scores (M, P, O, W, E, R scores) in Model 2.
- Standard errors were clustered at the country level.

Results

*** p<0.01, ** p<0.05, * p<0.1

A. Results-Market Price Variability

Variable	Model 1	Model 2
Tax Structure	N=279	
% Specific	-0.172*	-0.204***
	(0.088)	(0.075)
Elasticity	-0.522	-0.684
Uniform-REF		
Tiered	-0.014	-0.008
	(0.093)	(0.086)
Elasticity	-0.044	-0.026
TC Environment	No	Yes

B. Results-Global Brand Price Variability

Variable	Model 1	Model 2
Tax Structure	N=298	
% Specific	-0.050	-0.056*
	(0.033)	(0.031)
Elasticity	-0.433	-0.514
Uniform-REF		
Tiered	0.062	0.061*
	(0.038)	(0.037)
Elasticity	0.531	0.559
TC Environment	No	Yes

C. Results-Local Brand Price Variability

Variable	Model 1	Model 2
Tax Structure	N=298	
% Specific	-0.047	-0.052*
	(0.031)	(0.029)
Elasticity	-0.401	-0.469
Uniform-REF		
Tiered	0.060*	0.058*
	(0.035)	(0.034)
Elasticity	0.516	0.532
TC Environment	No	Yes

Findings

- A greater share of the specific component in total excises is significantly associated with **lower price variability** in the market , and with lower price variability within similar brands.
  - A change from ad valorem to specific tax structures is associated with a 47-68% decrease in price variability.
- A Tiered structure is significantly associated with greater price variability within similar brands (within Marlboro or within local brands).
  - Compared with a uniform tax structure, a tiered structure is associated with a 52-56% increase in price variability.

Conclusions

Using data from a large number of countries, we found consistent evidence to support that complicated tax structures (a smaller share of specific components in taxes, or a tiered structure) are associated with greater price variability and tax avoidance opportunities.

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