Relative tax rates, proximity and cigarette tax avoidance: Evidence from a national sample of littered cigarette packs

Shu Wang[1], David Merriman[2], Ph.D., Frank Chaloupka[3], Ph.D.
University of Illinois at Chicago
1. PhD candidate of Public Administration; 2. Professor of Public Administration; 3. Professor of Economics

RESEARCH QUESTION

We examine the interactive effects of two main factors on individual cigarette tax avoidance behavior, namely, tax rates and proximity to a lower-rate jurisdiction.

DATA COLLECTION

The novelty of the study lies in using littered cigarette packs to observe tax avoidance behavior. During the spring and summer of 2012, data collectors followed a replicable, published data collection protocol and collected littered cigarette packs from sidewalks, business entrances, and parking lot surface in 160 US school catchment areas. We coded the locations where packs were found, whether a stamp was affixed, and the taxing authority reflected on the stamp. 2,143 packs collected from 132 catchments from 38 states were included in the analysis.

MEASUREMENT

Dependent variable: Since the tax stamp found on a littered pack shows the location of its purchase, a discrepancy between the jurisdiction identified by the tax stamp and the jurisdiction where the littered pack was found suggests tax avoidance. We coded a pack as having avoided taxes if the pack had no tax stamp or had a stamp from a lower-rate jurisdiction. At the catchment level, we measured tax avoidance by the share of packs that avoided tax.

Independent variable: We created the index of "Incentive for tax avoidance (ITA)" to measure the interactive effect between the tax rate in the home state and the proximity to a lower-rate jurisdiction. It measures the maximum per mile reduction in the tax paid on a pack of cigarettes by traveling to adjacent jurisdictions, or the savings in tax dollars per mile traveled. It can be expressed as:

$$\text{ITA} = \sum_{i=1}^{n} \frac{Pop_i}{Pop_c} * \frac{\max(\text{BTax}_i - \text{ATax}, 0)}{d_{ij}}$$

RESULTS & DISCUSSION

We ran two ordinary least squares regressions with two samples, the full sample and the sample consist of only the catchments within 38 miles to a lower-rate state border. ITA remains statistically significant and is positively related to the level of tax avoidance. The coefficient on ITA suggests that a 10 cent increase in ITA would cause tax avoidance to increase by 2% and 8% in all catchments and the catchments near the border, respectively.

OLS Regression – Determinants for tax avoidance

	Full Sample	Catchments within 38 miles to the state border
ITA	0.0029***	0.0082***
	(0.0074)	(0.0032)
Ln(Median income)	-0.1709**	-0.1850
	(0.0851)	(0.1492)
% households with cars	0.0605	0.0650
	(0.4713)	(0.7636)
Ln(Population density)	-0.0281	-0.0518
	(0.0175)	(0.0369)
% retail/service land use	-0.2338	-0.3894
	(0.1907)	(0.3540)
Region dummies	Yes	Yes
R squared	0.184	0.170

Robust standard errors in parentheses
* p<0.10, ** p<0.05, *** p<0.01

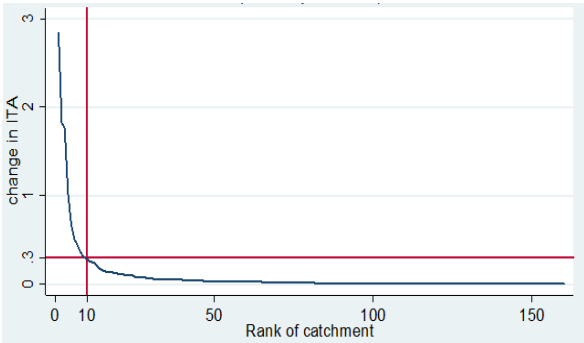
CONTRIBUTION

- A national sample of littered packs to account for geographic variation
- The creation of "Incentive for tax avoidance" index to indicate the interactive relationship between tax dollars saved and the travel costs
- Exploring the nonlinear relationship between tax avoidance and tax rates

Nonlinear Relationship

The OLS results suggest that there will be some reaction but the magnitude is hard to judge because the magnitude in any particular jurisdiction may depend on relative current tax rates and proximity to lower tax jurisdictions. For example, if a jurisdiction already has much higher tax rates than its neighbors those who can easily avoid may already have avoided so that a tax increase might cause little additional avoidance.

We used binomial logit estimation to account for the non-linear relationship between the tax rate and the level of tax avoidance. The coefficient on ITA is again statistically significant and positively related to avoidance. We used this coefficient to estimate how changes in avoidance vary with tax increases; the simulation result, shown in Figure 1, suggests that in the vast majority of areas ITA will rise little when taxes increase because most of the population lives relatively far from the border.



X-Axis shows rank of catchments from largest to smallest change.
Catchments with large share of population close to lower tax border will have large change in ITA.

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