Abstract

Many econometric studies have examined the effect of cigarette price on cigarette consumption. Consensus estimates from these studies imply that a 10 percent increase in cigarette price will reduce overall cigarette consumption by approximately 4 percent. These studies typically evaluate the price elasticity of demand for each observation and report the average price elasticity across all observations or report the price elasticity of demand at the mean of the price variable. While these average price effects are important, they provide no information on the likely non-linear effect of price on cigarette demand.

This research is the first econometric study to examine the non-linear effects of price on cigarette demand and estimate price elasticities at different price levels. We use both aggregate state-level data and individual-level data from the Tobacco Use Supplements to the Current Population Surveys. We employ generalized linear models to estimate cigarette demand equations.

We find that the absolute value of the price elasticity of demand monotonically increases with price. The findings from this study will be extremely important to policymakers contemplating increasing cigarette excise taxes.

Data

Aggregate State Level Data 1991-2012

Dependent variable: Per-Capita State Cigarette Sales

Independent Variables:
- Real Cigarette Price
- Gender Indicator
- Smoke-free air Index
- Race/Ethnicity Indicators
- Tax Avoidance Import
- Age Indicators
- Tax Avoidance Export
- Unemployment rate
- State Fixed Effects
- Real Personal Income
- Year Fixed Effects

Individual-level Survey Data 2010-11 Tobacco Use Supplement to the Current Population Survey

Dependent variable: Average Daily Cigarettes Smoked by Every day Smokers Past Month

Independent variables:
- Gender Indicator
- Race/Ethnicity Indicators
- Age Indicators
- Education Indicators
- Employment Indicators
- Income Indicators
- Industry Indicators

Modified Park Test used for link function

Results

Price is found to have a significant non-linear effect on cigarette consumption

Aggregate State Level Data

- Basic Model: No Tax Avoidance and SFA
- Model 2: Controls for tax avoidance and SFA

Individual-level Survey Data

- 4 models estimated, each using a different price

Modified Park Test used for Distribution

Box-Cox test used for link function

Implications for State and Community Tobacco Control

States contemplating cigarette excise tax increases rely on average price elasticity estimates from the literature when predicting changes in revenue or cigarette consumption. There is tremendous variation in cigarette prices across states and the use of an average price elasticity may yield misleading predictions. The estimates from this research will be invaluable to policy makers as they will be able to more accurately predict the effects of cigarette tax increases.

Conclusions

This research shows that the absolute value of the price elasticity of cigarette demand monotonically increases with price.

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For more information visit tobacconomics.org.