

The Use of Legal, Illegal, and Roll-your-own Cigarettes to Increasing Tobacco Excise Taxes and Comprehensive Tobacco Control Policies: Findings from the ITC Uruguay Survey

Dardo Curti¹, Ce Shang², William Ridgeway³, Frank J. Chaloupka^{2,3}, Geoffrey T Fong^{4,5}
 Contact: cshang@uic.edu. *Tobacco Control*, forthcoming

¹Centro de Investigación de la Epidemia del Tabaquismo (CIET), Uruguay; ²Institute for Health Research and Policy, UIC, USA; ³Department of Economics, UIC, USA; ⁴Department of Psychology, University of Waterloo, Canada; ⁵Ontario Institute for Cancer Research, Canada

BACKGROUND

- Few studies have examined whether smokers switch to illegal or roll-your-own (RYO) cigarette forms in response to a change in their relative price.
- According to the Global Adult Tobacco Survey, about 32.4% of cigarette smokers in Uruguay smoke RYO cigarettes, compared with only 7.7% in its neighbor country Argentina.
- As excise taxes of manufactured cigarettes have increased markedly, the relative price of RYO to manufactured cigarettes has decreased, making RYO cigarettes more appealing as an economic alternative.
- A recent study using ITC Uruguay data suggests that the prevalence of tax avoidance/evasion may have been increasing in recent years.

OBJECTIVES

- To explore how relative prices between three cigarette forms are associated with the choice of one form over another.

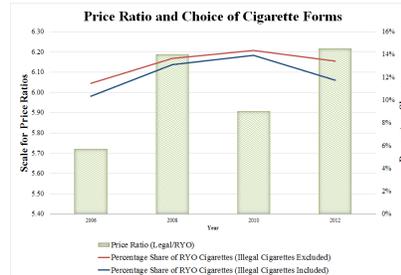
DESIGN/METHODS

- Data are from ITC Uruguay survey, waves 1-4, conducted during 2006-2012.
- Illegal, legal and RYO cigarettes were identified using brand information.
- Self-reported prices were used to construct price ratio measures.
- Generalized estimating equations were employed to analyze the association between price ratio and the choice of tobacco form.

MEASURES

- Four dichotomous dependent variables: RYO vs. Legal & illegal; RYO vs. Legal; RYO vs. illegal; and illegal vs. legal.
- Price ratios were constructed using aggregated self-reported prices at the segmental level.
- Respondents' exposure to anti-smoking messaging, warning labels, and tobacco marketing were aggregated at the segmental level and taken as controls.

RESULTS



- Controls also included socio-demographic variables.
- Smokers who are male, lower than middle-school educated, with a monthly household income of \$U4,500 or lower, and age 40 or older are more likely to choose RYO cigarettes over manufactured legal products.
- Smokers who are lower than middle-school educated, with a monthly household income of \$U4,500 or lower, and older than the age of 18-24 are more likely to choose manufactured illegal over legal cigarettes.
- In general, education, age, income, and marital status do not appear to be significantly associated with the choice between manufactured illegal and RYO cigarettes.

Binomial Generalized Estimating Equation Models Choice between Legal, Illegal and RYO Cigarettes			
Variable	Model 1 RYO=1, Legal=0, illegal=.	Model 2 RYO=1, illegal=0, legal=.	Model 3 illegal=1, legal=0, RYO=.
Price ratio variables			
Price manufactured-legal/Price RYO	1.10** (1.02, 1.18)	--	--
Price manufactured-illegal/Price RYO	--	1.05 (0.91, 1.22)	--
Price manufactured-legal/illegal	--	--	1.02 (0.96, 1.09)
Price ratio elasticity	0.46*** (0.19, 0.73)	0.65 (-0.06, 0.19)	0.05 (-0.10, 0.20)
Policy and tobacco marketing indices			
Anti-smoking	0.91** (0.84, 0.10)	0.90 (0.77, 1.06)	1.09 (0.97, 1.22)
Warning Labels	0.98 (0.76, 1.27)	0.99 (0.69, 1.42)	0.94 (0.72, 1.24)
Marketing	1.05 (0.94, 1.17)	1.03 (0.88, 1.20)	0.98 (0.86, 1.12)
# of observations	3726	994	3674

Note: Weighted regressions. Robust standard errors were clustered at the segment level. * p <= 0.1, ** p <= 0.05, *** p <= 0.01. Odds ratios are reported and 95% confidence intervals are in parentheses. Elasticity=the average of d(log y) / d(logx)

RESULTS (CONTINUED)

- A 10% increase in the relative price ratio of legal to RYO cigarettes is associated with 4.6% increase in the probability of consuming RYO over manufactured legal cigarettes (P<0.05).
- More exposure to anti-smoking messaging is associated with lower odds of choosing RYO over manufactured legal cigarettes (P<=0.05).
- Non-significant associations exist between the manufactured illegal to legal cigarette price ratios and choosing manufactured illegal cigarettes, suggesting that smokers do not switch to manufactured illegal cigarettes as prices of legal ones increase. However, these non-significant findings may be due to lack of variation in the price ratio measures.
- In order to improve the effectiveness of increased taxes and prices in reducing smoking, policy makers need to narrow price variability and price gaps in the tobacco market. Moreover, increasing anti-smoking messaging reduces tax avoidance in the form of switching to cheaper RYO cigarettes in Uruguay.
- More exposure to anti-smoking messaging reduces RYO consumption relative to the consumption of manufactured legal or illegal cigarettes. Given that a significant portion of Uruguayan smokers think RYO are less harmful than manufactured cigarettes, this negative association likely reflects the increase in the percentage of smokers who consider RYO and manufactured cigarettes equally harmful.

CONCLUSIONS

- A higher relative price of manufactured legal cigarettes to RYO cigarettes is associated with an increased use of RYO cigarettes over other cigarettes.
- There is a non-significant association between price ratios and choosing manufactured illegal cigarettes, though it is possible that participants underreport the purchase of illegal cigarettes due to legal concerns.
- It is necessary to narrow price gaps between RYO and manufactured legal cigarettes to decrease the odds of smokers switching from manufactured legal cigarettes to RYO for tax avoidance.