Association Between Tobacco Prices and Tobacco Use Onset – Evidence from the TCP India Survey

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BACKGROUND & PURPOSE

Background

- India has the second largest number of tobacco users in the world.
- India has an unparalleled variety of tobacco products including cheap products, such as chewing tobacco and bidis, and expensive products, such as cigarettes.
- There are no studies on how prices of multiple tobacco forms might be associated with tobacco use onset in India.
- In India, there is limited evidence on the effectiveness of increasing tobacco prices in reducing tobacco use.
- Federal taxes on cigarettes in India have been increasing significantly in recent years.
- State value-added taxes on tobacco have increased significantly since 2009. These taxes vary significantly across states and tobacco forms.

Purpose of the Present Study

To analyze the association between prices of cigarettes, bidis, and chewing tobacco, with tobacco use onset with any of these tobacco forms.

DATA

- Dependent variable: tobacco use onset of any of the following forms: cigarettes, bidis, and smokeless tobacco.
  - From the TCP India Survey Wave 1, surveyed during 2010-2012, by the International Tobacco Control (ITC) Project.
  - 4 States: Bihar, West Bengal, Madhya Pradesh, and Maharashtra.
  - Onset of cigarette, bidi, and smokeless tobacco use was reported retrospectively, in the form of age at initiation.

DATA (Continued)

- Data were expanded to create a pseudo-panel dataset for duration analysis.
  - Tobacco users were dropped out of the sample once they initiated.
  - Non-users were censored and kept in the sample for the entire study period.
  - Tobacco users who initiated before 1998 were excluded from the sample due to the lack of price data.
- Independent variables: tobacco prices.
  - Annual state-level cigarette, bidi, and chewing tobacco CPI prices 1998-2012.
  - Standardized to:
    - Per pack of 20 cigarettes.
    - Per pack of 10 bidis.
    - Per 100 gram chewing tobacco.
  - Smokeless tobacco prices were only available for chewing tobaccos.
  - Price data were linked to the expanded data using year and state identifiers.

METHODS

- Discrete time hazard model. Logistic regressions controlling for the following confounders:
  - Time-variant age.
  - Gender and urban/rural indicators.
  - Year fixed effects.
- Standard errors were clustered at the state level.
- The effects of cigarette, bidi, and chewing tobacco prices on tobacco initiation were estimated separately.
- Samples were restricted to respondents aged 15-70 at the time of survey.
- Analyses were conducted for both genders, then were stratified by gender.

RESULTS

Selected Summary Statistics- Tobacco Use Onset

N=42,375	Mean	[S.D.]	Price (IND)	Mean	[S.D.]
Onset	0.062	[0.241]	Bidi	3.388	[1.211]
Male	0.456	[0.498]	Cigarette	12.148	[5.499]
Age	26.743	[12.736]	Chewing	11.996	[6.285]
Rural	0.257	[0.437]	–	–	–

Note: Sample size is calculated in person-years. Thus, the incidence of onset was 6.2 per 100 person-years.

A. Results-Effects of Bidi Prices on Tobacco Use Onset

Variable	Both genders	Female	Male
OR	0.914***	0.811	0.969
[95% CI]	[0.867,0.964]	[0.611,1.077]	[0.916,1.026]
Elasticity	-0.335***	-0.821	-0.110
(S.E.)	(0.102)	(0.567)	(0101)
N	42,375	23,059	19,310

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

B. Results-Effects of Cigarette Prices on Tobacco Use Onset

Variable	Both genders	Female	Male
OR	0.967***	0.952*	0.971**
[95% CI]	[0.963,0.972]	[0.899,1.008]	[0.948,0.994]
Elasticity	-0.399***	-0.633	-0.324
(S.E.)	(0.026)	(0.377)	(0.131)
N	43,394	23,587	19,801

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

C. Results-Effects of Chewing Tobacco Prices on Tobacco Use Onset

Variable	Both genders	Female	Male
OR	1.011	1.019	1.005
[95% CI]	[0.998,1.024]	[0.950,1.093]	[0.987,1.023]
Elasticity	0.119	0.225	0.053
(S.E.)	(0.074)	(0.427)	(0.096)
N	29,667	15,468	14,193

- Increased cigarette prices are significantly associated with a lower probability of onset of tobacco use (price elasticity = -0.40)
- Increased bidi prices are significantly associated with a lower probability of onset of tobacco use (price elasticity = -0.34)
- Increased chewing tobacco prices are not significantly associated with tobacco use onset.
- The non-significant association between chewing tobacco prices and tobacco use onset might be due to measurement errors.
- Existing US studies found that the price elasticity of smoking initiation is around -0.3 (Nonnemaker et al. 2011; Lillard et al. 2012)
- Our elasticity estimates for tobacco use onset are very similar to those existing estimates for cigarette smoking initiation.

CONCLUSIONS

- **Increased cigarette and bidi prices are associated with a lower probability of onset of tobacco use.**
- **A 10% increase in cigarette or bidi prices is associated with a 3-4% lower probability of initiating tobacco use.**
- **Policy makers in India should consider continuing to raise tobacco taxes, such as central taxes, and state value-added taxes.**