Empirical Project II: Exposure to Smoking as Predictor of Youth Smoking

Jon Holder

Introduction

Kostova and Blecher (2013) explore the impacts of smoking advertising on youth smoking in developing countries. This study differs from previous studies by focusing on micro-level data instead of macro-level data. The authors note several issues with existing studies. The evidence on impact of advertising and smoking in the developed countries has produced conflicting results. A review completed by Blecher (2008) presents 17 studies noting significant positive impacts and 18 studies noting significant negative impacts. A further analysis of 49 studies indicates no statistically significant effect. This study also attempts to overcome the endogenous nature of advertising exposure. Those who already smoke or view smoking favorable are more likely to notice smoking advertising. The authors propose using an instrumental variable approach to account for this.

Kostova and Blecher propose to examine smoking from several perspectives. The first perspective is to estimate a logit model for likelihood of smoking given presence of advertising, cigarette prices, personal characteristics, and environmental characteristics. The second model is a cigarette quantity demand model estimated from advertising, cigarette prices, personal characteristics, and environmental characteristics. Lastly, the authors propose an instrumental variable, presence of comprehensive smoking ad bans in a country. The authors draw the micro-level data for these models from Global Youth Tobacco Survey (GYTS). Cigarette pricing data is drawn for the data published by the Economist Intelligence Unit. One drawback of the GYTS is that its respondents are sampled from schoolchildren rather than general youth population. This may result in a biased sample.

The results of the study reveal that no causal link could be determined between advertising bans/exposure and likelihood to smoke. The authors' initial model without the instrumental variable showed that ad exposure statistically reduces the smoking participation. However, the significance is lost and the sign of the coefficient becomes positive when the instrumental variable is included. Overall, the authors find that statistically significant characteristics for both demand for cigarettes and smoking participation are the price of cigarettes, presence of anti-smoking sentiment, being male, and have a parent that smokes.

The authors conclude with the recommendation that increasing cigarette taxes to increase the price of cigarettes would be a more effective deterrent for youth smoking than advertising bans alone. The authors also note that three other studies, (Farr, Tremblay, and Tremblay 2001; Gallet 2003; Iwasaki, Tremblay, and Tremblay 2006) suggest that advertising bans may effectively increase the price of cigarettes by reducing competition between producers.

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Model

I focused on the whether a youth's exposure to smoking inside and outside the home impacted the likelihood of smoking. Kostova and Blecher found a strong relationship between sex and availability of pocket money. Those items were also included in the model. The data was drawn from GTYS focusing on the nationwide surveys in 2014 for the countries of Cameroon and Zimbabwe. The model estimated:

$$Pr(smoker) = f(age, female, hasMoney, smokingHome, smokingIndoors, smokeingOutdoors)$$

A person is considered a smoker if they have smoked at least 1 cigarette in the past 30 days. A person is considered to have been present for smoking inside the home, outdoors, or indoors outside the home if they reported that at least 1 day there was someone smoking in their presence. A person is considered to have pocket money if they reported they have some amount of weekly independent spending. Table 1 shows the summary statistics from the surveys. In both countries, less than 10% of the surveyed youth surveyed report smoking at least 1 cigarette in the last 30 days. The demographics of the countries differ in that Cameroon's population is a bit older however both countries have a concentration between 13-15 years old. Also of note is that Cameroon's respondents are 55% male and Zimbabwe's respondents are 55% female.

Currently Zimbabwe only has a ban on smoking in public transportation but otherwise no bans on indoor or outdoor smoking. Cameroon currently has smoking bans in schools, universities, and government office buildings. The Cameroonian ban became effective in 2019. However, there are no other restrictions on indoor public spaces, outdoor spaces, or public transportation. When the survey was conducted in 2014, there were effectively no bans on indoor or outdoor smoking in either country.

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Table 1: Summary Statistics

	Cameroon			Zimbabwe		
Variable	Obs	Mean	Std. dev.	Obs	Mean	Std. dev.
smoker	2,768	0.0690	0.2535	5,562	0.08684	0.28162
ageCategory						
<= 11 yrs..	2,920	0.0418	0.2001	6,416	0.01107	0.10462
12 yrs old	2,920	0.0825	0.2752	6,416	0.09055	0.28700
13 yrs old	2,920	0.1839	0.3875	6,416	0.27743	0.44777
14 yrs old	2,920	0.2469	0.4313	6,416	0.31889	0.46608
15 yrs old	2,920	0.2106	0.4078	6,416	0.20075	0.40059
16 yrs old	2,920	0.1003	0.3005	6,416	0.07294	0.26006
>= 17 yrs..	2,920	0.1339	0.3406	6,416	0.02837	0.16603
female						
male	2,920	0.5555	0.4970	6,346	0.44674	0.49719
female	2,920	0.4445	0.4970	6,346	0.55326	0.49719
hasMoney						
No spending	2,913	0.2180	0.4130	6,393	0.30580	0.46078
Has some spending	2,913	0.7820	0.4130	6,393	0.69420	0.46078
smokingHome						
No Smoking	2,913	0.7123	0.4528	6,245	0.71193	0.45290
Yes Smoking	2,913	0.2877	0.4528	6,245	0.28807	0.45290
smokingIndoors						
No Smoking	2,904	0.5554	0.4970	6,298	0.45141	0.49767
Yes Smoking	2,904	0.4446	0.4970	6,298	0.54859	0.49767
smokingOutdoors						
No Smoking	2,905	0.5071	0.5000	6,267	0.44710	0.49723
Yes Smoking	2,905	0.4929	0.5000	6,267	0.55290	0.49723

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The model was estimated using both the probit and logit models and are summarized in the tables below.

Table 2: Estimates from Cameroon and Zimbabwe

	Cameroon		Zimbabwe	
	smoker (logit)	smoker (probit)	smoker (logit)	smoker (probit)
1.ageCategory (12 yrs old)	-1.048	-0.546	-1.924	-0.899
	(0.644)	(0.341)	(1.113)	(0.609)
2.ageCategory (13 yrs old)	-1.210	-0.589	-1.832	-0.956
	(0.490)*	(0.259)*	(1.133)	(0.616)
3.ageCategory (14 yrs old)	-0.808	-0.415	-1.871	-0.980
	(0.653)	(0.345)	(1.040)	(0.565)
4.ageCategory (15 yrs old)	-0.274	-0.113	-2.074	-1.076
	(0.557)	(0.291)	(1.176)	(0.631)
5.ageCategory (16 yrs old)	-0.715	-0.334	-1.143	-0.610
	(0.651)	(0.339)	(1.179)	(0.638)
6.ageCategory (>=17 yrs old)	0.120	0.078	0.224	0.143
	(0.694)	(0.361)	(1.139)	(0.623)
1.female	-1.262	-0.618	-0.127	-0.094
	(0.200)**	(0.108)**	(0.242)	(0.131)
1.hasMoney	0.656	0.345	0.417	0.239
	(0.327)	(0.154)*	(0.189)*	(0.098)*
1.smokingHome	1.341	0.667	2.281	1.187
	(0.217)**	(0.113)**	(0.287)**	(0.149)**
1.smokingIndoors	0.643	0.293	0.888	0.448
	(0.200)**	(0.096)**	(0.246)**	(0.121)**
1.smokingOutdoors	0.672	0.315	0.312	0.145
	(0.270)*	(0.128)*	(0.206)	(0.107)
_cons	-3.653	-1.952	-2.449	-1.329
	(0.738)**	(0.368)**	(1.068)*	(0.583)*
N	2,732	2,732	5,240	5,240

* $p<0.05$; ** $p<0.01$

Table 2 shows that that the logit and probit estimates are very similar. The difference between the estimation models is that probit estimates that the availability of pocket money is a statistically significant variable at the 5% level and logit estimates that the variable is only statistically significant at the 10% level for the data from Cameroon. There are not differences in significance in the Zimbabwe data between the two models. Given that probit estimates a relationship between pocket money, I chose to estimate margins with the logit model rather than overstate a weak effect.

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Table 3 Marginal Effects on Likelihood of Smoking

	Cameroon	Zimbabwe		Cameroon	Zimbabwe
	Margin	Margin		Margin	Margin
ageCategory			hasMoney		
<= 11 yrs..	0.0602418 (0.0397)	0.2380668 (0.1892)	No spending	0.0197457 (0.0054)**	0.0368153 (0.0095)**
12 yrs old	0.0219864 (0.0117)	0.0436215 (0.0176)**	Has some spending	0.0373795 (0.0079)**	0.0547967 (0.0119)**
13 yrs old	0.0187628 (0.00557)**	0.0476281 (0.0173)**			
14 yrs old	0.0277681 (0.0056)**	0.0458948 (0.0118)**	smokingHome		
15 yrs old	0.0464721 (0.0096)**	0.0377874 (0.0112)**	No Smoking	0.022657 (0.0040)**	0.0279797 (0.0071)**
16 yrs old	0.0303942 (0.0059)**	0.0906027 (0.0241)**	Yes Smoking	0.0814064 (0.0213)**	0.2198533 (0.0423)**
>= 17 yrs..	0.0674161 (0.0172)**	0.2809438 (0.1093)*			
			smokingIndoors		
female			No Smoking	0.024755 (0.0052)**	0.0323169 (0.0082)**
male	0.0573067 (0.0122)**	0.0504062 (0.0131)**	Yes Smoking	0.0460569 (0.0094)**	0.075098 (0.0176)**
female	0.0169211 (0.0034)**	0.0446623 (0.0103)**			
			smokingOutdoors		
			No Smoking	0.0237044 (0.0057)**	0.0410881 (0.0107)**
			Yes Smoking	0.0453846 (0.0097)**	0.0552868 (0.0117)**

* $p<0.05$; ** $p<0.01$

Table 3 display the margin effects evaluated at the mean of the survey data. Both countries follow similar patterns in the marginal effects. Probability of being a smoker is higher for youth who are more exposed to others smoking and have spending money. For Zimbabwe, while males are still predicted to have a higher probability of smoking, sex is no longer a statistically significant predictor of smoking.

Results

Exposure to smoking has a statistically significant impact for the likelihood of youth smoking. Public smoking bans would be effective to reduce a youth's exposure to smoking. Many cities in developed countries have adopted bans on smoking indoors in public places. Additionally in the United States there are bans regarding where one can smoke outdoors. The bans both reduce the exposure of youth to smoking and reduce the availability of locations a youth can smoke.

References

Kostova, D and Belcher, E. "Does Advertising Matter? Estimating the impact of cigarette advertising on smoking among youth in developing countries." Contemporary Economic Policy 31(3), 2013, 537-548