Estimation of different price elasticities of cigarettes in Romania

Ede Lázár[1], Frank J. Chaloupka[2], Todd Rogers[3], Árpád Szabó[4], Zoltán Ábrám[5]

1 Sapientia – Hungarian University of Transylvania, Miercurea Ciuc, Romania
2 Institute for Health Research and Policy, University of Illinois at Chicago, Chicago, USA
3 RTI International, San Francisco, CA 94104, USA
4 MÜTF Educational Centre, Odorheiu Secuiesc, Romania
5 University of Medicine and Pharmacy of Tîrgu Mureș, Tîrgu Mures, Romania

ABSTRACT

Cigarette smoking has fallen sharply in Romania over the past decade, from an estimated 35.3 percent in 2004 to 26.7 percent in 2011. One factor likely to have contributed to this decline is the significant rise in cigarette prices during this period following Romania's entry into the European Union, as cigarette taxes were increased sharply in order to comply with the EU tobacco tax directive.

Excise tax increases are likely to be an effective tobacco control policy in Romania, given the relatively low affordability of cigarettes. The average smoker, who consumes 21,5 packs/month, spends 16% of average net personal income on cigarettes.

Using data from the 2011 Global Adult Tobacco Survey conducted in Romania, we find that higher cigarette prices are associated with reduced cigarette consumption among smokers, but we did not find evidence of a similar association with smoking prevalence.

Our estimated price elasticity for cigarette consumption among smokers is -1.45 (-1.46 for men and -1.32 for women), implying that a 10 percent price increase would reduce cigarette consumption by nearly 15 percent..

MATERIAL and METHODS

We used data on 4,517 persons ages 15 and older taken from the nationally representative Global Adult Tobacco Survey conducted in Romania in 2011 to estimate two-part models of the impact of price on cigarette demand.

Measures of local market prices for cigarettes were derived from the prices smokers reported paying for their last cigarette purchase, aggregated to the sampling unit level.

In the first part of the model, we estimated the associations between cigarette smoking prevalence and local cigarette prices. In the second part, we estimated the associations between average cigarette consumption among smokers and local cigarette prices. All models controlled for a variety individual level factors likely to affect cigarette smoking behavior.

OBJECTIVES

Main research aims:

-To estimate the price elasticity of cigarette demand in Romania

- to assess differences in price elasticity for different socio-economic and demographic subgroups,

- to compare estimated price elasticities for Romania to those for other middle income countries.

BACKGROUND

Fig.1. Number of cigarettes smoked per person per year: age ≥ 15. 2014.
Source: www.tobaccoatlas.org
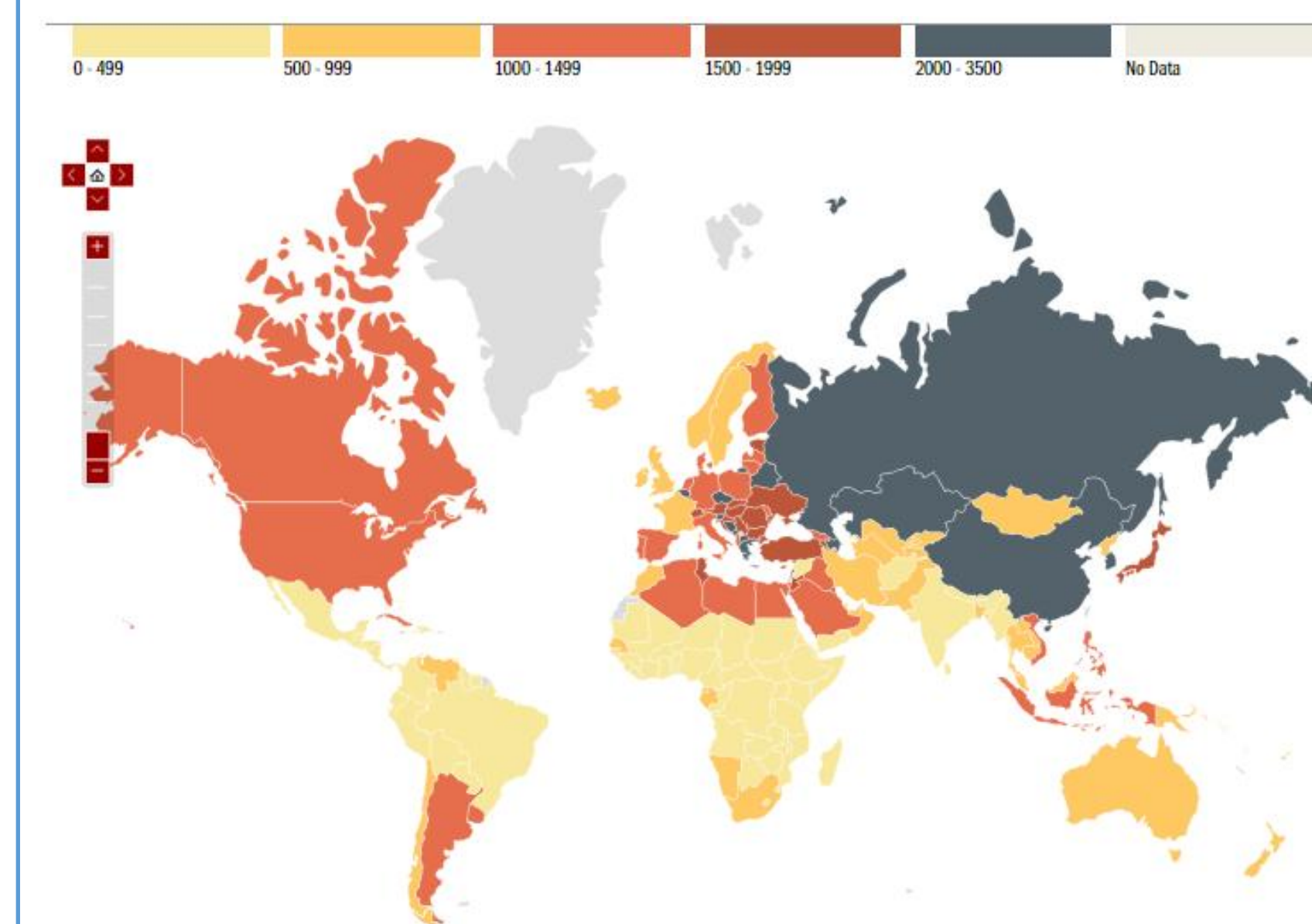
Cigarette consumption is high in Romania and other Eastern European countries.

Fig.2. Average price per pack and net earnings
Source: www.tobaccoatlas.org, eurostat

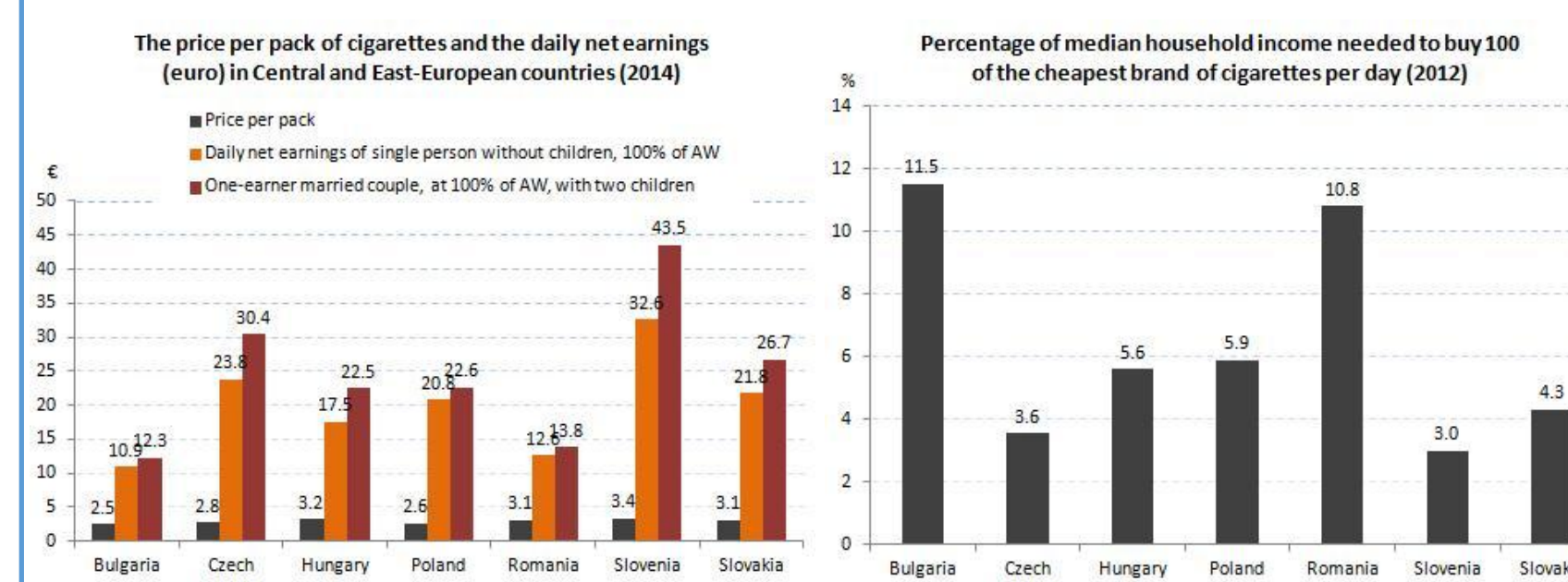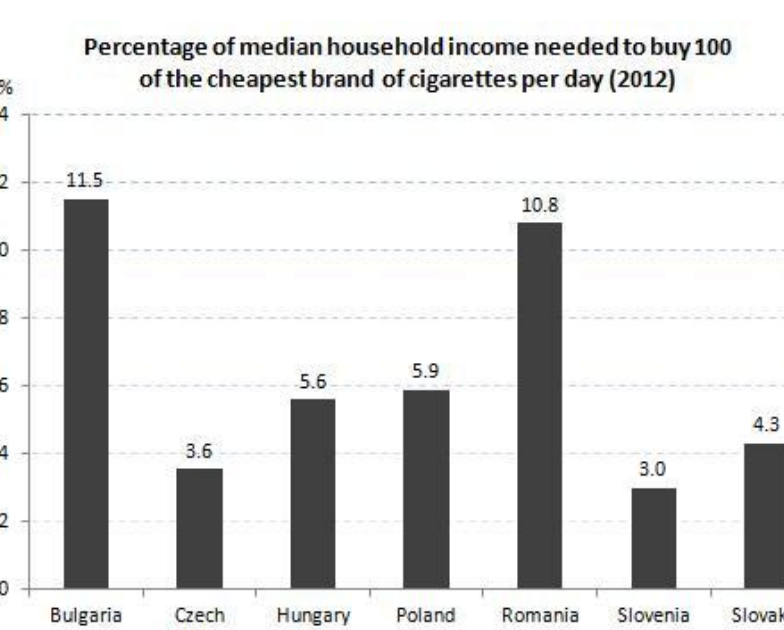**Fig.3. Price and median net household income**
Source: www.tobaccoatlas.org

Among Central and Eastern European countries, cigarettes are least affordable in Romania and Bulgaria.

BENCHMARK

Tab.1. Estimated price elasticities in low- and middle income countries
Source: IARC Handbooks of Cancer Prevention (2012)

Country	Estimated price elasticity	Study	Data
Brazil	Shor-run -0.35 Long-run -0.80	Da Costa e Silva (1998)	Annual time series data 1983-1994
Bulgaria	-0.8	Sayginsoy (2002)	-
China	Shor-run -0.35 Long-run -0.66	Hu and Mao (2002)	Annual time series data 1980-1997
Egypt	-0.47	Hanafy et al. (2011)	Annual time series data 1990-2006
Estonia	Short-run -0.34	Taal et al. (2004)	Monthly time series data 1996-2001
Morocco	Shor-run -0.73 Long-run -1.54	Aloui (2003)	Annual time series data 1965-2000
Papua New Guinea	-0.71	Chapman and Richardson (1990)	Annual time series data 1973-1986
Poland	-0.11	Florkowski and McNamara (1992)	Annual time series data 1959-1985
Taiwan, China	-0.66	Lee (2007)	Annual time series data 1972-2002
Turkey	Shor-run -0.21 Long-run -0.37	Tansel (1993)	Annual time series data 1960-1988
Ukraine	insignificant	Peng and Ross (2009)	Monthly time series data 1997-2006

METHODOLOGY

DATA SPECIFICATIONS

- Individual cross-sectional data from GATS 2011
- Representative to Romanian population aged 15 or older
- Cigarette prices: the potential endogeneity of cigarette price is accounted for by using the average of self-reported prices by microregions in Romania.

PRICE ELASTICITY OF CIGARETTE DEMAND

Price elasticity is defined as the **percentage change in consumption** in response to 1% change in price. Price elasticity is usually negative indicating that when price goes up, consumption goes down and vice versa.

Cross-sectional data allows one to estimate price elasticity by utilizing cross-sectional variation in consumption and price to determine the price sensitivity across the population at a point in time.

The estimated model is a c**onventional two-part demand model** assessing the associations between price and other explanatory variables on the dependent variables (whether or not the respondent smokes and cigarette consumption among smokers) at a single point in time.

RESULTS

1. **Model. The effect of cigarette price on smoking prevalence.**

Demand function: smoking status (1 for smokers, 0 for nonsmokers) = f (price, age, gender, wealth index, school, employment, exposure to cigarette advertising).
Applied model: binary logistic regression model (logit).

Result: no significant association between cigarette price and smoking prevalence

2. **Model. The effect of cigarette price on smoking consumption among daily and less than daily smokers.**

Demand function: cigarette consumption = f (price, age, gender, wealth index, school, employment, exposure to cigarette advertising).
Applied model: linear regression model (OLS).

Result: higher cigarette prices associated with significantly lower cigarette consumption

Price elasticity = Coefficient of price x Average price/Average consumption
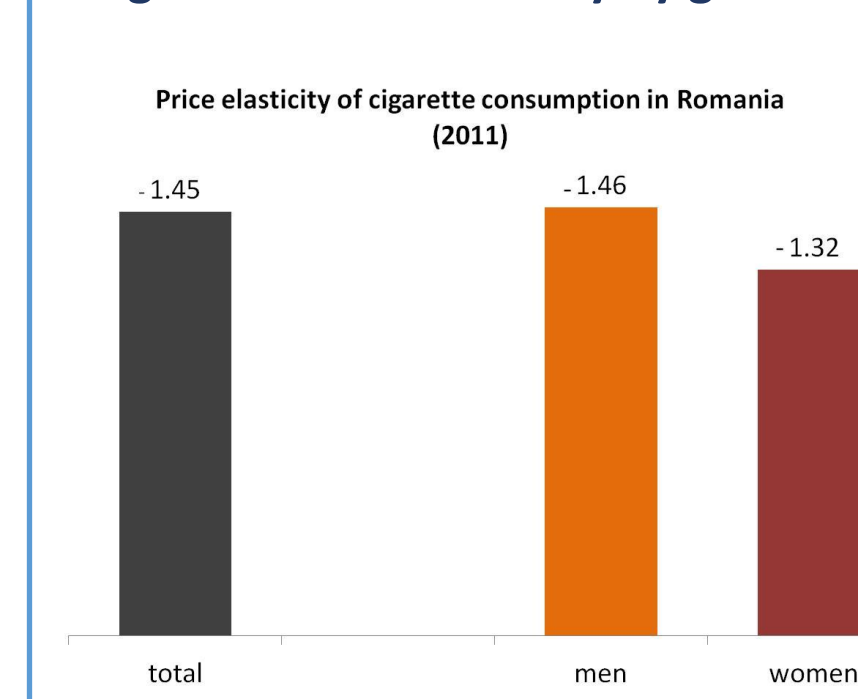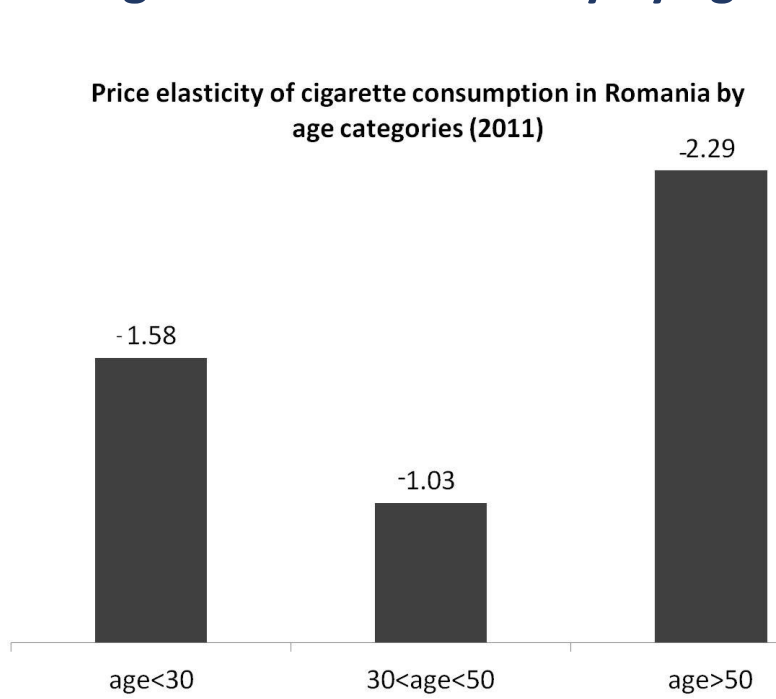
Figure 4. Price elasticity by gender

Price elasticity of cigarette consumption in Romania (2011)

Figure 5. Price elasticity by age

Price elasticity of cigarette consumption in Romania by age categories (2011)

According to the conditional demand model the **price elasticity of cigarette demand is -1.45**.

This implies that when price increases by 10%, cigarette consumption falls by 14.5%

CONCLUSIONS

Our estimates indicate that the declines in cigarette consumption in Romania over the last decade are largely attributable to the significant increases in cigarette prices during this period.

As a result of the sharp increases in cigarette taxes Romania adopted to comply with the EU tobacco tax directive, cigarettes in Romania are among the least affordable in the region, with typical monthly consumption of 21.5 packs costing 14% of average net official monthly income. This likely contributes to the greater price elasticity of cigarette demand in Romania than estimated in most other middle-income countries.

Further increases in cigarette taxes and prices are likely to lead to additional reductions in smoking in Romania.

RESEARCH EXTENSIONS

The estimated price elasticity for cigarette consumption is only part of the total effect of prices on cigarette demand. The single cross-sectional survey did not allow us to adequately assess the impact of cigarette prices on smoking prevalence in Romania. Future research will use the retrospective data on smoking initiation and cessation collected as part of the GATS to assess the impact of changes in cigarette taxes and prices over time on smoking prevalence.

ACKNOWLEDGEMENT

CORRESPONDING AUTHOR

Ede Lazar

e-mail: lazarede@gmail.com
phone: +40 723 662466
str. Apor Péter 26, 530200
Miercurea Ciuc, Romania