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Increasing Taxes on Tobacco in Low and Middle-Income Countries: Hurting or Saving the Poor?

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Policy makers hesitate to increase tobacco taxes over concerns about taxes being regressive and potentially increasing poverty and inequality. This note summarizes a set of studies of the effects of raising tobacco taxes in 11 low and middle-income countries using an extended cost-benefit analysis (ECBA) and harmonized national household budget survey data and introduces the TOBACTAX Tool. The studies find that demand price elasticities for tobacco products are larger among lower-income households and that the poor receive the largest long-term gains from tobacco taxation. Tobacco taxes have progressive long-term effects due to lower medical expenses and added years of productive life, which contribute to poverty reduction in most countries studied. TOBACTAX Tool can help replicate such analyses elsewhere.

Tobacco is a major public health priority (WHO 1999). Smoking is the second leading cause of death and disability worldwide, killing over 8 million people each year (Ng et al. 2014; WHO 2017), and triggering an array of policy initiatives. Tobacco taxation is considered the most efficient intervention (World Bank 1999): by boosting prices, taxes induce smokers to quit and discourage potential consumers. Evidence suggests that higher taxes are responsible for almost half the decline in smoking worldwide (WHO 2014).

The retail prices of tobacco products represent only a fraction of overall costs from smoking to societies. In addition to health consequences, smoking cuts earnings potential and labor productivity, and lowers human capital accumulation and economic growth (WHO 2015a). Goodchild, Nargis, and Tursan d'Espaignet (2018) estimate that tobacco-related diseases accounted for 5.7 percent of global health expenditure in 2012 and that total economic costs of smoking, including health expenditures and productivity losses, were equivalent to 1.8 percent of the world's gross domestic product (GDP). Yet, policy makers hesitate to raise tobacco taxes because of concerns that poorer households may face higher costs.

Evidence on the effects of taxing tobacco in developing countries remains scant. Nearly 80 percent of the world's smokers live in low and middle-income countries. Yet, to the authors' knowledge, this is the first cross-country analysis on the distributional welfare effects of taxing tobacco based on harmonized household consumption and other international data. The sample of 11 countries in this study represents over 860 million people, or 15 percent of smokers worldwide.

Methodology

The ECBA[1] Equation 1 quantifies medium to long-terms benefits as tobacco taxes rise, based on 3 effects.

Equation 1: ECBA Conceptual Framework

$$\text{Net Income Effect} = \underbrace{\text{Change in tobacco expenditure}}_{\text{(A)}} + \underbrace{\text{Change in medical expenses}}_{\text{(B)}} + \underbrace{\text{Change in years of working life lost}}_{\text{(C)}}$$

The immediate effect of raising taxes on cigarettes increases household tobacco expenditures (A).[2] Taxes discourage smoking and health outcomes and thus improve, at least 2 indirect benefits to households:

changes in direct medical expenditures (B) (hospitalization, pharmaceuticals, medical equipment: Lightwood et al. 2001), and improvement in years of working life lost (C).[3]

Data

This study includes 11 countries: Bangladesh, Bosnia and Herzegovina, Chile, Georgia, Indonesia, Moldova, Mexico, South Africa, the Russian Federation, Ukraine, and Vietnam. These countries vary widely in income, sociodemographic characteristics, and tobacco consumption patterns. They range from lower-middle-income countries (Bangladesh has the lowest GDP per capita) to upper-middle (Mexico, Russia) and high-income countries (Chile). The main source of data are national household budget surveys in each country. For several countries, the study also used datasets and work of other researchers and studies.[4] If available, we used surveys with nationally representative data for 2016. Otherwise, we used the most recent publicly available datasets.

In most countries, poorer or middle-income households spend a larger share of their budgets on tobacco. In half the sample (Bosnia and Herzegovina, Georgia, Mexico, Moldova, Russia, and South Africa), people in the wealthiest decile are most likely to smoke. However, lower-income households allocate larger shares of consumption to tobacco. Except in Bosnia and Herzegovina, the richest 10 percent consistently allocates the smallest share. Indonesia and Vietnam exhibit the highest smoking prevalence rates in the sample; on average, 64 percent of households in Indonesia and 58 percent of households in Vietnam consume tobacco.

To maintain data consistency across countries, the analysis adapted direct medical expenditures from the calculations of Goodchild, Nargis, and Tursan d'Espaignet (2018), who used data on the cost of illness to estimate the direct medical costs of smoking-attributable diseases in 2012. We collected data on mortality, years of life lost, and morbidity for 2016 from the Global Burden of Disease (GBD) Project. For the shares of total health expenses financed through out-of-pocket health expenditures, we used the World Development Indicators (WDI) database.

Table 1: Share of cigarettes in household expenditures, by decile (%)

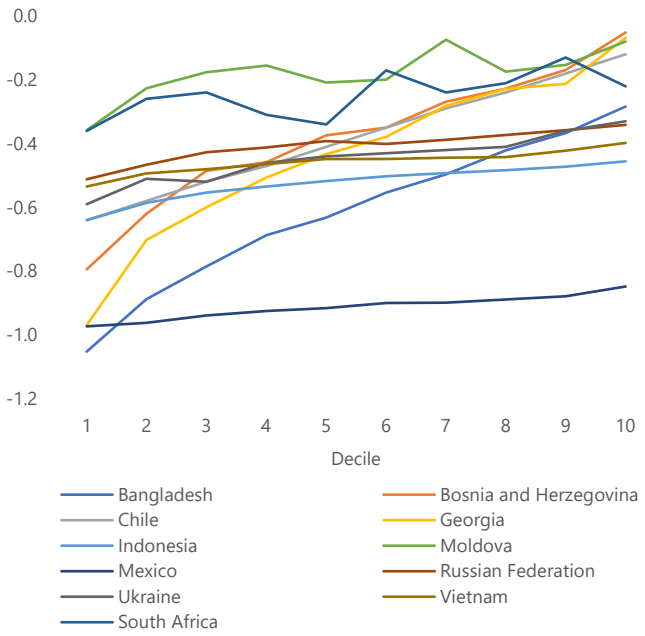
	Decile									
	1	2	3	4	5	6	7	8	9	10
Bangladesh	5.4	5.1	4.9	4.8	4.6	4.5	4.3	4.2	4.1	3.6
Bosnia and Herzegovina	8.1	8.0	7.9	7.9	7.8	7.8	8.3	7.4	7.2	7.0
Chile	4.7	4.1	3.9	3.2	2.8	3.2	2.8	2.4	1.9	1.5
Georgia	14.0	12.5	11.5	10.8	10.3	10.3	9.9	8.7	8.1	6.8
Indonesia	11.6	12.7	12.8	13.0	13.1	13.2	12.7	11.9	10.9	8.8
Mexico	10.1	5.3	5.6	5.0	4.6	4.6	4.0	4.3	3.6	2.8
Moldova	5.4	5.3	4.9	5.1	4.7	4.5	5.9	4.8	5.3	4.9
Russian Federation	5.6	2.7	2.4	2.0	2.1	1.8	1.5	1.5	1.4	1.0
South Africa	4.5	4.1	4.2	3.8	4.6	4.5	5.1	4.4	3.3	1.8
Ukraine	7.4	5.5	5.0	5.2	5.6	4.9	4.1	3.8	4.2	3.8
Vietnam	1.8	1.7	1.6	1.5	1.4	1.3	1.3	1.1	1.0	0.7

Sources: National budget surveys, circa 2016.
Note: Shares are conditional on household reporting spending on cigarettes, and relative to the harmonized household consumption aggregate. Deciles based on per capita consumption aggregate.

Tobacco Demand Price Elasticity

Evidence suggests that price elasticities of demand for tobacco may be higher in lower-income settings (World Bank 1999). The distributional and welfare effects of tobacco taxation ultimately depend on the responsiveness of consumers to changes in tobacco prices (WHO 2011a). An equivalent price change of 10 percent in low and middle-income countries would likely result in a 6 percent average fall in demand (IARC 2011). Less dependence on nicotine, larger peer effects, and limited disposable income may also make younger people less likely to buy tobacco when prices increase (Jha and Peto 2014).

Figure 1: Illustrates the estimated price elasticities of demand for cigarettes by decile



Sources: Estimates based on national socioeconomic surveys. Elasticities in Chile and Ukraine have been simulated based on Fuchs and Del Carmen 2018; Fuchs and Meneses 2017a. See the supplemental material for details.
Note: In most cases, a multiple time cross-section model with time fixed effects has been used. Demographic controls include the age, education, and gender of the household head, the share of individuals by age-group in each household, and urban status. Deciles are based on the harmonized per capita household consumption aggregate.

Consistent with previous empirical results, the analysis finds elasticities to be greater in lower-income deciles. Demand responses are inelastic in all countries (absolute values below 1).[5] However, responsiveness is greater in lower-income households. Elasticity estimates range from −1.05 among the poorest 10 percent of the population in Bangladesh to −0.05 among the wealthiest decile in Bosnia and Herzegovina.

Study Results

We assume a tax increase that raises the prices of tobacco products by 100 percent in each country. While different patterns emerge across countries, our main findings are that higher tobacco taxes:

- Decrease household disposable income, without behavioral adjustments
- Reduce medical expenditures across all deciles and countries
- Lowers workers' mortality modestly in all deciles and countries
- Adds working years
- Reduce poverty

Doubling the price of tobacco could lower the total number of extreme poor by 1.1 to 2.0 million, equivalent to lifting 1.7 percent to 2.0 percent of the poor out of extreme poverty.

Table 2 approximates the changes in the number of poor in each country if the price of cigarettes were increased by 100 percent.

Table 2: Simulated changes in number of poor

Country	Including all tobacco-related medical expenses	Including out-of-pocket tobacco-related medical expenses
Bangladesh	−559,680	−439,974
Bosnia and Herz.	0	0
Chile	0	0
Georgia	−4,697	−2,183
Indonesia	−987,656	−483,317
Moldova	0	0
Mexico	−135,942	−103,030
Russian Fed.	−101,803	−39,262
South Africa	−149,426	12,098
Ukraine	0	0
Vietnam	−97,006	−19,494
Total	**−2,036,209**	**−1,075,163**

Source: Simulations based on national budget surveys, circa 2016.
Note: Negative numbers represent a reduction in the estimated number of the poor. Positive numbers represent a rise. All simulations have been calculated based on the harmonized per capita consumption aggregate and the international extreme poverty line of US$1.90 per person per day (PPP 2011 dollars).

Conclusions

There is reason for optimism about the long-term economic and health benefits of increasing tobacco taxes. While households will likely experience short-term welfare losses, in addition to health benefits, taxes on tobacco generate medium and long-term economic benefits, including higher labor productivity and fewer

medical bills, which offset short-term household welfare losses.

The analysis found net benefits for 80 to 90 percent of the population analyzed. Despite differences in the magnitude and distribution of the net welfare effects across countries, the distributional impact of raising taxes on cigarettes is generally progressive: across countries, lower-income households capture the largest relative benefits.

Introducing TOBACTAX Tool for Global Analysis

Comprehensive policy strategies are needed related to tobacco usage and taxation. Inducing changes in tobacco consumption that translate into net social gains requires country-specific policies that meet that country's consumer responses, especially among youth and at-risk groups.

The Poverty and Equity Global Practice has developed a user-friendly tool—TOBACTAX—to aid policy practitioners and academics in estimating the welfare and distributional impacts of implementing tobacco tax reforms. TOBACTAX contributes to global knowledge by applying the ECBA methodology to any country with available household survey data and minimal data requirements. Using the STATA software, TOBACTAX estimates the price-elasticities of tobacco by income decile, and it assesses the impacts of increasing taxes on tobacco on household income and distributional outcomes.

The TOBACTAX tool can be accessed **here**.

Next Steps

Extending the comparative ECBA study to other countries requires more data sources. Including countries with the highest numbers of smokers—such as China and India— will add to the understanding of the global implications of raising taxes on tobacco for long-term welfare and distributional outcomes.

ABOUT THE AUTHORS

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[1] This study relies on the ECBA methodology adapted from previous applications by Fuchs and Meneses (2017a, 2017b, 2018), Pichón-Riviere et al. (2014), and Verguet et al. (2015).
[2] Secondhand smoke exposure is excluded from ECBA. The income gains that households may derive from potential increases in public expenditure linked to greater revenue collection. Potential earmarking of tax revenues are also excluded.
[3] There are several other benefits from cessation of smoking on productivity and human capital endowments and returns not captured in the ECBA. Labor and productivity costs of tobacco include reduced output per worker because of illness on the job, tobacco-related work absenteeism, and forgone labor force participation to care for family members sick from smoking.
[4] Fuchs and Del Carmen 2018; Fuchs, Del Carmen, and Genoni 2018; Fuchs, Del Carmen, and Mukong 2018; Fuchs, Matytsin, and Obukhova 2018; Fuchs and Meneses 2017a, 2017b, 2018; Fuchs, Orlic, and Cancho 2019.
[5] With the exception of the first decile in Bangladesh.

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