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Research Article

The Health Gains, Financial Risk Protection Benefits, and Distributional Impact of Increased Tobacco Taxes in Armenia

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Abstract—The majority of Armenian adult males smoke, yet tobacco taxes in Armenia are among the lowest in Europe and Central Asia. Increasing taxes on tobacco is one of the most cost-effective public health interventions, but many opponents often cite regressivity as an argument against tobacco taxation. We use a mixed-methods approach to study the potential regressivity of tobacco taxation and the extent to which the regressivity argument hindered increases in tobacco taxation in Armenia. First, we pursued an extended cost-effectiveness analysis (ECEA) to assess the health, financial, and distributional consequences (by consumption quintile) of increases in the excise tax on cigarettes in Armenia. We simulated a hypothetical price hike leading to a tax rate of about 75% of the retail price of cigarettes, which would be fully passed on to consumers. Second, we conducted a series of stakeholder interviews to examine the importance of the regressivity argument and identify the factors that allowed tobacco tax increases to be adopted as public policy in Armenia. We show that increased excise taxes would bring large health and financial benefits to Armenian households. Half of tobacco-related premature deaths and 27% of associated poverty cases averted would be concentrated among the bottom 40% of the population. Though regressivity was raised as a concern at the initial stages of the policy adoption process, our qualitative stakeholder analysis indicates that the recent accession to the Eurasian Economic Union and the fiscal constraints faced by the government created a window of opportunity for tobacco taxation to be placed on the policy agenda and adopted as government policy, and the ECEA findings were an important input into the process.

INTRODUCTION

In Armenia, smoking prevalence is high and tobacco use is one of the leading risk factors for premature mortality.¹

About 25% of Armenian adults smoke, largely the men (53% smoking prevalence among males versus 2% among females).² Smoking is also higher among the poorer socioeconomic groups: it is particularly high among men in the second and third wealth quintiles (60% prevalence) compared to the bottom (49%) and top (42%) quintiles.³

Price measures are central to tobacco control.⁴⁻⁸ Price is a key determinant of smoking uptake and cessation, and price increases on tobacco are highly effective in inducing smokers to quit and deterring nonsmokers from initiating.⁶ Higher prices can also result in current smokers reducing cigarette consumption and preventing ex-smokers from returning to smoking.^{6,7} Though tax hikes can generate additional revenue for financing for development, as stated in the 2015 Addis Ababa Action Agenda,⁹ the main objective of tobacco taxes is to discourage smoking and avert its adverse health consequences.

Tobacco taxes can often be applied as excise taxes of two types: specific and ad valorem. A specific excise tax is a fixed monetary value per quantity (e.g., per cigarette pack), whereas an ad valorem excise tax is levied as a percentage per tobacco product (e.g., per retail price of cigarette pack).⁶ Unlike other types of taxes (e.g., value-added tax or VAT), large specific excise taxes can narrow the price gap between different types of cigarette brands and prevent substitution to lower-priced cigarettes as prices increase.^{7,10} However, only 33 countries so far have raised tobacco tax rates to the World Health Organization's recommended rate of 75% of the retail price.^{5,11} Opponents, particularly the tobacco industry, have used the potential "regressivity" of tobacco taxes as an argument to build coalitions against cigarette price increases.¹²⁻¹⁴ According to this argument, because the poor spend a larger proportion of their income on smoking than the rich, increased cigarette taxes could disproportionately hurt the poor.¹⁵ However, this argumentation is largely based on the immediate fiscal impact and not on a comprehensive analysis of all of the potential benefits of increased tobacco taxes.¹⁶

Tobacco use can lead to substantial societal costs, because half of those who prematurely die of tobacco-related non-communicable diseases are in the prime of their productive years.¹⁷ It can result in high out-of-pocket (OOP) disease treatment costs and ultimately push households into poverty. Despite an explicit publicly funded health benefits package, OOP health care expenditures represent almost 54% of Armenia's total health spending,¹⁸ and 9% of households incur catastrophic health expenditures (health expenditures > 25% of nonfood expenditures).¹⁹ Therefore, in addition to averting premature mortality, reducing the burden of tobacco could potentially avert high OOP expenditures in Armenia.

Armenia was the first among the former Soviet Union countries to ratify WHO's Framework Convention on Tobacco Control (FCTC) and shortly after adopted a national law in March 2005 on restrictions on the sale, consumption, and use of tobacco.²⁰ However, the government subsequently failed to act,²¹ and Armenia now ranks behind many other neighboring countries (e.g., Ukraine, Russia) on tobacco control.⁵ Tax measures have remained inadequate, constituting 34% (17% excise tax, 17% VAT) of the price of the most sold cigarette brand in 2014.

In 2015, the Armenian government approved a draft legislation to revise its tax code in order to raise revenues.²² This included higher tobacco taxes and it was the first time the government had been able to successfully pass legislation to increase tobacco taxes. However, concerns were raised about the regressivity of such changes, hence prompting the need to analyze the distributional impact. Here, we apply a mixed-methods approach to examine the validity of the regressivity argument in Armenia by using Extended Cost Effectiveness Analysis (ECEA) methods²³⁻²⁵ and identify factors that allowed increased tobacco taxes to be adopted as public policy in Armenia.

METHODS

In the Armenian context, we applied a mixed-methods approach using ECEA and stakeholder analysis to answer two questions: (1) Would higher tobacco taxes be regressive? and (2) Did their perceived regressivity hinder the adoption of enhanced tobacco control policy? The ECEA was used to assess the health, financial, and distributional consequences (by individual consumption quintile) among Armenian smokers (males only) of increased cigarette taxes. Its results were then used in Armenia's policy dialogue, allowing us to conduct a series of interviews with key stakeholders to analyze the agenda setting and adoption processes of tobacco taxation and identify factors that enabled tobacco taxation to be adopted as public policy in 2015.

Modeling Approach

ECEA is used for health policy assessment^{23,24} and has been applied to a wide range of policies, including tobacco taxation.^{25,26} It examines multiple policy outcomes: the health gains (e.g., premature mortality averted), the financial consequences for individuals and households (e.g., OOP expenditures averted due to disease treatment averted) and the corresponding financial risk protection (e.g., cases of medical impoverishment averted), and the distributional

consequences among the population (e.g., per socioeconomic group). In doing so, ECEA goes beyond traditional cost-effectiveness analysis in enabling quantification of the financial protection and equity (distributional) benefits of policy.²⁴

Few studies have investigated the distributional consequences of increased tobacco taxes. Here we built on a previously developed ECEA model^{25,27} to examine the premature deaths averted, the OOP expenditures averted and financial protection provided, and their distributions across socioeconomic groups among Armenian male smokers, following increased excise taxes on tobacco.

Using Armenia's baseline excise tax rate of 17% of the retail price and an average price per cigarette pack of 525 Armenian dram (AMD; approximately 1.25 USD),²⁸ we simulated a price increase leading to the WHO-recommended tax rate of 75%.⁵ The average price per cigarette pack would correspondingly increase by about 145% (an additional 1.80 USD). We assessed distributional impact in terms of averted premature tobacco-related deaths; averted OOP expenditures on tobacco-related disease treatment; government savings resulting from tobacco-related disease treatment costs averted for those eligible for the publicly funded basic benefits package (BBP); averted cases of medical impoverishment (number of individuals falling below the national poverty line as a result of OOP tobacco-related treatment costs); and averted cases of catastrophic expenditures (number of individuals spending more than 10% of their individual consumption on tobacco-related treatment costs; Figure 1).

We focused our analysis on the male population only: in Armenia, 53% of males smoke compared to 2% of females.³ The population was divided into five-year age groups (from age 0 to 84 and a single group for men > 84) using population estimates from the World Bank's Health, Nutrition, and Population Statistics database.²⁹ It was subsequently divided into individual consumption quintiles, with maximum consumption for each quintile estimated using the 2014 Integrated Living Conditions Survey (ILCS).¹⁹ We applied these consumption quintile cutoffs and the Gini index (estimated from ILCS) to simulate a consumption distribution in the population using a gamma distribution.^{30,31} Age- and quintile-specific smoking prevalence rates were used to calculate the total number of smokers per age group and consumption quintile.

Due to lack of data, we could not obtain the price elasticity of demand for tobacco products in Armenia. Instead, we used a price elasticity of -0.54 , estimated from the 2015 Kyrgyz Integrated Household Survey³² using the approach of Hu et al.³³ and Adioetomo et al.³⁴ This price elasticity falls within the -0.40 to -0.80 elasticity range estimated for developing countries.^{6,8} Consistent with other studies,^{6,7,26} the 2015 Kyrgyz Integrated Household Survey estimates indicated the poor to be more price responsive, with the price elasticity ranging from -0.74 (poorest quintile) to -0.28 (richest quintile; see supplementary appendix). Although the Kyrgyz Republic exhibits a lower smoking prevalence among men (26%) and a lower average price per cigarette

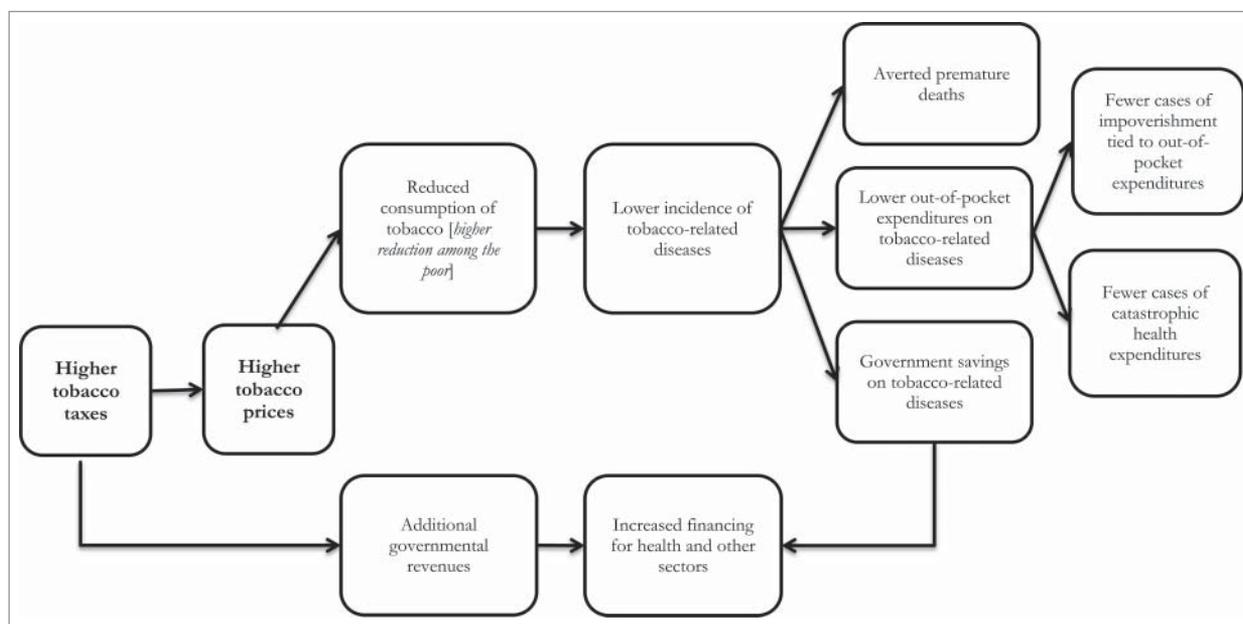


FIGURE 1. Conceptual Framework Capturing the Health, Financial, and Distributional Consequences of Increased Tobacco Taxes among Armenian Male Smokers

pack (0.60 USD) compared to Armenia, excise tax rates are similarly low (16% specific, 8% ad valorem excise tax rates).⁵ We did not have the necessary data to estimate price elasticity by age group, yet, consistent with reviews,^{6,11} those under age 25 were assumed to be twice as responsive to price changes as those above age 24.

We updated a previously published static model²⁷ following over time all Armenian men alive in 2015. The large excise tax increase was assumed to be fully passed on to consumers through an approximately 145% increase in tobacco retail price, and half of price elasticity would be due to participation elasticity.⁶ By age group (a) and consumption quintile (q), the number of individuals who would quit (from the current adult male smoking population) or not initiate smoking (among males currently < 15 years), denoted $\Delta S_{a,q}$, would depend on the initial number of smokers ($S_{a,q}$), the participation elasticity ($\frac{1}{2}$), price elasticity $\varepsilon_{a,q}$ (per age group and quintile), and relative price change ($\frac{\Delta p}{p}$):

$$\Delta S_{a,q} = \left(\frac{1}{2} \varepsilon_{q,a} \frac{\Delta p}{p} \right) S_{a,q}. \quad (1)$$

For the number of premature deaths averted ($\Delta D_{a,q}$), we used estimates from Verguet et al.²⁷ and Doll et al.³⁵ for the changes in expected mortality based on age at cessation (r_a), assuming that half of smokers would die from their addiction.³⁵⁻³⁷ Hence, the premature deaths averted would amount to

$$\Delta D_{a,q} = \left(\frac{1}{2} \varepsilon_{q,a} \frac{\Delta p}{p} \right) r_a D_{a,q}. \quad (2)$$

Though higher prices would likely lower smoking intensity among continuing smokers, we only estimated the mortality reduction associated with quitting and did not model any substitution effects of smokers switching to lower priced cigarettes.

For OOP and government expenditures averted, we allocated the averted premature deaths (equation 2) to four main causes: heart disease, neoplasms (lung cancer), stroke, and chronic obstructive pulmonary disease.¹ Health care utilization for each cause was derived using the total annual number of hospitalizations by the International Statistical Classification of Diseases and Related Health Problems group in Armenia's Ministry of Health's 2015 statistical yearbook³⁸ and the prevalence rates of the four diseases.¹ To derive hospitalizations by quintile, we used data on quintile-specific utilization rates for inpatient services from the 2014 ILCS.¹⁹ The utilization rates were normalized using the middle

consumption quintile as a reference and applied to the disease-specific hospitalization rates. The average cost of treatment per disease was obtained from Armenia's BBP price list.³⁹ The BBP fully funds services for socially vulnerable groups, including the poor and those with disabilities.⁴⁰ According to the 2014 ILCS data,¹⁹ almost 28% of the population was eligible for the BBP. In our modeling, the government was assumed to fully pay the treatment costs for those covered by the BBP; those individuals not eligible would pay the full BBP price out of pocket. The change in OOP spending would be

$$\Delta OOP_q = (1 - B_q) \left(\sum_a \Delta D_{a,q} \sum_d P_d u_{d,q} C_d \right), \quad (3)$$

where B_q is the fraction of population covered in quintile q , P_d is the contribution (in percentage) of disease d to tobacco-related premature deaths, C_d is the treatment cost for disease d , and $u_{d,q}$ is the utilization of health services for disease d per quintile q . Likewise, government savings among those covered by BBP would be

$$Govt_{savings, q} = B_q \left(\sum_a \Delta D_{a,q} \sum_d P_d u_{d,q} C_d \right). \quad (4)$$

We did not estimate potential health care costs incurred resulting from increased survival among quitters. However, previous studies have suggested that quitting could be associated with a reduction in overall health expenditures.⁴¹⁻⁴³

For the cases of medical impoverishment (poverty) averted, we counted the number of individuals who would fall below the poverty line as a result of OOP tobacco-related disease treatment costs. Almost 30% of Armenia's population lives below the national poverty line (41,700 AMD per month or 100 USD).⁴⁴ Given that the national poverty line was estimated in per adult equivalent terms,⁴⁵ we identified an annual individual consumption cutoff in the simulated consumption distribution at the 30th percentile⁴⁵ (about 1200 USD per year). Therefore, we calculated the number of individuals for whom the simulated annual consumption was above this poverty line but whose annual net consumption would decrease to less than 1200 USD after paying for tobacco-related disease treatment. Likewise, for averted cases of catastrophic expenditures, we calculated the number of individuals for whom OOP expenditures on tobacco-related disease treatment would be greater than 10% of annual individual consumption.

In addition to the base-case scenario, we conducted three sensitivity analyses. First, we applied a flat price elasticity of -0.54 to all quintiles. Second, we used two alternative poverty thresholds: a lower poverty line of about 80 USD per

month and a food poverty line of about 60 USD per month.⁴⁵ Around 10% and 2% of the population were classified as poor using the lower and food poverty lines, respectively.⁴⁵ Third, we used two alternative thresholds for catastrophic expenditures: 20% and 40% of individual consumption. Table 1 shows all of the input parameters used. All analyses were conducted using R software (R 3.3.2, www.r-project.org).

Stakeholder Analysis

Following Bump and Reich,⁴⁶ to gain a better understanding of the political circumstances in which the tax hike was proposed, we conducted interviews with Armenian stakeholders, which focused on these stages of the policy cycle: the initial placement on the policy agenda or agenda setting, the technical design of the reform proposal, and the adoption of the tobacco tax as public policy.^{47,48}

Qualitative data were collected through semistructured interviews. We used a purposeful sampling approach to identify interviewees by constructing a preliminary list of stakeholders prior to arriving in Armenia based on a literature review of Armenia's tobacco control efforts. The interviews were conducted in Yerevan in June 2016. Interviewees included representatives from the Ministry of Health, international organizations, health professionals, local nongovernmental organizations, and universities. We interviewed a total of 11 individuals (Table 2), using a semistructured interview guide, although stakeholders were encouraged to talk generally about tobacco control.

Contemporaneous notes were taken and content analysis was performed once all interviews were completed to identify relevant themes. We identified reasons for failure to strengthen tobacco control in the past, the degree to which distributional consequences of the policy were important, and changing factors that allowed the tobacco tax dialogue to commence in 2015. This work was supplemented by information extracted from national surveys, news releases, and published research relating to tobacco control in Armenia. We reviewed the laws and initiatives, which were cited during interviews, to gain a detailed account of the historical evolution of Armenia's tobacco control measures. The Harvard Human Research Protection Program granted an exemption for this study.

RESULTS

In Armenia, increasing taxes to about 75% of the retail price of cigarettes would avert about 88,000 premature deaths among current estimated quitters and noninitiators (Table 3).

Half of those deaths would be averted among the bottom two quintiles, with only 10% of them among the richest quintile. This is largely driven by the higher price elasticity among the poor (almost 2.6 times higher among the poorest than the richest quintile). As a sensitivity analysis, when assuming a flat elasticity across all quintiles, as expected, the total number of deaths averted would remain similar (about 86,000) but the distribution would be more uniform following the quintile-specific smoking rates: 20% of deaths would be averted in the richest quintile versus 17% in the poorest quintile (supplementary appendix, Table A1).

Large savings in OOP and public spending would also occur. With averted tobacco-related disease treatment costs among those eligible for the BBP, the government would save approximately 26 million USD, and almost 63 million USD of OOP expenditures would be averted among those not covered by the BBP. Almost 37% of these OOP savings would accrue to the bottom two quintiles and 30% to the middle quintile in which fewer individuals were eligible for the BBP. When we assumed a flat price elasticity, OOP savings would be slightly greater (67 million USD), and almost 27% of those savings would incur among the richest quintile versus 28% in the bottom two quintiles (Table A1).

With a hike to a 75% tax rate, almost 22,000 poverty cases would be averted. Given that 30% of the population already lived below the poverty line, no poverty cases would be averted among this population. Almost 27% of the averted poverty cases would accrue to the second poorest quintile and 14% to the richest quintile. Using a lower poverty line (about 980 USD per year), the number of poverty cases averted would rise slightly to 23,000; using the food poverty line (about 690 USD per year), 24,000 poverty cases would be averted (Table A2). Similarly, almost 33,000 cases of catastrophic expenditures (defined as health spending > 10% of individual consumption) would be avoided.

The ECEA showed that tobacco taxes could be progressive in Armenia and that the poor could accrue large benefits. This analytical result served as an important element in refuting the regressivity argument. The stakeholder analysis suggested that regressivity more so than any other argument against tobacco taxation (e.g., smuggling, revenue losses) was at the center of the policy debate over increasing the tax. In several interviews, stakeholders stated that Armenia had strong tax and customs administration systems. Tobacco products, as well as other goods and imports, have holographic labels and unique identification codes, and tax officers commonly make sample purchases to test the information provided on the products. This was argued to be a strong deterrent to smuggling. In addition, two interviewees mentioned the ease of tobacco tax increases. Unlike other

Input		Value	Reference
Male population		1,419,370	29
Male population distribution, age group (years)	<15	21%	29
	15–24	16%	
	25–44	30%	
	45–64	25%	
	≥65	9%	
Individual annual consumption (USD 2014)	Q1 (poorest)	<1091	19
	Q2	1092–1458	
	Q3	1459–1744	
	Q4	1745–2191	
	Q5 (richest)	>2191	
Male smoking prevalence, per age group (years)	15–24	38%	Authors' calculations based on ref. 3
	25–44	67%	
	45–64	58%	
	≥65	31%	
Male smoking prevalence, by wealth quintile	Q1 (poorest)	49%	Authors' calculations based on ref. 3
	Q2	61%	
	Q3	59%	
	Q4	49%	
	Q5 (richest)	42%	
Daily cigarette consumption		24 cigarettes	Authors' calculations based on ref. 3
Price per pack of cigarettes (USD 2014) before tax increase		1.25	5
Tobacco-related disease treatment costs (USD 2014)	COPD	424	39
	Stroke	350	
	Heart disease	1724	
	Neoplasm (lung cancer)	4781	
Fraction of population eligible for the publically financed basic benefits package (%), by consumption quintile	Q1 (poorest)	40	19, 61
	Q2	30	
	Q3	27	
	Q4	23	
	Q5 (richest)	19	
Utilization (%) of health care services per tobacco-related disease	Neoplasms	40	Authors' calculations based on ref. 38
	Circulatory system diseases	75	
	Respiratory system diseases	27	
Relative use of health care services by consumption quintile (standardized to use Q3 as a reference)	Q1 (poorest)	0.72	Authors' calculations based on ref. 19
	Q2	0.73	
	Q3	1	
	Q4	1.06	
	Q5 (richest)	1.17	
Reduction in mortality risk by age (age group in years) at quitting smoking	15–24	97%	35
	25–44	85%	
	45–64	75%	
	≥65	25%	
Price elasticity of demand for tobacco products, by consumption quintile	Q1 (poorest)	–0.74	Authors' assumption based on estimates from the Kyrgyz Republic ³²
	Q2	–0.65	
	Q3	–0.65	
	Q4	–0.46	
	Q5 (richest)	–0.28	

(Continued on next page)

Input	Value	Reference
National monthly poverty line	41,698 AMD (100 USD)	45
National poverty rate (percentage of population)	30	45

COPD = chronic obstructive pulmonary disease.

TABLE 1. Inputs for the Modeling of the Distributional Impact of Increased Tobacco Excise Taxes in Armenia

proposed tax changes, they noted that tobacco and alcohol taxes were easier to enforce and did not require any additional regulation. As a result, higher tobacco/alcohol taxes were adopted as government policy in 2015 and entered into force on January 1, 2017, and remaining changes to the budget code will be implemented in the following year.⁴⁹

Based on the interviews and a literature review, our analysis showed that, unlike previous unsuccessful attempts, two important contextual factors helped to garner support for the inclusion of higher tobacco taxes in Armenia's new tax code: first, tobacco tax increases were included alongside tax increases on other goods and services, including labor income tax, and, second, it was seen as an inevitable step for the harmonization of taxes in the Eurasian Economic Union.

Economic pressures presented an opportunity for an overhaul of the existing tax system. In recent years, the small but relatively open Armenian economy has been hard hit due to its sensitivity to regional factors and shocks. The escalation of tensions between Russia and Ukraine in 2014 and the decline in international oil prices led to declines in Russia's economic growth prospects. Combined with sanctions, this led to the appreciation of the US dollar, less external funding available for Russian companies, and depreciation of the ruble. This significantly affected Armenia through the reduction of remittances (which in 2014 accounted for 20% of its gross domestic product [GDP]) and exports and the depreciation of the exchange rate at the end of 2014.^{50,51}

With a public debt of about 55% of its GDP and fiscal revenues of only about 22% of GDP, Armenia was facing significant fiscal pressures.⁴⁹ In 2015, the World Bank and the International Monetary Fund supported measures to raise

additional revenues.⁴⁹ In addition, Armenia's 2015 accession to the Eurasian Economic Union resulted in its own set of tax measures and regulations, including the mandated harmonization of rates of excise duties on alcohol and tobacco products over the next five years.^{52,53} Therefore, in October 2015, the government approved a package of draft laws on the tax code including tobacco excise taxes. More specifically, the recently approved tax code mandates alcohol/tobacco excise taxes to increase by 15% per year over 2017–2021, leading to an excise tax rate of 44% by 2021.⁴⁹

The tax reform design was based on two key principles: the new tax system should enhance growth and equity and generate revenue to allow higher social and capital expenditures.^{49,54} Equity was particularly important: according to our stakeholder analysis, concerns about regressivity were an important factor in delaying increased tobacco taxes after FCTC ratification.

Despite FCTC's recommendations, the government had not strengthened tobacco control, particularly in relation to raising excise taxes, and tobacco control efforts in Armenia had diminished since FCTC ratification.²¹ All stakeholders emphasized that Armenia was the first among the former Soviet countries to ratify the FCTC in 2004. The early push for tobacco control measures in Armenia was largely attributed to former President Kocharyan, himself a nonsmoker, who strongly advocated for FCTC implementation. In the absence of strong public supporters, the importance of tobacco control measures subsided after Kocharyan left office in 2008. Though the Ministry of Health was a proponent of stronger tobacco control, most interviewees suggested that it was not a powerful player in fiscal policy discussions. In addition, the tobacco industry held a strong lobby in the Parliament, with several former tobacco industry executives having served on the Parliamentary Standing Committees on Financial Credit and Budgetary Affairs and on Economic Affairs, leading to several draft laws on tobacco control being recalled from the Parliament.

Realizing that the regressivity argument had been an important roadblock in the adoption of increased tobacco taxes, the World Bank and the International Monetary Fund provided technical assistance to simulate scenarios of

Stakeholder Group	Number of Interviews
Ministry of Health	3
Health professionals	2
International organizations	3
Local nongovernmental organizations	2
Universities	1

TABLE 2. Number of Interviews Conducted with Key Stakeholders ($n = 11$) in Armenia

	Total	(Poorest) Quintile 1	Quintile 2	Quintile 3	Quintile 4	(Richest) Quintile 5
Premature deaths averted (in 1000s)	88 (71–106)	21 (17–25)	23 (18–28)	22 (18–27)	13 (11–16)	9 (7–10)
Out-of-pocket expenditures related to tobacco-related disease treatment averted (million USD)	63 (51–77)	10 (8–12)	13 (11–16)	19 (15–22)	12 (10–15)	9 (7–11)
Government savings related to tobacco-related disease treatment averted (million USD)	26 (20–30)	7 (6–8)	6 (5–7)	7 (5–8)	4 (3–4)	2 (2–3)
Poverty cases averted (in 1000s)	22 (18–27)	0 0	6 (5–7)	8 (7–10)	5 (4–6)	3 (2–3)
Cases of catastrophic health expenditures (>10% of consumption) averted (in 1000s)	33 (28–40)	5 (4–6)	7 (6–8)	10 (8–12)	6 (5–8)	5 (4–6)

^aNo poverty cases are averted in the poorest consumption quintile given that 30% of the population is already below the poverty line. Lower and upper bounds (calculated by using $\pm 20\%$ variations in price elasticities) are indicated in parentheses.

TABLE 3. Estimated Distributional Impact of Increased Tobacco Taxes among the Current Male Population in Armenia, by Individual Consumption Quintile for a Shift to a 75% Tobacco Tax Rate^a

proposed tax increases on various products, including tobacco, to address the equity concerns.^{49,54} Experience from other countries (e.g., the Philippines) played an important role in addressing the regressivity concerns and allowing the Ministry of Finance to adopt the proposed changes as government policy.

Though several interviewees cited examples from the Philippines and Thailand, where tobacco and alcohol taxes are earmarked for health, earmarking was not discussed at length and few interviewees supported it in Armenia. They cited the danger of setting a precedent, which would result in other ministries and government agencies requesting their own earmarked sources. One stakeholder also cited the unsuccessful attempt to earmark proceeds from a VAT on medicines for health in 2001 as a reason why earmarking tobacco taxes was not thought to be viable in Armenia.

Tobacco tax was seen as an important measure to reduce consumption, but all stakeholders emphasized that other FCTC measures should be enforced. They stressed the importance of raising public awareness and enforcing smoke-free zones and indicated that though they supported further tobacco tax increases, they believed that national cessation support services (currently not available in Armenia) should follow to fully realize the benefits of higher cigarette prices.

DISCUSSION

The ECEA indicates that higher tobacco taxes in Armenia would avert large numbers of premature deaths and poverty cases. With a large hike to a 75% tax rate, among the current

male population, cumulatively into the future, 88,000 premature deaths, 63 million USD of OOP medical expenditures, and 22,000 poverty cases could be averted. Because the poor are more sensitive to price increases, the health gains would be more concentrated among the bottom two consumption quintiles of the population. Given that a larger share of the poor is eligible for the BBP (exempt from OOP payments), averted tobacco-related disease treatment costs would benefit the middle quintiles. Cumulative government savings on tobacco-related disease treatment costs for those BBP-eligible would amount to 26 million USD, about 12% of the country's annual health budget.¹⁸

Our modeling findings about the distributional effects on increased tobacco taxes were used as an input in the policy dialogue. Yet the extent to which regressivity concerns had hindered prior adoption of increased tobacco taxes remained unclear; hence, we conducted interviews to identify the factors that allowed tobacco taxes to be placed on the policy agenda in 2015. Based on our stakeholder analysis, we identified several reasons. First, the fiscal constraints faced by the government and the 2015 accession to the Eurasian Economic Union initiated a comprehensive review of the existing tax policy. Though previous attempts to increase tobacco taxes were unsuccessful in part due to lack of sufficient support in Parliament, the comprehensive nature of the tax reform allowed tobacco measures to be included in the proposal. Second, despite initial regressivity concerns, the stakeholder interviews suggested that experience from other countries and our analysis of simulations of the potential impact of such taxes on the poor were strong arguments for agreeing to raise tobacco taxes

as part of the overall fiscal reform. Our case study presents evidence of a successful attempt to increase tobacco taxes as part of a broader governmental tax reform, yet the proposed excise tax of 44% (to be achieved by 2021) will still remain well below WHO's recommended level.

Limitations

Our analysis presents a number of limitations. First, we were not able to calculate the price elasticity of demand for tobacco products in Armenia, and our model was based on elasticity estimates from the Kyrgyz Republic. Yet, the Kyrgyz elasticities fell within the range of elasticities previously estimated in low- and middle-income countries.⁶ To test the sensitivity of our findings to elasticity assumptions, we also simulated impact using a flat price elasticity across all quintiles. Second, we did not model substitution effects of individuals switching to lower-priced cigarettes following price increases. However, unlike other types of taxes, high specific excise taxes would narrow the price gap between the most and least expensive cigarettes and encourage cessation rather than substitution to lower-priced cigarettes.^{7,10} Third, we assumed that reduced smoking intensity would not yield any health benefits: individuals smoking fewer cigarettes per day as a result of tax hike would not have better health outcomes in our model; we did not model secondhand smoking either. Consequently, we are likely to underestimate the full impact of higher tobacco taxes on avoiding premature mortality and providing financial protection. Fourth, in the absence of data on OOP expenditures per disease, we used the BBP price list as a proxy for incurred OOP expenditures. Although this is the official price for services in all public facilities, there may be informal payments.⁵⁵ In addition, data on expenditures on medicines not covered by the BBP were not available and hence could not be included. Our results are thus likely to underestimate the expenditures related to tobacco-related disease treatment and the number of poverty cases averted, because OOP medical expenditures are likely to be higher than the established government fees for the BBP. Fifth, we only included the cost of inpatient care, because we were not able to obtain detailed data on utilization for each disease and associated costs at the primary care level. However, primary care is free for all citizens in Armenia. Sixth, the health and financial benefits were modeled into the future (for the current Armenian male population), when individuals are expected to face tobacco-related diseases. Hence, there is large uncertainty in our assumptions, because we assume that key inputs (e.g., consumption, costs, utilization, BBP coverage) would remain the same over time. Seventh, we assumed that the tax increases would be fully passed onto

the consumer. Although this is a standard assumption in modeling studies,^{4,6} the empirical evidence is mixed,^{6,56-59} and we may have overestimated the impact of increased excise taxes. Lastly, the stakeholder analysis we pursued was simple: we conducted a limited number of discussions with participants from a small group of organizations and institutions, and some of these interviews may also have suffered from recall bias.

CONCLUSION

Our study contributes to the literature on the distributional impact of higher tobacco taxes. Though the regressivity argument has been commonly used against tobacco price increases and was perceived to be a barrier in Armenia, similar to other recent studies,^{25,26,60} we do not find that higher tobacco prices in Armenia would necessarily disproportionately burden the poor. As recent studies have found, higher price responsiveness among the poor may shift the burden of additional taxes to the rich.^{25,26} Not only can higher taxes reduce premature mortality through smoking cessation, but they can also decrease potential OOP expenditures on tobacco-related disease treatment. Given the associated high costs, tobacco taxes can bring substantial financial protection to individuals by preventing such OOP medical expenditures altogether.²⁵

Though the health benefits associated with smoking cessation have been well established, this has not necessarily been enough to encourage countries to raise tobacco taxes. Our stakeholder analysis in Armenia suggests that identifying the potential windows of fiscal opportunities is important and could enable a push for higher tobacco taxes. Because the global health community encourages the use of fiscal policies to change behavior (e.g., tobacco, alcohol, sugar-sweetened beverage taxes), the sole public health argument might be insufficient. In the case of Armenia, our qualitative interviews indicate that governments could successfully increase tobacco taxes by including them as part of broader fiscal reforms rather than pushing them through as stand-alone reforms. Though the proposal marks an important step forward, the proposed 44% rate in Armenia remains well below WHO's recommended level. Concerted efforts need to be taken to ensure that further tax increases are implemented and other tobacco control measures are enacted following best practices.

DISCLOSURE OF POTENTIAL CONFLICTS OF INTEREST

Iryna Postolovska was a consultant to the World Bank for this study, and Rouselle Lavado was a staff member of the World Bank. The findings, interpretations, and conclusions

in this article are entirely those of the authors. Responsibility for the views and opinions expressed rests solely with the authors; they are not endorsed by any member institution of the World Bank Group, its Executive Directors, or the countries they represent.

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