Evaluating the Distributional and Poverty Effects of Tobacco Taxation in Bosnia and Herzegovina

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Abstract

Background

With smoking prevalence estimated at approximately 43 percent in 2025 and cigarette prices remaining low relative to European Union levels, tobacco use places considerable financial pressure on households in Bosnia and Herzegovina. Expenditure on tobacco and smoking-attributable health care may reduce resources available for other needs and deepen poverty, particularly among economically vulnerable households. This study examines the impoverishing effects of these financial burdens and the short-run distributional implications of higher cigarette excise taxation.

Methodology

Using nationally representative microdata from the 2021/2022 Household Budget Survey, the study measures welfare through household consumption adjusted using the OECD-modified equivalence scale and an official relative poverty threshold. Alternative welfare scenarios account for tobacco expenditure alone and in combination with smoking-attributable out-of-pocket health costs estimated using smoking-attributable fractions. Poverty incidence, depth, and severity are assessed alongside the Gini coefficient, concentration indices, and Kakwani and Reynolds–Smolensky indices. A static microsimulation evaluates a 32.6 percent increase in the minimum cigarette excise tax, from BAM 3.77 to BAM 5.00 per pack, corresponding to an approximately 15.87 percent increase in average cigarette prices. The simulation assumes full tax pass-through and applies consumption-group-specific demand elasticities.

Results

The baseline poverty rate is 13.58 percent. Accounting for tobacco expenditure alone increases it to 14.50 percent, corresponding to approximately 30,900 additional people in poverty. Including smoking-attributable health expenditures raises the rate to 15.06 percent, equivalent to approximately 49,700 additional people, including about 4,200 children. The combined burden increases the aggregate poverty deficit by approximately BAM 6.2 million per month, while aggregate consumption inequality changes little. The simulated excise increase raises the poverty rate only modestly, from 13.58 to 13.66 percent, corresponding to approximately 2,990 additional people. The effect is concentrated in the lowest consumption tercile, where poverty rises from 40.55 to 41.10 percent. Approximately BAM 6.4 million annually could offset the simulated increase in the aggregate poverty deficit under perfect targeting.

Conclusions

Tobacco expenditure and smoking-attributable health costs substantially exacerbate poverty in Bosnia and Herzegovina, particularly among households near the poverty line, despite limited effects on aggregate inequality. A higher minimum cigarette excise tax produces relatively modest

simulated short-run poverty costs, which could be mitigated through targeted use of additional tax revenues. Excise reform should therefore be accompanied by social protection, accessible smoking cessation services, prevention programs, and regular adjustments to inflation and income growth. Because the model is static and smoking-related illnesses often develop over long periods, simulated reductions in health costs should not be interpreted as immediate savings, and longer-term health and welfare gains are not fully captured.

JEL Codes: I14, I18, I32, H23

Keywords: Impoverishing effects, distributional effects, tobacco expenditure, household consumption, static microsimulation, tobacco taxation, Bosnia and Herzegovina

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Table of Contents

INTRODUCTION 5

LITERATURE REVIEW 7

METHODOLOGY 8

Poverty and inequality pre-tax measurement frameworks 10

Tobacco tax simulation and post-tax analysis 14

DATA OVERVIEW & STATISTICAL SUMMARY 17

RESULTS 19

Poverty and inequality pre-tax analysis 19

Tobacco tax simulation and post-tax analysis 28

DISCUSSION 33

POLICY IMPLICATIONS 36

LIMITATIONS 38

REFERENCES 40

INTRODUCTION

Despite moderate improvements in living standards over the past decade in Bosnia and Herzegovina (B&H), poverty and economic vulnerability remain important policy concerns. According to the Agency for Statistics of Bosnia and Herzegovina (ASB&H), 8.6 percent of households were at risk of poverty in 2022. At the individual level, the poverty headcount rate, defined as the percentage of individuals living below the poverty line, stood at 13.5 percent in 2022, down from 16.9 percent in 2015 and 17.9 percent in 2011. The decline was steepest in the Republic of Srpska (RS), where the poverty headcount rate fell from 19.5 percent in 2011 to 16.4 percent in 2015 and 11.1 percent in 2022. In the Federation of Bosnia and Herzegovina (FB&H), the poverty headcount rate also declined, but to a lesser extent, from 17.1 percent in both 2011 and 2015, to 14.8 percent in 2022.

More broadly, relative poverty indicators have remained persistently elevated since 2011, reflecting continued structural socioeconomic pressures and substantial heterogeneity across households and regions. In this context, household expenditures that divert resources away from essential consumption categories may have significant welfare implications, particularly for lower-income populations.

At the same time, B&H continues to experience one of the highest levels of tobacco smoking prevalence in Europe, coupled with relatively low cigarette prices compared to European Union (EU) member states. Smoking prevalence reached approximately 43 percent in 2025 (Gliorić et al., 2025a) compared to the EU average of 24 percent, while the weighted average retail price of cigarettes also remains substantially below the EU average.

Although tobacco excise taxes were raised periodically between 2009 and 2019, the specific excise rate has since been frozen. Meanwhile, inflation and real income growth have increased cigarette affordability. Recent evidence indicates that cigarette affordability in B&H has not consistently declined over

time and may have even increased in the most recent period, as income growth outpaced tobacco price adjustments (Gligorić et al., 2025a).

These developments raise serious concerns about the effectiveness of the current tobacco taxation policy in reducing consumption and improving public health outcomes. The current cigarette tax structure combines ad valorem and specific excise taxes with value-added tax and a minimum excise duty; however, because the combined specific and ad valorem excise liability exceeds the minimum duty, cigarette prices are effectively determined by these two excise components.

An expanding body of literature demonstrates that tobacco consumption affects household welfare not only through direct spending on tobacco products but also by crowding out essential expenditures on food, health care, and education. These crowding-out effects are particularly pronounced among lower-income households, where tobacco spending accounts for a larger share of the household budget (Borović et al., 2025). Moreover, smoking-related health expenditures further erode disposable resources and heighten vulnerability to poverty. Collectively, these mechanisms imply that tobacco use generates significant distributional consequences that extend well beyond its direct health impacts.

Despite a growing body of international literature on the impoverishing effects of tobacco use, evidence for B&H remains limited. Existing studies for the region have primarily focused on cigarette affordability, demand elasticities, and the macroeconomic dimensions of tobacco taxation. Relatively little attention has been devoted to household-level welfare and distributional outcomes.

This study contributes to the literature by applying a static microsimulation framework to nationally representative Household Budget Survey (HBS) data to evaluate the poverty and distributional effects of tobacco consumption and simulated tobacco tax increases in B&H. The analysis combines household tobacco expenditure, smoking-attributable health expenditures, and

behavioral responses to price increases in order to assess how tobacco-related financial burdens affect poverty, inequality, and welfare across household groups.

LITERATURE REVIEW

A substantial body of literature has examined the relationship between tobacco consumption and household welfare, particularly in low- and middle-income countries (LMICs) such as B&H where tobacco expenditure may crowd out essential consumption. Previous research shows that spending on tobacco products can reduce resources available for food, education, housing, and health care, thereby increasing household vulnerability to poverty and financial insecurity (John et al., 2023). Lower-income households are especially vulnerable because tobacco expenditure typically represents a larger share of household budgets among poorer populations (Ciapponi, 2014).

Recent evidence from across Southeastern Europe suggests that tobacco-related expenditures may generate measurable impoverishing effects at the household level. In Montenegro, Čizmović et al. (2025) estimated that tobacco expenditure alone pushed approximately one percent of the population below the poverty line, while smoking-attributable health expenditures further increased poverty incidence. Similar findings have been reported for Albania, where tobacco spending contributed to a substantial increase in the number of households living below the poverty threshold (Merkaj et al., 2023). These findings are particularly relevant for B&H given similarities in smoking prevalence, household income levels, and tobacco affordability dynamics across the region.

Similar impoverishing effects of tobacco expenditure have also been documented in other low- and middle-income countries (LMICs) throughout Asia and Latin America. Evidence from Vietnam indicates that the

impoverishing effects of tobacco-related expenditures are particularly pronounced among rural populations, ethnic minorities, and households in the two lowest consumption quintiles (Nguyen et al., 2022). In Mexico, these effects are especially consequential for low-income households, including those whose remaining resources fall below the extreme poverty line after accounting for tobacco expenditure and smoking-related healthcare costs (Macías Sánchez & García Gómez, 2024). Similarly, evidence from India shows that tobacco expenditure and attributable medical costs increase poverty in both rural and urban areas, with larger estimated effects among rural populations (John et al., 2011).Evidence from high-income countries also suggests that tobacco expenditure may contribute to poverty among economically vulnerable households. For example, Reed (2015) found that accounting for tobacco expenditure increased the estimated number of households living below the poverty line in the United Kingdom, particularly among households located near the poverty threshold.

Despite the growing body of international literature on tobacco-related impoverishment, evidence for B&H remains limited. Existing studies have primarily focused on cigarette demand, affordability trends, and the macroeconomic dimensions of tobacco taxation, with relatively little attention devoted to household-level welfare and distributional effects. Additionally, few studies in Southeastern Europe jointly evaluate tobacco expenditure, smoking-attributable health expenditures, and behavioral responses to tax-induced price changes within a unified microsimulation framework. This study addresses these gaps using nationally representative household survey data from B&H.

METHODOLOGY

The analysis is based on microdata from the 2021/2022 B&H Household Budget Survey (HBS), a nationally representative survey that provides

detailed information on household expenditures, tobacco consumption, health expenditures, and socioeconomic characteristics. Since the HBS does not collect direct measures of household income, total household expenditure is used as a proxy for household resources—a standard approach in welfare and poverty analysis in developing and transition economies.

Household welfare is measured using equivalized total household expenditure adjusted using the Organisation for Economic Co-operation and Development (OECD)–modified equivalence scale, which accounts for differences in household size and demographic composition. Under this approach, the first adult is assigned a weight of 1, each additional adult a weight of 0.5, and each child (under 14 years of age) a weight of 0.3 (OECD, 2024).

Poverty analysis is based on equivalized household consumption and the official relative poverty threshold published by the ASB&H. For the 2021/2022 survey wave the equivalized poverty line was set at BAM 526.21 per equivalent adult using the OECD-modified equivalence scale. All poverty and distributional indicators are estimated using the Distributive Analysis Stata Package (DASP) (Abdelkrim & Duclos, 2007).

The hypothetical tax scenario examined in this study models a 32.6-percent increase in the minimum excise rate, from BAM 3.77 to BAM 5.00 per cigarette pack. The simulated increase in the minimum excise duty from BAM 3.77 to BAM 5.00 per pack is consistent with the policy scenario proposed by Vidović et al. (2026), which also envisages a minimum excise duty of BAM 5.00 per pack. Post-tax poverty and inequality indicators are then recalculated in order to assess the short-run distributional effects of the simulated excise increase across household groups in B&H. Both the baseline and post-tax scenarios make use of detailed data on excise stamps and corresponding 2025 retail cigarette prices provided by the Indirect Taxation Authority (ITA).

The HBS dataset reports total household health expenditure but does not identify the portion directly attributable to tobacco use. Following John et al.

(2023), smoking-attributable fractions (SAFs) are applied to approximate the share of household health expenditures associated with smoking-related illnesses. In this study, SAF estimates from Gligorić et al. (2024) are used for household out-of-pocket health expenditures. This approach constitutes a reduced-form approximation and should not be interpreted as an estimate of actual short-run reductions in medical expenditures.

Although tobacco expenditure and smoking-attributable health expenditures do not constitute taxes in a formal fiscal sense, both represent welfare-reducing financial burdens that may affect household living standards and poverty outcomes. Following the broader distributional and health economics literature, these expenditures are analyzed using concentration indices and related progressivity measures in order to evaluate how tobacco-related financial burdens are distributed across the welfare distribution (Wagstaff et al., 1991; Wagstaff & van Doorslaer, 2000; O'Donnell et al., 2008; Deaton, 1997). The analysis therefore focuses on the distributional incidence of tobacco-related expenditure rather than on formal fiscal incidence in the public finance sense.

Poverty and inequality pre-tax measurement frameworks

The impoverishing effect of tobacco consumption is evaluated using the Foster–Greer–Thorbecke (FGT) class of poverty measures, which capture the incidence, depth, and severity of poverty. The analysis considers both household tobacco expenditure and smoking-attributable health expenditures in order to evaluate how tobacco-related financial burdens affect household welfare and poverty outcomes. The FGT family of indices is commonly expressed through the following generalized functional form:

$$FGT(\alpha) = \frac{1}{N}\sum_{p=1}^{p}\left(\frac{z-y_p}{z}\right)^{\alpha} \quad (1),$$

where z denotes the poverty line, N the total population, p the number of poor individuals, y_p the welfare indicator (equivalized consumption), and a the

poverty aversion parameter determining sensitivity to the depth of poverty. Distinct poverty measures within the FGT family are derived by assigning specific values to a under this unified framework.

This study adopts three specific measures from the FGT family of poverty indices, differentiated by the value assigned to the sensitivity parameter a:

Headcount Index (a = 0). The headcount ratio *FGT(0)* measures the proportion of the population living below the poverty line:

$$FGT(0) = \frac{1}{N}\sum_{p=1}^{p} 1 = \frac{p}{\dot{N}} \qquad (2).$$

Thus, in the case of the Headcount Index (α = 0), no weighting is applied according to the magnitude of the poverty gap. To evaluate the direct welfare effect of tobacco expenditure, equivalized tobacco spending is subtracted from equivalized household consumption:

$$FGT(0)_1 = \frac{1}{N}\sum_{p=1}^{p}(eqcons - tobacco) \qquad (3),$$

where $eqcons$ denotes equivalized household consumption and $tobacco$ equivalized household tobacco expenditure, both calculated using the OECD-modified equivalence scale. The expression $(FGT(0)_1 - FGT(0)) \times N$ represents the number of individuals pushed below the poverty line after accounting for tobacco expenditure. The analysis is further extended by incorporating smoking-attributable health expenditures estimated using the smoking-attributable fraction (SAF) approach:

$$FGT(0)_2 = \frac{1}{N}\sum_{p=1}^{p}(eqcons - tobacco - health) \qquad (4),$$

where health represents equivalized smoking-attributable health expenditures estimated using SAF-adjusted household health expenditures following John et al. (2023). The combined adjustment captures the joint welfare effect of tobacco consumption and smoking-related health expenditures on household poverty outcomes. The expression *(FGT(0)₂* –

$FGT(0)_1)*N$ represents the number of individuals who are pushed into poverty because of these combined financial pressures.

The *Poverty Gap Index (a = 1)* measures the average proportional shortfall of poor households from the poverty line:

$$FGT(1) = \frac{1}{N}\sum_{p=1}^{p}\frac{z-y_p}{z} \quad (5).$$

This measure captures the aggregate depth of poverty. Unlike the Headcount Index, which only identifies whether a household is poor, the Poverty Gap Index measures how far poor households fall below the poverty line.

The *Poverty Severity Index (a = 2)* assigns greater weight to households with larger poverty gaps:

$$FGT(2) = \frac{1}{N}\sum_{p=1}^{p}\left(\frac{z-y_p}{z}\right)^2 \quad (6).$$

This measure is sensitive to inequality among the poor. By squaring the normalized poverty gap, the Poverty Severity Index places disproportionately greater weight on households experiencing the deepest poverty, making it sensitive to inequality within the poor population rather than merely to the average shortfall from the poverty line.

Distributional outcomes are evaluated using the Gini coefficient, concentration indices (CI), the Kakwani progressivity index, and the Reynolds–Smolensky (RS) redistributive-effect index. The Gini coefficient measures inequality in equivalized household consumption, with higher values indicating greater inequality. Concentration indices measure the distribution of tobacco expenditure and smoking-attributable health expenditures across the welfare distribution, where positive values indicate that expenditures are concentrated among higher-consumption households and negative values indicate concentration among lower-consumption households.

The Kakwani index, defined as the difference between the concentration index and the Gini coefficient ($K = CI - G$), measures whether the expenditure burden is distributed more or less progressively than household consumption. Positive Kakwani values indicate that the expenditure burden increases more than proportionally with household consumption and is therefore progressive, whereas negative values indicate that the burden increases less than proportionally with consumption and is therefore regressive.

The Reynolds–Smolensky index is closely related to the Kakwani index, as the redistributive effect depends on both the degree of progressivity and the average size of the expenditure burden. As a result, the sign of the RS index generally follows that of the Kakwani index, although the magnitude of the redistributive effect is typically smaller. The Reynolds–Smolensky index measures the resulting change in inequality and is defined as the difference between the pre-expenditure and post-expenditure Gini coefficients ($RS = G_{pre} - G_{post}$). Positive RS values indicate an equalizing effect that reduces inequality, while negative values imply that the expenditure burden increases inequality.

In distributional analysis using concentration indices, it is important that the ranking variable remains exogenous to the burden being evaluated. If equivalized consumption is adjusted by subtracting tobacco-related expenditures prior to ranking households, mechanical endogeneity may arise because households with larger expenditure burdens are shifted downward in the welfare distribution. To avoid this problem, concentration indices are calculated using the original pre-burden, equivalized consumption ranking. This approach ensures that concentration measures reflect the distribution of tobacco-related financial burdens relative to an unchanged welfare distribution, consistent with established practice in health economics and incidence analysis (Wagstaff & van Doorslaer, 2000; O'Donnell et al., 2008).

The analysis is conducted within a static microsimulation framework and therefore captures only the short-run effects of tobacco taxation on household welfare. The model does not account for dynamic behavioral responses such as addiction persistence, quitting trajectories, or long-run changes in smoking-related morbidity and health expenditures. Consequently, potential long-run benefits of tobacco taxation—including reductions in future medical expenditures, morbidity, and productivity losses—are not fully captured. This limitation is common in microsimulation analyses based on cross-sectional household survey data and reflects the absence of longitudinal information required to model dynamic adjustments. As such, the findings represent short-run distributional projections conditional on the assumed elasticities, rather than causally identified effects, and may differ from the long-run welfare impacts of tobacco taxation.

Previous studies examining the relationship between tobacco expenditure and poverty have primarily focused on secondary poverty effects, estimating the number of households falling below the poverty line after accounting for tobacco-related expenditures (Nguyen et al., 2022; Merkaj et al., 2023). In contrast, this study additionally evaluates the short-run poverty implications of simulated tobacco-tax-induced price increases within a static microsimulation framework. The analysis additionally evaluates heterogeneity in poverty and distributional outcomes across entities and household consumption groups in order to assess how tobacco-related financial burdens vary across population subgroups.

Tobacco tax simulation and post-tax analysis

The post-tax analysis is conducted using a static microsimulation framework that evaluates the short-run welfare effects of simulated tobacco-tax-induced price increases. Following previous tobacco microsimulation studies, behavioral responses are incorporated using income-group-specific cigarette demand elasticities obtained from Gligorić et al. (2022).

Initial tobacco expenditure is defined as $tob^i = P^i \cdot Q^i$, where P^i is price and Q^i is the quantity consumed. Following an excise-induced price increase ΔP, the new price becomes $P_t^i = P^i * (1 + \Delta p)$. Assuming a constant price elasticity of demand $E_{D,P}^i$, the percentage change in quantity demanded is given by $\frac{\Delta Q}{Q} = E_{D,P}^i * \Delta P$ implying $Q_t^i = Q^i * \left(1 + E_{D,P}^i * \Delta P\right)$. Post-tax tobacco expenditure is recalculated by combining the direct price effect with the simulated behavioral response implied by the price elasticity of demand.

Although cigarette consumption declines following the simulated tax increase, remaining smokers may still experience higher tobacco-related expenditures when demand is price inelastic in absolute value:

$$tob_t^i = tob^i * (1 + \Delta p) * \left(1 + E_{D,P}^i * \Delta p\right) \qquad (7),$$

where tob_t^i represent post-tax equivalized household tobacco expenditure (OECD-modified) for the different income groups, ΔP represents the price increase (percentage) for the average retail sales price, and $E_{D,P}^i$ represents the price elasticity of demand for the different income groups. The simulation captures behavioral responses only through the estimated price elasticities and, therefore, reflects reductions in cigarette consumption among continuing smokers. It does not explicitly incorporate alternative adjustment mechanisms such as illicit tobacco purchases, tax evasion, or cross-product substitution.

The simulation assumes full pass-through of the excise increase to retail cigarette prices, implying that the entire tax increase is reflected in consumer prices. This assumption is standard in tobacco-tax microsimulation studies and is consistent with the absence of reliable evidence on pass-through heterogeneity in B&H. Due to data limitations, the model captures only the overall reduction in cigarette consumption implied by the estimated price elasticities and does not explicitly model substitution between cigarette brands, hand-rolled tobacco, or other tobacco products. In the absence of income-group-specific price changes, we apply the observed change in the

weighted average retail sales price across all groups. This formulation includes a second-order interaction term between price and quantity effects, which captures the joint adjustment in expenditure following the price change.

Smoking-attributable health expenditures are also adjusted under the simulated tax scenario using the same elasticity-based behavioral response. Specifically, post-tax equivalized health-related expenditure is approximated as:

$$health_t^i = health^i\left(1 + \eta^i * \Delta p\right) \qquad (8),$$

where $health^i$ represents equivalized tobacco-attributable health care costs (OECD-modified) for different income groups, and η^i represents the prevalence elasticity for different income groups. This specification reflects a reduced-form approximation in which changes in smoking prevalence are assumed to translate proportionally into changes in smoking-attributable health care costs.

It is important to note, however, that this adjustment represents a reduced-form approximation rather than a realistic short-run prediction. Smoking-related diseases such as cancer, cardiovascular disease, and chronic obstructive pulmonary disease (COPD) typically involve long latency periods. Therefore, any reduction in smoking prevalence resulting from the tax increase is unlikely to produce immediate declines in smoking-attributable health expenditures. The modeled reduction in health costs should thus be interpreted as an illustrative long-run tendency rather than an expected short-run outcome. In the short run, health expenditures may remain largely unchanged or even increase temporarily due to existing morbidity among current smokers. This caveat implies that the short-run welfare gains from lower health spending are likely overstated in the simulation.

The post-tax equivalized household consumption (OECD-modified) for different income groups is calculated as:

$$eqcons_t^i = eqcons^i - \left(tob^i + health^i\right) + \left(tob_t^i + health_t^i\right) \qquad (9).$$

The analysis therefore uses post-tax equivalized household tobacco and SAF-adjusted health care expenditures in place of the corresponding pre-tax measures.

After estimating post-tax household welfare, poverty measures—including FGT(0), FGT(1), and FGT(2)—are recalculated and compared with their pre-tax values in order to evaluate the short-run welfare effects of the simulated excise increase. Inequality and distributional incidence are reassessed using the Gini coefficient, concentration indices, and related progressivity measures, including the Kakwani and Reynolds–Smolensky indices.

DATA OVERVIEW & STATISTICAL SUMMARY

This study uses microdata from the 2021/2022 Bosnia and Herzegovina Household Budget Survey (HBS), a nationally representative survey containing detailed information on household expenditures, tobacco consumption, health expenditures, and socioeconomic characteristics. Because HBS does not report direct measures of household income, total household expenditure is used as a proxy for household resources. The final sample comprises 8,660 individuals, of whom 32.3 percent reside in the Republic of Srpska (RS) and 67.7 percent in the Federation of Bosnia and Herzegovina (FB&H).

Table 1 reports descriptive statistics for households reporting positive tobacco expenditure, presented separately for the RS, FB&H, and the full sample. Overall, 37.72 percent of households include at least one smoker. On average, tobacco expenditure represents 5.98 percent of household consumption, while health expenditure accounts for 2.33 percent of total household expenditure.

Table 1. Descriptive statistics for households reporting tobacco expenditure

	Prevalence of households with at least one smoker (%)	Budget share spent on tobacco (%)	Budget share spent on smoking-attributable health costs (%)	Number of household members (OECD-modified scale)
Whole sample	37.72 (34.59; 40.95)	5.98 (5.46; 6.49)	2.33 (1.9; 2.76)	1.93 (1.88; 1.97)
RS	36.47 (31.62; 41.62)	6.52 (5.92; 7.12)	2.25 (1.8; 2.7)	2.00 (1.93; 2.08)
FB&H	38.33 (34.35; 42.47)	5.72 (5.04; 6.41)	2.37 (1.77; 2.96)	1.89 (1.84; 1.96)

Notes: All monetary values are deflated to 2010 prices using the consumer price index (CPI). Values in parentheses indicate 95% confidence intervals.

Source: Authors' calculations based on HBS data, CPI obtained from the ASB&H (2025)

Regional differences in smoking behavior and expenditure patterns are also evident. Smoking prevalence is slightly higher in the FB&H, while households in the RS allocate a larger share of household expenditure to tobacco consumption. Health expenditure shares remain relatively similar across entities, although somewhat higher in the FB&H.

Households are ranked by equivalized consumption and divided into terciles, where the first tercile represents the bottom third of the welfare distribution and the third tercile the top third. Table 2 indicates a clear inverse relationship between household welfare and the share of expenditure devoted to tobacco consumption. Households in the lowest tercile allocate the largest proportion of their budgets to tobacco expenditure, while households in the highest tercile devote comparatively smaller shares. A similar pattern is observed in the RS, whereas in the FB&H, the highest tobacco budget share is observed among middle-income households.

Table 2. Tobacco budget share by equivalized household consumption (low, middle, high)

Income group	Budget share spent on tobacco – whole sample (%)	Budget share spent on tobacco – RS (%)	Budget share spent on tobacco – FB&H (%)
First tercile (bottom third)	6.64 (5.97; 7.34)	8.33 (7.32; 9.34)	5.81 (5.06; 6.56)
Second tercile (middle third)	6.44 (5.87; 7.00)	6.70 (5.91; 7.48)	6.32 (5.58; 7.02)
Third tercile (top third)	5.23 (4.67; 5.78)	5.32 (4.85; 5.78)	5.20 (4.43; 5.79)

Note: Values in parentheses indicate 95% confidence intervals.

Source: Authors' calculations based on HBS data, CPI obtained from the ASB&H (2025)

RESULTS

Poverty and inequality pre-tax analysis

Poverty and inequality indicators are evaluated under three alternative welfare specifications. The baseline specification reflects observed household welfare, while the first counterfactual excludes household tobacco expenditure. The second counterfactual additionally subtracts smoking-attributable health expenditure in order to capture the combined welfare burden associated with tobacco consumption.

Table 3 presents the results of the impoverishing effects of tobacco-related expenditures under the baseline specification. The headcount ratio (FGT(0)) indicates that 13.58 percent of the population, corresponding to 457,372 individuals, lives below the relative poverty line, defined as 60 percent of the median equivalized consumption. Poverty incidence is higher in the FB&H (14.74 percent; 330,903 individuals) than in the RS (11.26 percent; 126,470 individuals). Among children under the age of 14, approximately 57,154

individuals are classified as poor, indicating that poverty remains an important intergenerational concern in B&H.

Poverty indicators suggest that deprivation in B&H is concentrated primarily among households located close to the poverty line, while extreme poverty is relatively limited. This pattern implies that well-targeted transfers could substantially reduce poverty, although more intensive support would still be required for households experiencing deeper deprivation.

Household consumption inequality is modest, with the lowest levels observed in the RS and the highest in the FB&H. Tobacco expenditure is progressive at the national level and in the FB&H but regressive in the RS. This divergence appears to reflect differences in spending patterns across the consumption distribution: in the RS, tobacco expenditure accounts for a declining share of household budgets as consumption rises, whereas in the FB&H tobacco budget shares vary less systematically across consumption groups and absolute tobacco spending remains more concentrated among higher-consumption households. Differences in cigarette price segments or brand choices may also contribute, although these mechanisms cannot be directly assessed with the available survey data. Smoking-attributable health expenditures are regressive across all regions, imposing a proportionally greater burden on lower-consumption households. The corresponding Reynolds–Smolensky indices indicate that the overall effect of tobacco-related expenditures on aggregate inequality is limited.

The principal welfare impact of tobacco expenditure operates through poverty rather than inequality. Excluding tobacco expenditure from household consumption increases the national poverty headcount from 13.58 percent to 14.50 percent, pushing approximately 30,900 additional individuals below the poverty line. The increase is more pronounced in the RS than in the FB&H, indicating a stronger poverty-threshold effect in the RS. Poverty depth and severity also increase, suggesting that tobacco expenditure affects not only the likelihood of falling below the poverty line but also the extent of deprivation

among poor households, particularly those clustered around the poverty threshold.

Child poverty is similarly affected, with more than 3,300 additional children falling below the poverty threshold after accounting for tobacco expenditure. At the same time, the Gini coefficient remains virtually unchanged, reinforcing the conclusion that tobacco expenditure primarily increases poverty incidence and depth rather than substantially altering the overall distribution of household consumption.

Table 3. Poverty effects of tobacco-related expenditures

	Whole sample	RS	FB&H
Number of people	3,368,724	1,123,656	2,245,068
HCR - (FGT(0))	13.58	11.26	14.74
Total number of people below poverty line	457,372	126,470	330,903
Number of children below poverty line	57,154	13,418	43,736
Poverty gap FGT(1)	2.74	2.40	2.91
Poverty severity index FGT(2)	0.86	0.85	0.86
Gini	26.25	24.75	26.97
Concentration index (tobacco)	29.20	22.02	32.65
Concentration index (health)	21.06	17.43	22.67
Concentration index (combined)	27.16	20.79	30.29
Kakwani progressivity index (tobacco)	2.95	-2.73	5.68
Kakwani progressivity index (health)	-5.19	-7.32	-4.27
Kakwani progressivity index (combined)	0.91	-3.96	3.32
Reynolds and Smolensky progressivity index (tobacco)	0.073	-0.068	0.139
Reynolds and Smolensky progressivity index (health)	-0.042	-0.067	-0.032
Reynolds and Smolensky progressivity index (combined)	0.030	-0.138	0.11
Tobacco expenditure			

	Whole sample	RS	FB&H
	Whole sample	RS	FB&H
HCR - (FGT(0))	14.50	12.48	15.50
Total number of people below poverty line	488,314	140,282	348,032
Poverty gap FGT(1)	2.97	2.64	3.13
Poverty severity index FGT(2)	0.94	0.94	0.94
Impoverishing effect (percentage points)	0.92	1.22	0.76
Impoverishing effect - number of people	30,942	13,812	17,130
Number of children in the impoverished population	60,477	14,339.76	46,137.24
Impoverishing effect - number of children	3,323	922	2,401
Changes in the poverty gap (percentage points)	0.23	0.24	0.22
Changes in poverty severity index (percentage points)	0.08	0.07	0.07
Gini	26.27	24.93	26.92
The combined effect of tobacco expenditure and medical costs attributable to tobacco			
	Whole sample	RS	FB&H
HCR - (FGT(0))	15.06	13.09	16.03
Total number of people below poverty line	507,068	147,153	359,915
Poverty gap FGT(1)	3.09	2.77	3.25
Poverty severity index FGT(2)	0.99	0.98	0.99
Impoverishing effect (percentage points)	1.48	1.83	1.29
Impoverishing effect - number of people	49,695	20,683	29,012
Number of children in the impoverished population	61,345	14,678	46,667
Impoverishing effect - number of children	4,191	1,260	2,931
Changes in the poverty gap (percentage points)	0.35	0.37	0.34
Changes in poverty severity index (percentage points)	0.13	0.13	0.13
Gini	26.32	26.97	25.01

Source: Authors' calculations based on HBS data obtained from ASB&H (2025), data on SAF obtained from Gligorić et al. (2024)

Smoking-attributable health care costs are incorporated into the welfare analysis using SAFs applied to equalized health expenditures. Two alternative specifications are implemented. First, a national approach applies a single B&H–level SAF to all households. Second, a disaggregated approach applies entity-specific SAFs for the FB&H and the RS, allowing for heterogeneity in smoking-related health risks. The reported results are based on this combined adjustment. Because different SAF specifications generate distinct welfare distributions, resulting poverty estimates are not strictly additive across subgroups but provide complementary perspectives on the distributional consequences of tobacco-related health burdens.

Accounting for both tobacco expenditure and smoking-attributable health care costs substantially amplifies the measured impoverishing effect across all poverty indicators. The headcount ratio increases to 15.06 percent, corresponding to approximately 507,068 individuals living below the poverty line. Relative to the baseline specification, this represents an increase of 1.48 percentage points, or approximately 49,696 additional individuals falling into poverty.

The effect varies across entities. In the RS, the poverty rate increases from 11.26 to 13.09 percent (+1.83 percentage points; +20,683 individuals), while in the FB&H it rises from 14.74 to 16.03 percent (+1.29 percentage points; +29,012 individuals). Although both entities experience a deterioration in welfare outcomes, the proportional increase is somewhat larger in the RS.

The poverty gap index (FGT(1)) indicates that the aggregate resources required to eliminate poverty increase substantially once both tobacco expenditure and smoking-attributable health expenditures are incorporated. Under the baseline specification, approximately BAM 48.5 million per month would be required to eliminate poverty under perfect targeting, compared with approximately BAM 54.7 million under the combined specification. This implies an additional aggregate poverty deficit of roughly BAM 6.2 million per month attributable to tobacco-related financial burdens.

The poverty severity index (FGT(2)) increases from 0.86 to 0.99, suggesting a moderate increase in inequality among poor households and indicating that welfare losses become somewhat more concentrated among households with larger poverty gaps. Child poverty is also meaningfully affected. The number of children living below the poverty line increases from 57,154 under the baseline specification to approximately 61,345 under the combined specification, implying that roughly 4,191 additional children fall into poverty. These findings suggest that the welfare effects of tobacco consumption extend beyond direct adult consumption losses and may contribute to intergenerational deprivation among the poorest households.

Despite the increase in poverty incidence and poverty depth, overall inequality remains broadly stable. The Gini coefficient increases only marginally, from 26.25 to 26.32, indicating that the combined welfare burden of tobacco expenditure and smoking-attributable health expenditures primarily affects households near the poverty threshold rather than substantially reshaping the overall consumption distribution.

Overall, the results (Table 4) indicate that incorporating smoking-attributable health expenditures substantially increases the estimated welfare burden associated with tobacco use. The combined effect operates both through additional households falling below the poverty line and through an increase in the aggregate poverty deficit among households already experiencing poverty.

Because households are grouped into terciles based on equivalized consumption, poverty is concentrated almost entirely within the bottom tercile of the welfare distribution. Under the combined specification, only a negligible number of individuals from the middle tercile fall below the poverty threshold, while no households from the top tercile become poor. These findings indicate that tobacco-related welfare losses are concentrated primarily among already economically vulnerable households.

Table 4. Poverty effects of tobacco-related expenditures, by equivalized household consumption

	Whole sample	First tercile (bottom third)	Second tercile (middle third)	Third tercile (top third)
Number of people	3,368,724	1,127,876	1,156,077	1,084,771
HCR - (FGT(0))	13.58	40.55	0.00	0.00
Total number of people below poverty line	457,372	457,372	0.00	0.00
Poverty gap FGT(1)	2.74	8.19	0.00	0.00
Poverty severity index FGT(2)	0.86	2.56	0.00	0.00
Gini	26.25	12.65	6.31	16.26
Concentration index (tobacco)	29.20	16.49	10.62	13.11
Concentration index (health)	21.06	9.02	1.15	15.15
Concentration index (combined)	27.19	14.09	8.41	13.59
Kakwani progressivity index (tobacco)	2.95	3.83	4.23	-3.14
Kakwani progressivity index (health)	-5.27	-3.07	-4.57	-1.34
Kakwani progressivity index (combined)	0.91	1.61	2.17	-2.72
Reynolds and Smolensky progressivity index (tobacco)	0.073	0.076	0.115	-0.078
Reynolds and Smolensky progressivity index (health)	-0.042	-0.028	-0.037	-0.010
Reynolds and Smolensky progressivity index (combined)	0.030	0.047	0.077	-0.089
Tobacco expenditure				
	Whole sample	First tercile (bottom third)	Second tercile (middle third)	Third tercile (top third)
HCR - (FGT(0))	14.50	43.29	0.00	0.00
Total number of people below poverty line	488,314	488,314	0.00	0.00

	Whole sample	First tercile (bottom third)	Second tercile (middle third)	Third tercile (top third)
Poverty gap FGT(1)	2.97	8.87	0.00	0.00
Poverty severity index FGT(2)	0.94	2.82	0.00	0.00
Impoverishing effect (percentage points)	0.91	2.74	0.00	0.00
Impoverishing effect - number of people	30,942	30,942	0.00	0.00
Changes in the poverty gap (percentage points)	0.23	0.68	0.00	0.00
Changes in poverty severity index (percentage points)	0.08	0.26	0.00	0.00
Gini	26.27	12.82	6.62	16.50
The combined effect of tobacco expenditure and medical cost attributable to tobacco				
	Whole sample	First tercile (bottom third)	Second tercile (middle third)	Third tercile (top third)
HCR - (FGT(0))	15.06	44.95	0.01	0.00
Total number of people below poverty line	507,068	506,952	116	0.00
Poverty gap FGT(1)	3.09	9.23	0.00	0.00
Poverty severity index FGT(2)	0.99	2.95	0.00	0.00
Impoverishing effect (percentage points)	1.48	4.4	0.01	0.00
Impoverishing effect - number of people	49,696	49,580	116	0.00
Changes in the poverty gap (percentage points)	0.35	1.04	0.00	0.00
Changes in poverty severity index (percentage points)	0.13	0.39	0.00	0.00
Gini	26.32	12.88	6.70	16.54

Source: Authors' calculations based on HBS data obtained from the ASB&H (2025), data on SAF obtained from Gligorić et al. (2024), and data on elasticities obtained from Gligorić et al. (2024).

The results from Table 4 also reveal important differences in the distributional incidence of tobacco-related expenditures across household consumption groups. At the aggregate level, tobacco expenditure is relatively concentrated among higher-consumption households, while smoking-attributable health expenditures impose a relatively larger proportional burden on lower-consumption households. However, substantial heterogeneity exists across terciles. In particular, lower-income households continue to devote a larger share of household resources to tobacco-related expenditures despite lower absolute spending levels.

The Reynolds–Smolensky indices indicate that the redistributive effects associated with tobacco-related expenditures remain limited in magnitude across all terciles. Tobacco expenditure produces a small equalizing effect overall, whereas smoking-attributable health expenditures slightly increase inequality. Taken together, the results suggest that tobacco-related expenditures primarily influence poverty outcomes among households in the lowest consumption tercile rather than substantially altering aggregate inequality within the broader consumption distribution.Introducing tobacco expenditure into the welfare aggregate produces a clear deterioration across all FGT poverty measures, concentrated almost entirely within the bottom tercile of the welfare distribution. The headcount ratio in the lowest tercile increases from 40.55 to 43.29 percent, while the poverty gap and poverty severity indices also rise substantially. These findings indicate that tobacco expenditure disproportionately worsens welfare outcomes among households already located close to the poverty threshold.

When smoking-attributable health expenditures are also incorporated, the welfare effects become more pronounced. The headcount ratio rises to 15.06 percent, corresponding to approximately 49,696 additional individuals falling below the poverty line relative to the baseline specification. Importantly, a small number of individuals from the middle tercile (116 persons) fall below the poverty threshold, indicating that smoking-related health expenditures may also affect households located just above the poverty line.

The poverty gap increases to 3.09 percent, while the poverty severity index rises to 0.99, indicating both a larger aggregate poverty deficit and a moderate worsening of welfare among poorer households. Together, these findings suggest that smoking-attributable health expenditures amplify the negative welfare effects of tobacco consumption beyond direct tobacco spending alone.

The findings suggest that strengthening tobacco control policies in B&H—including renewed increases in specific and/or minimum cigarette excise taxes, integration of tobacco control within broader social protection and poverty-reduction strategies, and targeted measures aimed at reducing smoking initiation among young people—could contribute to improved welfare outcomes over the longer term. Given the stagnation of cigarette excise increases after 2019, such measures may help counter rising cigarette affordability while reducing the disproportionate financial burden that tobacco consumption places on economically vulnerable households.

Tobacco tax simulation and post-tax analysis

The post-tax analysis evaluates the short-run welfare effects of simulated excise-induced cigarette price increases after incorporating behavioral responses through adjusted tobacco expenditure and smoking-attributable health expenditures. Poverty and inequality measures are recalculated using the post-tax welfare distribution in order to assess the distributional implications of the simulated excise increase across household groups in B&H.

Table 5 presents post-tax descriptive statistics for households reporting positive tobacco expenditure, with results shown separately for the RS, FB&H, and household consumption terciles. Because region-specific elasticity estimates are unavailable for the RS and the FB&H, national-level elasticities are applied for entity-level simulations, while income-group-specific

elasticities are used for tercile-level analysis in order to better capture behavioral heterogeneity across the welfare distribution.

Table 5. Descriptive statistics for households reporting tobacco expenditure, post-tax

	Budget share spent on tobacco (%)	Budget share – smoking-attributable health costs (%)
Whole sample	5.84 (5.34; 6.34)	2.15 (1.75; 2.55)
RS	6.37 (5.78; 6.96)	2.07 (1.65; 2.49)
FB&H	5.59 (4.92; 6.26)	2.18 (1.63; 2.73)
First tercile (bottom third)	6.07 (5.42; 6.71)	2.42 (1.88; 2.97)
Second tercile (middle third)	6.32 (5.76; 6.86)	2.14 (1.74; 2.55)
Third tercile (top third)	5.39 (4.82; 5.95)	2.01 (1.53; 2.49)

Note: All monetary values are deflated to 2010 prices using the consumer price index (CPI). Simulated excise-induced price increases and corresponding behavioral responses are incorporated into household welfare through adjusted tobacco expenditure and health costs. Values in parentheses indicate 95% confidence intervals.
Source: Authors' calculations based on HBS data, CPI obtained from the ASB&H (2025).

At the aggregate B&H level, the post-tax scenario produces modest declines in both tobacco and health expenditure shares. The tobacco budget share decreases from 5.98 percent to 5.84 percent, while the health expenditure declines from 2.33 percent to 2.15 percent. Similar patterns are observed in both entities, suggesting a modest behavioral adjustment following the simulated excise increase.

Prior to the simulated excise increase, tobacco budget shares were highest among households in the lowest consumption tercile, where tobacco expenditure accounted for 6.64 percent of household budgets, compared with

6.44 percent in the middle tercile and 5.23 percent in the top tercile. Following the simulated price increase, tobacco expenditure shares decline across all terciles as households adjust cigarette consumption in response to higher prices. Health expenditure shares also decline modestly, consistent with the simulated reduction in smoking prevalence and smoking-attributable health expenditures.

Despite these reductions, lower-income households continue to devote a larger share of household resources to tobacco expenditure than higher-income households, indicating that tobacco-related financial burdens remain proportionally more substantial among economically vulnerable households.

Table 6 presents the results of the post-tax analysis of the effects of tobacco use on poverty, based on equivalized household consumption.

Table 6. Poverty effects of tobacco-related expenditures by equivalized household consumption, post-tax analysis

	Whole sample	First tercile (bottom third)	Second tercile (middle third)	Third tercile (top third)
Number of people	3,368,724	1,127,876	1,156,077	1,084,771
HCR - (FGT(0))	13.66	41.10	0.00	0.00
Total number of people below poverty line	460,362	460,362	0.00	0.00
Poverty gap FGT(1)	2.77	8.36	0.00	0.00
Poverty severity index FGT(2)	0.87	2.62	0.00	0.00
Gini	26.35	12.66	6.32	16.26
Concentration index (tobacco)	29.02	13.93	9.95	13.52
Concentration index (health)	20.31	6.30	-1.52	13.92

	Whole sample	First tercile (bottom third)	Second tercile (middle third)	Third tercile (top third)
Concentration index (combined)	24.98	9.63	4.85	13.70
Kakwani progressivity index (tobacco)	2.67	1.27	3.63	-2.74
Kakwani progressivity index (health)	-6.04	-6.36	-7.84	-2.34
Kakwani progressivity index (combined)	-1.37	-3.03	-1.47	-2.56
Reynolds and Smolensky progressivity index (tobacco)	0.066	0.022	0.094	0.071
Reynolds and Smolensky progressivity index (health)	-0.125	-0.145	-0.148	0.050
Reynolds and Smolensky progressivity index (combined)	-0.060	-0.072	-0.061	-0.16
Tobacco expenditure				
	Whole Sample	First tercile (bottom 33%)	Second tercile (middle 33%)	Third tercile (top 33%)
HCR - (FGT(0))	14.59	43.72	0.00	0.00
Total number of people below poverty line	491,523	491,523	0.00	0.00
Poverty gap FGT(1)	2.99	8.99	0.00	0.00
Poverty severity index FGT(2)	0.95	2.86	0.00	0.00
Impoverishing effect (percentage points)	0.93	2.62	0.00	0.00
Impoverishing effect - number of people	31,161	31,161	0.00	0.00
Changes in the poverty gap (percentage points)	0.22	0.63	0.00	0.00

	Whole sample	First tercile (bottom third)	Second tercile (middle third)	Third tercile (top third)
Changes in poverty severity index (percentage points)	0.08	0.24	0.00	0.00
Gini	26.31	12.83	6.63	16.50

Source: Authors' calculations based on HBS data obtained from the ASB&H (2025), data on SAF obtained from Gligorić et al. (2024), and data on elasticities obtained from Gligorić et al. (2024).

Comparing the pre-tax and post-tax scenarios, the simulated 32.6-percent increase in the minimum excise rate— corresponding to an approximately 15.87-percent increase in average cigarette prices—produces only a modest short-run increase in poverty. The headcount ratio rises from 13.58 percent to 13.66 percent, corresponding to approximately 2,990 additional individuals falling below the poverty line. The effect is concentrated almost entirely in the lowest consumption tercile, where the poverty rate increases from 40.55 percent to 41.10 percent. Poverty depth and severity also increase only marginally, while the Gini coefficient remains broadly unchanged, indicating that the main welfare effects occur among households already close to the poverty threshold rather than through substantial changes in overall consumption inequality.

These short-run effects are consistent with the price-inelastic nature of cigarette demand. Although lower-income smokers tend to respond more strongly to higher prices, reductions in consumption only partly offset the increase in cigarette prices, leaving some poorer households with higher tobacco-related expenditure burdens in the short run (Chaloupka et al., 2012; U.S. National Cancer Institute & World Health Organization, 2016). The estimated increase in the aggregate poverty gap remains small relative to the potential additional excise revenue, suggesting scope for targeted revenue recycling to offset these short-run welfare losses.

The Kakwani indices provide a similar distributional picture. Tobacco expenditure remains progressive at the aggregate level, although its Kakwani index declines from 2.95 to 2.67 after the tax increase, indicating weaker progressivity. Smoking-attributable health expenditure remains regressive and becomes somewhat more regressive, with its Kakwani index declining from approximately −5.31 to −6.04. When tobacco and smoking-attributable health expenditures are combined, the Kakwani index shifts from 0.91 to −1.37, indicating a change from a mildly progressive to a mildly regressive distributional pattern. Nevertheless, the corresponding Reynolds–Smolensky indices remain small, suggesting that the overall effect on aggregate inequality is limited.

These results capture only the immediate distributional effects of the simulated tax increase and do not incorporate longer-term gains from lower smoking prevalence, reduced smoking-attributable morbidity and health expenditures, and improved productivity and longevity. Such benefits may be particularly important for lower-income households because of their greater price responsiveness (U.S. National Cancer Institute & World Health Organization, 2016; Chaloupka et al., 2012). Allocating part of the additional excise revenue to targeted health financing, cessation services, or social protection could further mitigate the modest short-run adverse effects identified in the simulation.

DISCUSSION

This study provides the first comprehensive assessment of the poverty and distributional consequences of tobacco consumption and simulated tobacco tax increases in B&H. The results demonstrate that tobacco use imposes a measurable welfare burden on households through both direct tobacco expenditure and smoking-attributable health expenditures. While tobacco expenditure alone increases poverty incidence and poverty depth, the inclusion of smoking-attributable health expenditures substantially amplifies

these effects, indicating that the economic consequences of smoking extend beyond the direct purchase of tobacco products.

The findings are broadly consistent with evidence from other Western Balkan countries. In Montenegro, Čizmović et al. (2025) found that tobacco expenditure alone pushed approximately one percent of the population below the poverty line, while smoking-attributable health expenditures further increased the impoverishing effect. Similar evidence from Albania shows that tobacco expenditure increases the number of households falling below the poverty threshold (Merkaj et al., 2023). The results for B&H confirm a regional pattern in which the financial burden of smoking operates not only through direct tobacco expenditure but also through associated health costs, with particularly important consequences for households close to the poverty line.

Evidence from Vietnam, India, and Mexico points to similar mechanisms outside the Western Balkans (Nguyen et al., 2022; John et al., 2011; Macías Sánchez & García Gómez, 2024). A particularly important finding of the present study is that smoking-attributable health expenditures represent an additional source of impoverishment and impose a more regressive financial burden than tobacco expenditure alone. While tobacco expenditure is mildly progressive at the aggregate level, smoking-attributable health expenditures are consistently regressive across both entities and at the national level, imposing a proportionally greater burden on households in the lower part of the consumption distribution. Consequently, incorporating smoking-attributable health expenditures reduces the overall progressivity of tobacco-related financial burdens, while their combined impoverishing effects remain concentrated primarily among households in the lowest consumption tercile, particularly those living below or close to the poverty line. These findings are consistent with international evidence demonstrating that out-of-pocket medical expenditures associated with tobacco use constitute an additional pathway through which smoking contributes to poverty and financial hardship, especially where financial protection against healthcare costs is limited.

The simulation of a 32.6-percent increase in the minimum excise tax indicates that the short-run poverty effects are relatively modest. The poverty headcount ratio increases only slightly, while the poverty gap rises from 2.74 to 2.77 percent. These effects are concentrated almost entirely among households in the lowest consumption tercile and primarily affect households located close to the poverty threshold. Similar findings have been reported in previous tobacco-tax microsimulation studies, where higher cigarette prices generated limited short-run poverty effects because reductions in cigarette consumption offset a substantial share of the increase in tobacco expenditure (Chaloupka et al., 2012; U.S. National Cancer Institute & World Health Organization, 2016).

The results also complement the findings of a previous tobacco tax modeling study conducted in Bosnia and Herzegovina in 2025 (Vidović et al.). While that study demonstrated that increases in the minimum excise tax are likely to reduce cigarette consumption while generating additional government revenues, the present analysis shows that the associated short-run poverty costs are relatively small. Taken together, these findings strengthen the case for renewed increases in the minimum excise tax by demonstrating that the expected public health and fiscal gains are unlikely to be accompanied by substantial adverse welfare effects.

An additional consideration concerns illicit tobacco consumption. The simulation does not explicitly model potential behavioral responses through illicit tobacco purchases or tax evasion. However, recent evidence suggests that the illicit tobacco market in B&H has declined substantially in recent years. Manufactured cigarettes account for approximately 85 percent of total cigarette consumption. Within this segment, the illicit share declined from 18.6 percent in 2019 to 6.6 percent in 2025, alongside a substantial reduction in tax evasion related to both manufactured cigarettes and hand-rolled tobacco. Though a small amount of illicit trade remains, these developments suggest that moderate increases in the minimum excise tax are unlikely to trigger a major resurgence of illicit tobacco consumption under current

enforcement conditions. Consequently, the omission of illicit trade from the simulation is unlikely to materially alter the main conclusions of the analysis.

Finally, the results highlight an important distinction between poverty and inequality effects. Although tobacco-related expenditures increase poverty incidence, poverty depth, and poverty severity, their effect on aggregate inequality remains relatively modest. The Gini coefficient changes little across scenarios, indicating that tobacco-related expenditures primarily affect households located near the poverty threshold without substantially reshaping the overall consumption distribution. The principal welfare consequences of tobacco use in B&H therefore operate through increased economic vulnerability and poverty rather than through large changes in aggregate inequality.

POLICY IMPLICATIONS

The findings of this study provide additional evidence supporting renewed increases in the minimum cigarette excise tax in Bosnia and Herzegovina.

Importantly, the estimated increase in the poverty gap is small relative to the additional fiscal resources expected from the reform. The simulation indicates that approximately BAM 6.4 million annually would be sufficient to offset the short-run increase in the aggregate poverty deficit under a scenario of perfect targeting. Given the additional revenues projected under the revised minimum excise scenario (Vidović et al., 2025), only a small fraction of the expected fiscal gains would be required to compensate vulnerable households. These findings suggest that concerns regarding short-run distributional effects should not represent a major obstacle to future increases in the minimum excise tax.

At the same time, the results indicate that more ambitious excise taxation should be implemented as part of a broader tobacco control strategy rather

than as a stand-alone fiscal measure. Allocating a portion of the additional revenues generated by higher tobacco taxes towards smoking cessation services, prevention programs, public awareness campaigns, and early detection and treatment of smoking-related diseases—especially among those with lower income—could substantially enhance the overall welfare impact of the reform. Such investments would, not only reduce smoking prevalence, but also address the smoking-attributable health expenditures that this study identifies as an important contributor to household poverty and economic vulnerability.

The findings are particularly relevant given that cigarette affordability in Bosnia and Herzegovina has increased in recent years as excise taxes have remained largely unchanged despite inflation and income growth (Gligorić et al., 2025a). Under these conditions, the unchanged excise structure has already weakened the effectiveness of tobacco control policy by allowing cigarettes to become increasingly affordable. Periodic adjustments of the minimum excise tax, combined with comprehensive tobacco control measures and targeted support for vulnerable households, would help reduce cigarette affordability while mitigating the limited short-run welfare costs identified in this study.

Overall, the results suggest that increasing the minimum excise tax is justified not only from a public health perspective but also from a broader social welfare perspective. While the reform generates modest short-run poverty effects, these costs are substantially outweighed by the potential long-run benefits associated with lower smoking prevalence, reduced tobacco-attributable disease burden, improved population health, and additional fiscal resources available to support complementary health and social protection policies.

LIMITATIONS

Several limitations should be acknowledged when interpreting the findings of this study. First, the analysis is based on a static microsimulation framework and therefore captures only the short-run welfare effects of tobacco taxation. The model does not account for dynamic behavioral adjustments such as addiction persistence, cessation trajectories, labor-market responses, or future reductions in smoking-attributable morbidity and mortality. Consequently, the estimated welfare effects should be interpreted as short-run projections rather than long-run outcomes.

Second, the simulation relies on previously estimated income-group-specific price elasticities rather than household-specific behavioral responses. Although these elasticities are derived from B&H and represent the best available evidence, actual responses to future tax increases may differ across households and over time.

Third, smoking-attributable health expenditures are estimated using smoking-attributable fractions applied to observed household health expenditures. These estimates represent reduced-form approximations of the welfare burden associated with smoking-related illnesses and should not be interpreted as realized short-run changes in medical expenditures. Given the long latency periods associated with many smoking-related diseases, reductions in smoking prevalence are unlikely to generate immediate declines in health care spending.

Fourth, the simulation assumes full pass-through of the excise increase to retail cigarette prices. While this assumption is standard in tobacco tax microsimulation studies, actual pass-through may vary across cigarette brands and market segments due to industry pricing strategies and market conditions.

Fifth, the analysis does not explicitly model illicit tobacco purchases, tax evasion, or other forms of tax avoidance. Recent evidence suggests that illicit

tobacco consumption has declined substantially in Bosnia and Herzegovina, and moderate increases in the minimum excise tax are unlikely to reverse this trend or lead to a significant resurgence of illicit trade provided that current enforcement conditions are maintained.

Finally, due to data limitations, the study cannot explicitly model substitution between cigarette brands, hand-rolled tobacco, heated tobacco products, electronic cigarettes, or other nicotine products. The simulation only captures the overall reduction in cigarette consumption implied by the estimated demand elasticities. Future research using more detailed consumption data and longitudinal household surveys could provide a more comprehensive assessment of substitution patterns and the long-run distributional consequences of tobacco taxation.

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