

International Conference:

Why reducing smoking is crucial for a healthy and wealthy society and how can that be achieved?

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Extended cost-benefit analysis of tobacco taxation: The case of Serbia



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tobaccotaxation
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Tobacco Taxation Policy

Background

- WHO (2021) estimation: more than 8 million die each year from tobacco use
- Tobacco use will be the most significant cause of premature mortality and disability in the world by 2030.
- USA CDC estimates: 20% to 40% of premature deaths are preventable through lifestyle modification such as smoking cessation or consumption of healthier foods.
- Smoking imposes a risk for many chronic non-communicable diseases



Background 2

- Cigarette tobacco smoke contains over 7,000 different chemical compounds, over 250 of which are dangerous to health, almost 70 cause cancer (Kilibarda, 2021)
- Smokers today have a higher risk of lung cancer than smokers 50 years ago (changes in cigarette design and composition)
- Smokers with lower personal or family income are more likely to suffer from tobacco-related diseases than smokers with higher personal or family income
- As a result of tobacco use, smoking households spend less on food, clothing, education, and health care (Vladisavljević et al., 2021)



The aim of the study

- To analyze the impact of raising tobacco taxes on avoiding the social and health costs of tobacco consumption
- To apply the extended cost-benefit analysis (ECBA) methodology decomposed into four components:
 - changes in the disposable household budget
 - reduction in tobacco-related medical expenditures
 - extension of working life years
 - extension of pension years



Serbia facts

- Serbia is considered an upper-middle-income country (World Bank)
- Consumption of tobacco products is widespread, especially for manufactured cigarettes and hand-rolled cigarettes, nearly 38% among adults (Zubović et al., 2020)
- Annual number of deaths 101,459 (62.405 - 61,5% from the smoking related diseases)
- Consequently, the population in Serbia is vulnerable to the development of smoking-related diseases
 - Increased medical expenditures for the treatment
 - Loss of productivity due to illness-related absence from work and premature death
 - Loss of pension income



Serbia facts 2

- At least 1.2 million current smokers will die prematurely in Serbia if stronger and stricter tobacco control measures are not implemented (WHO, 2016)
- More than 15,000 premature deaths due to smoking were registered in Serbia in 2016. (Kilibarda, 2021)
- Tobacco taxes in Serbia are currently below the level set under the Association Agreement and the EU Directive 2011/64/EU
 - (a) 60 percent of the average weighted retail price
 - (b) not less than EUR 90 per 1,000 cigarettes



Serbia facts 3

- Both specific and ad valorem taxes are presently applied to tobacco products in Serbia.
- Serbia has a so-called “excise calendar” which defines the specific excise semi-annual growth followed by an increase in retail prices of cigarettes by 8 Euro cents.
- There are no officially published data to estimate the economic cost of smoking in Serbia

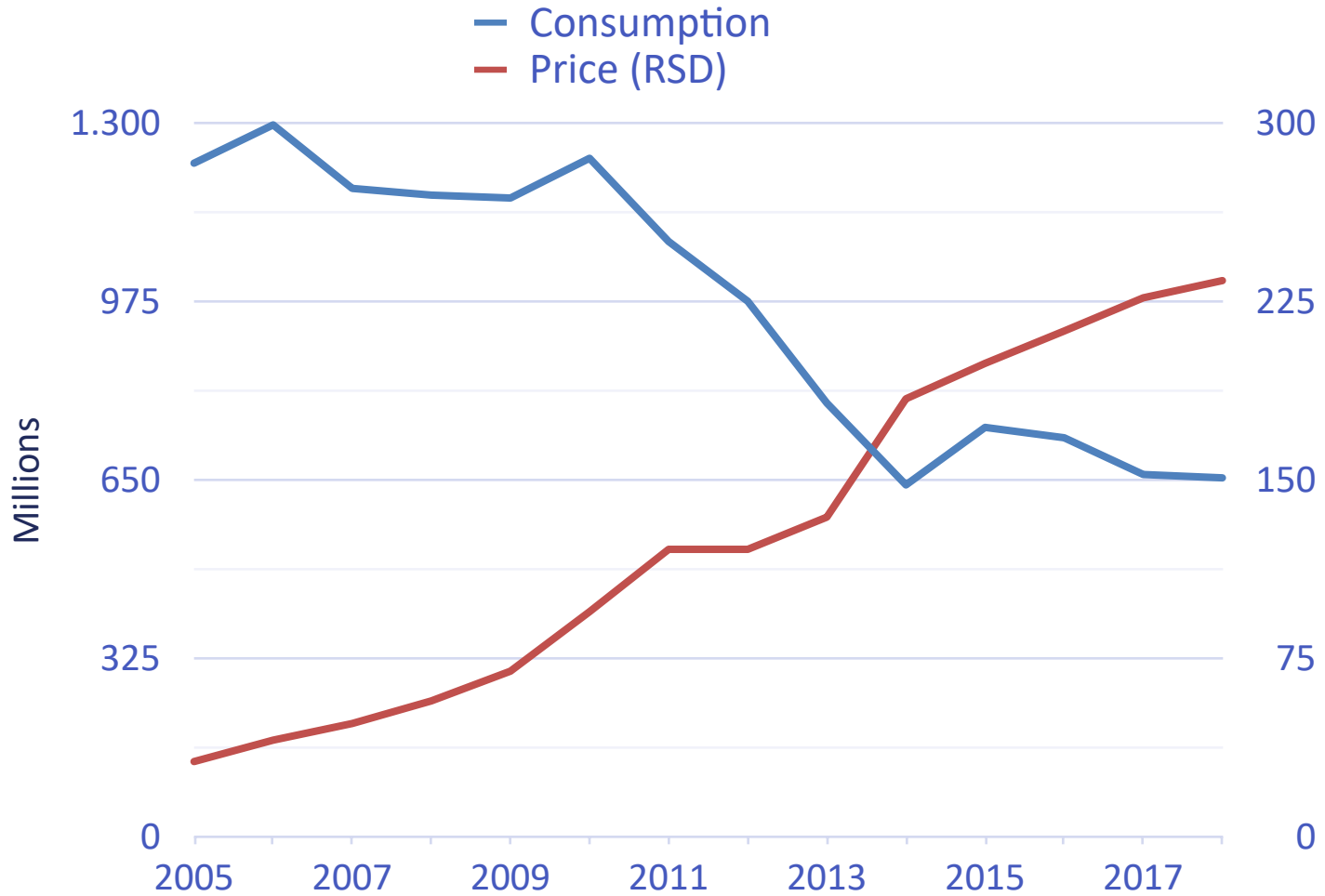


Data and methodology

- At the end of 2020, the total excise on the weighted average price for manufactured cigarettes was 58.7%
- From 2017 to 2020, excises have grown from EUR 1.21 per pack to EUR 1.46 per pack (EUR 73 per 1,000 cigarettes)
- Excise taxes on tobacco are a significant component of fiscal revenue in Serbia - EUR 915 million in 2020; 4.8% of total budget revenues
- The consumption volume and prevalence rates have been decreasing continuously since 2005 until 2020



Trends



Methodology

- To estimate the net effects of increased tobacco taxes, we use an extended cost-benefit analysis (ECBA) model:

Net income effects = Change in tobacco expenditure (A) + Change in medical expenses (B) + Change in years of productive life (C) + Change in pension income (C+)

- (A) = increase in tobacco expenditures after the tax increase at household level
- (B) = decrease of direct medical expenses needed for tobacco-related medical treatments
- (C) = additional income households can earn by increasing their productive life years
- (C+) = additional pension income by increased life expectancy



Methodology 2

- The net effects are calculated at the household level
- We made estimations of the effects using **two scenaria**:
 - 1) **10% increase** in the specific excise tax
 - enables Serbia to achieve one component of the EU Tobacco Tax Directive recommendation that excise taxes comprise a 60% share of the retail price
 - 2) **43.6% increase** in the specific excise tax
 - reaching the second EU directive recommendation of EUR 90 in excise taxes per 1,000 cigarettes



Methodology 3

- To estimate the changes in tobacco expenditures, we used:
 - Price elasticities (low-, middle, high-income group)
 - Quantity and spending on cigarettes by household/individual and total income (spending)
 - Tobacco tax structure (decomposed retail price)
 - Public health expenditure on selected diseases
 - Number of deaths per ICD code



Part A

- Changes in tobacco expenditures are calculated using the formula

$$\frac{E_{C_0}}{E_{T_0}} \left((1 + \% \Delta p) (1 + \varepsilon_p \% \Delta p) - 1 \right)$$

- E_{C_0} = spending on cigarettes (tobacco),
- E_{T_0} = total income,
- Δp = change in price, and
- ε_p = tobacco price elasticity.



Part A 2

- To estimate the change in retail price of cigarettes we used the formula

- $$p_{cig} = p_{not} + \tau_{esp} + p_{cig} * \tau_{eav} + p_{cig} * \tau_{vat}$$

- where:

- p_{cig} = price of cigarettes,
- p_{not} = price net of tax,
- t_{esp} = specific excise,
- t_{eav} = ad valorem excise, and
- t_{vat} = value-added tax.

- The estimation is made using the weighted average price (WARP), published ones a year RSD 274.24 per pack in 2019




Part A₃

		p_{cig}	p_{not}	t_{esp}	t_{eav}	t_{vat}	tax share	excise share
	initial	274.24	67.28	70.75	90.50	45.71	75.47%	58.80%
Scenario 1	10% increase	288.30	67.28	77.83	95.14	48.08	76.66%	59.99%
	$\Delta 1$	5.13%		10%				
Scenario 2	43.6% increase	335.53	67.28	101.60	110.72	55.92	79.95%	63.28%
	$\Delta 2$	22.35%		43.6%				



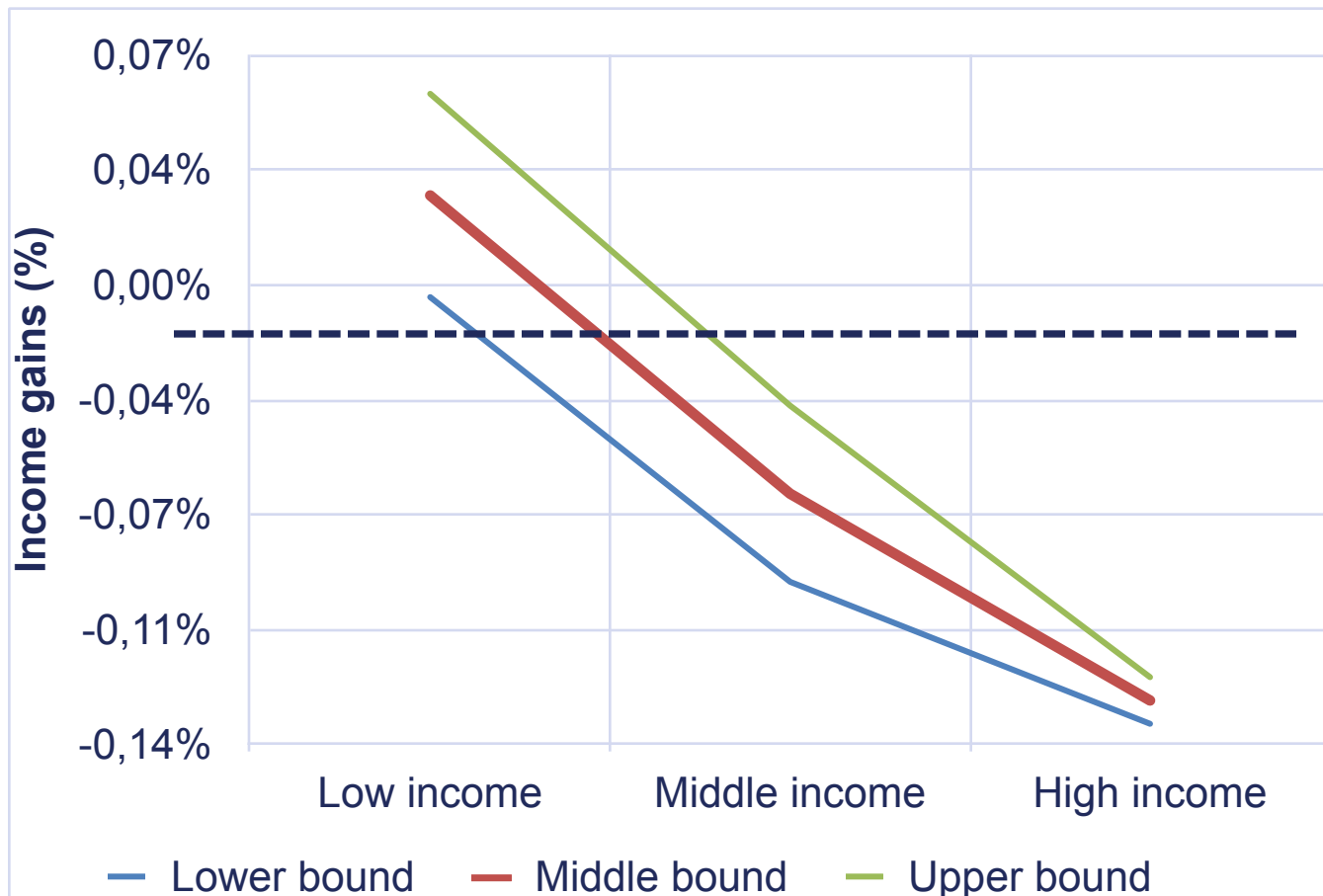
Current smoker prevalence rates by income groups, 2019

Income group	HR	MC	Total
Low	8.2%	36.0%	41.0%
Middle	5.8%	32.6%	36.9%
High	5.1%	30.4%	34.9%
Total	6.4%	33.1%	37.7%

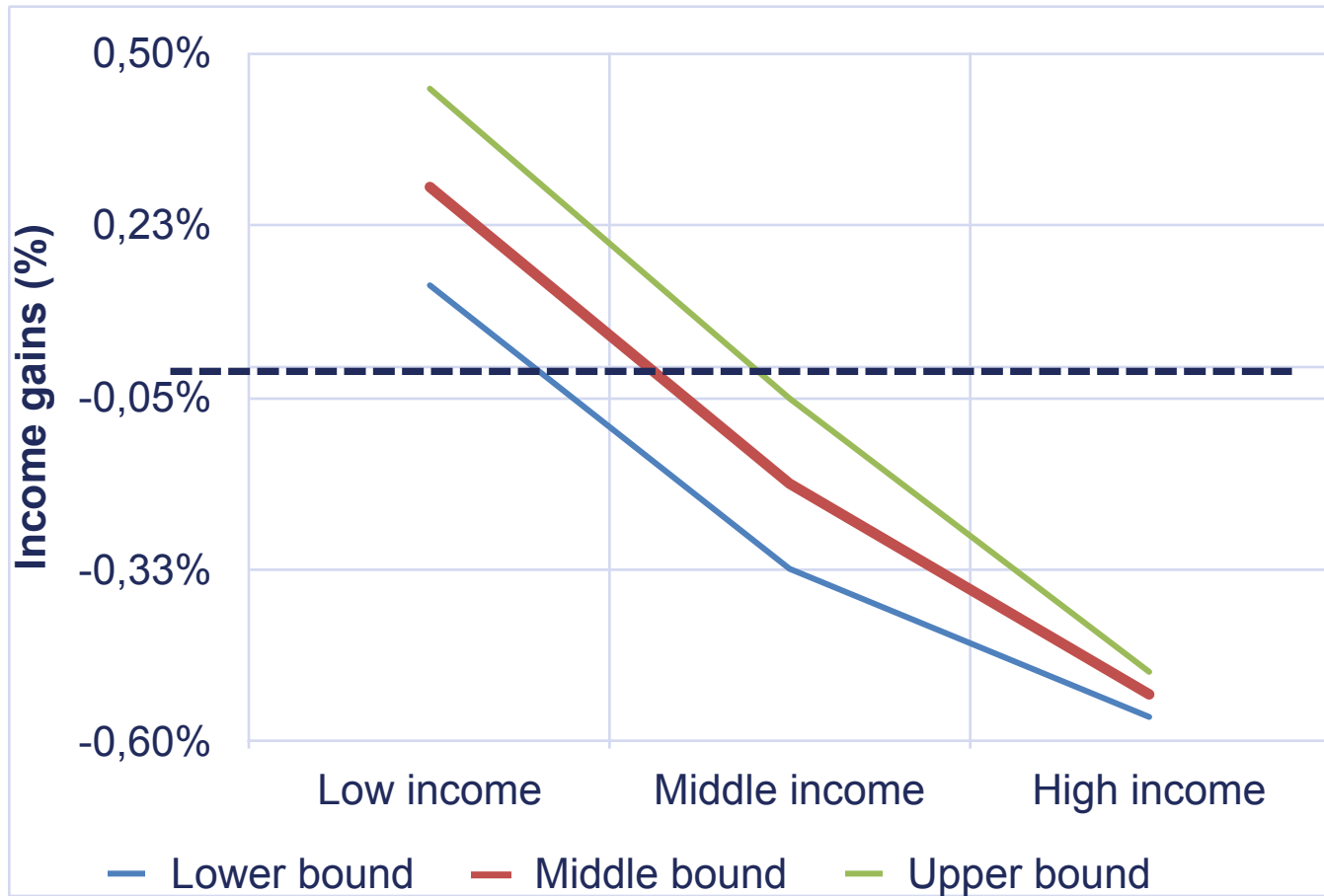
 Income group	Lower bound	Middle bound	Upper bound
Low income	-0.934	-1.076	-1.218
Middle income	-0.496	-0.631	-0.766
High income	-0.179	-0.220	-0.261



Part A – scenario 1



Part A – scenario 2



Part B

- We estimate the change in tobacco-related direct medical expenses in two stages for all tobacco-attributable diseases
 - (based on information on relative risk from the US Department of Health and Human Services (2014)), by gender, age group, and type of illness).
- The data included:
 - a list of smoking-related ICD codes
 - public medical expenditure for treatment of smoking-related diseases from the Republic Fund of Health Insurance by age, gender, and ICD code in Serbia 2019 (**€328 mil.**)
 - estimated out-of-pocket medical expenditures for treatment of smoking-related diseases (40% of total)
 - relative risk (RR) of mortality/morbidity by ICD code from smoking and smoking prevalence to calculate SAF (smoking-attributable fraction)
 - # Data are applied for each age, gender group, and disease type - both for current smokers and former smokers



Part B 2

- We calculated the change in medical expenditures by income groups
 - using mortality RRs as the proxy for morbidity RR (USDHHS, 2014)
 - applying the formula for calculation of SAF on the smoking prevalence rates for current and former smokers (SAF is not the same for current and former smokers) and RRs for each smoking-attributable disease and by gender and age
 - applying SAF on prevalence rates by income groups

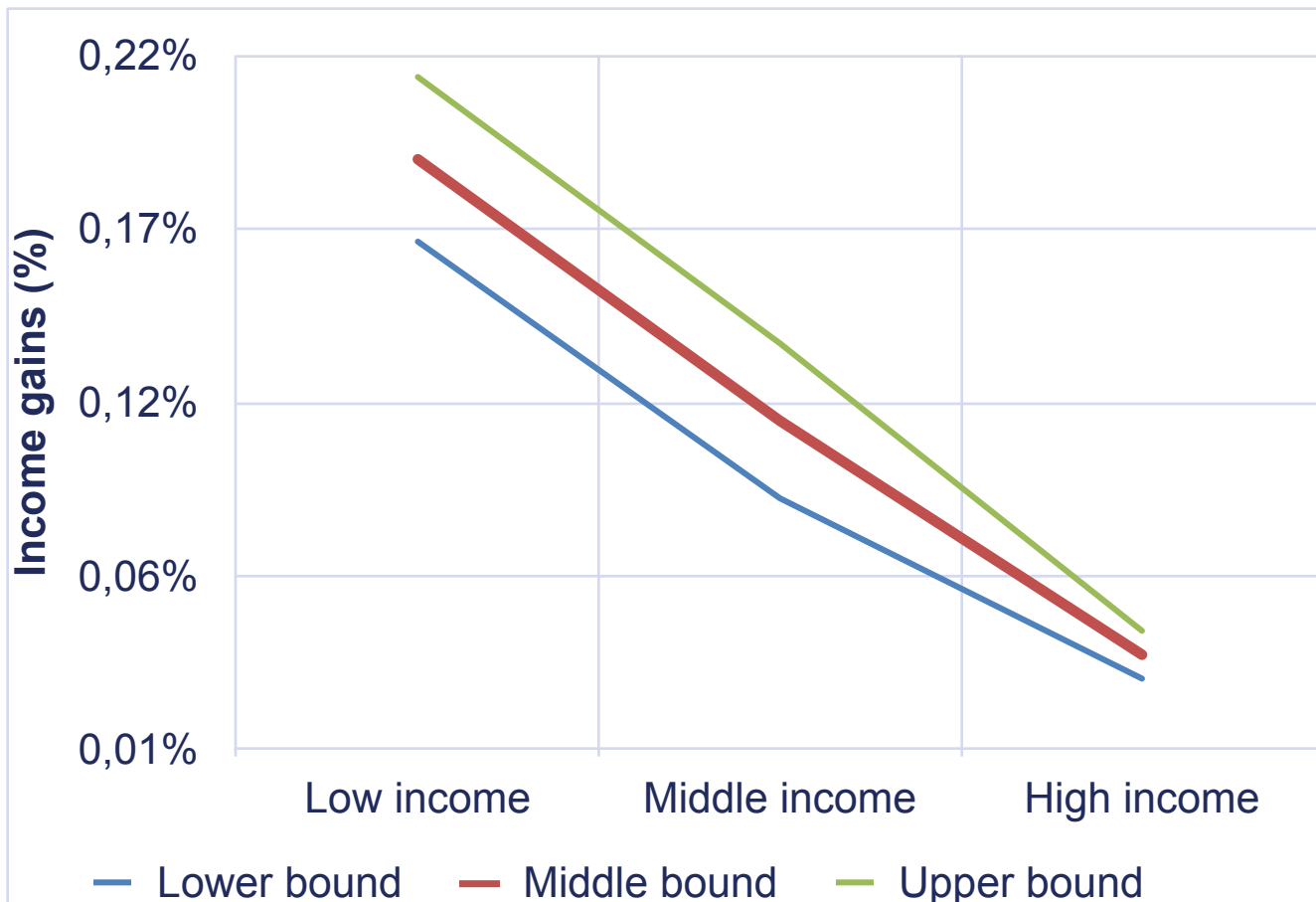


Part B results

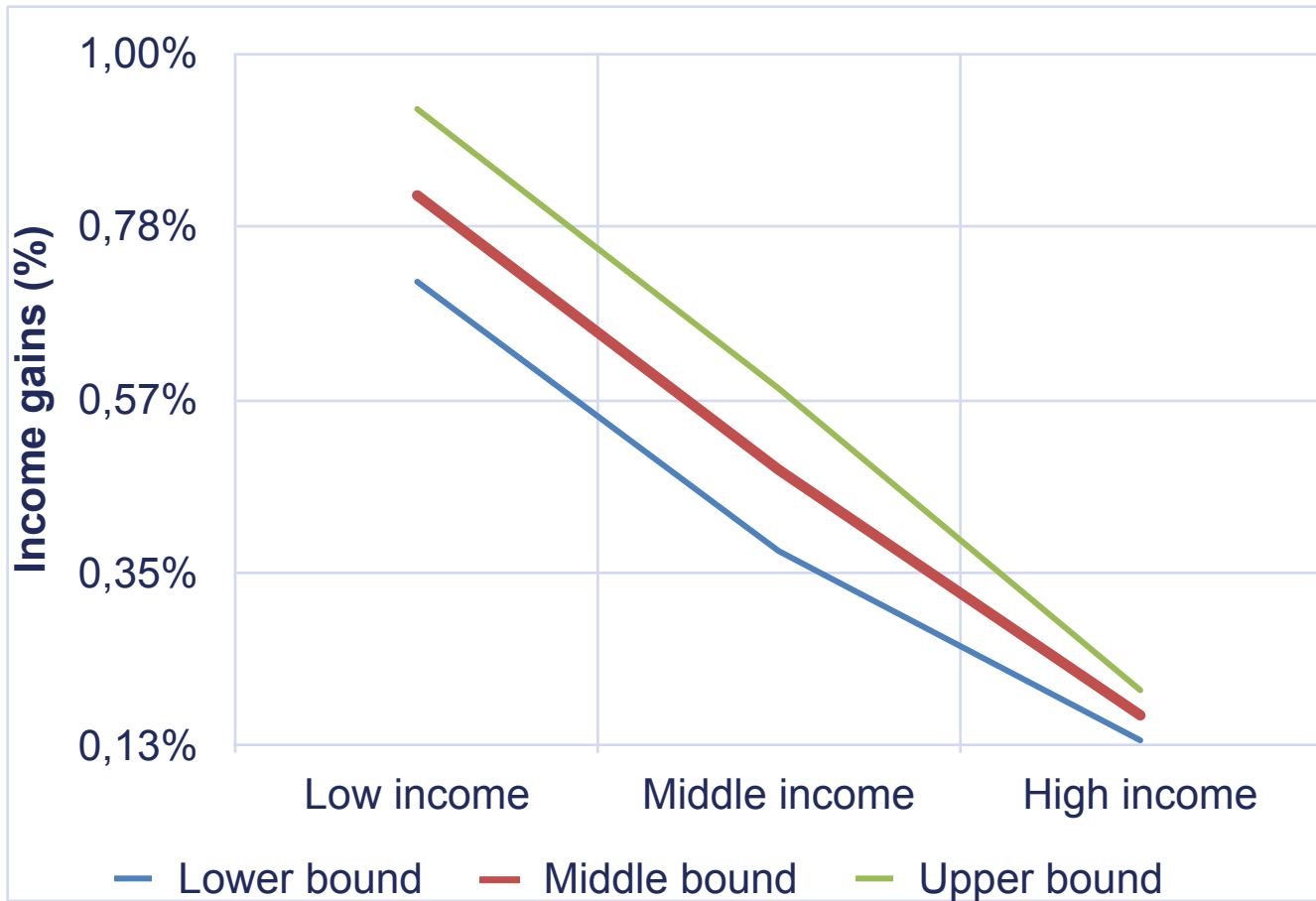
- Positive income gains are obtained in both scenarios, and specifically in the low-income group
- The poorest population group will have more resources after the tax increase, as the reduced prevalence and quantity consumed would lower the incidence of smoking-related diseases and, subsequently, the spending to treat them.



Part B – scenario 1



Part B – scenario 2



Part C

- Additional income earned from increased years of productive life
- We estimated the value of additional income that could be earned by all household members resulting from an increase in the specific excise tax
- The data included:
 - smoking-attributable death events (SAF * total number of deaths from smoking-related diseases)
 - years of life lost among the working population



Part C 2

- Additional income earned is estimated by:
 - Identifying number of deaths among the working population by age group and ICD10
 - Estimating number of years of working life lost (YWLL) by age group using SAF
 - Determining income by age cohorts
 - Calculating effects on income

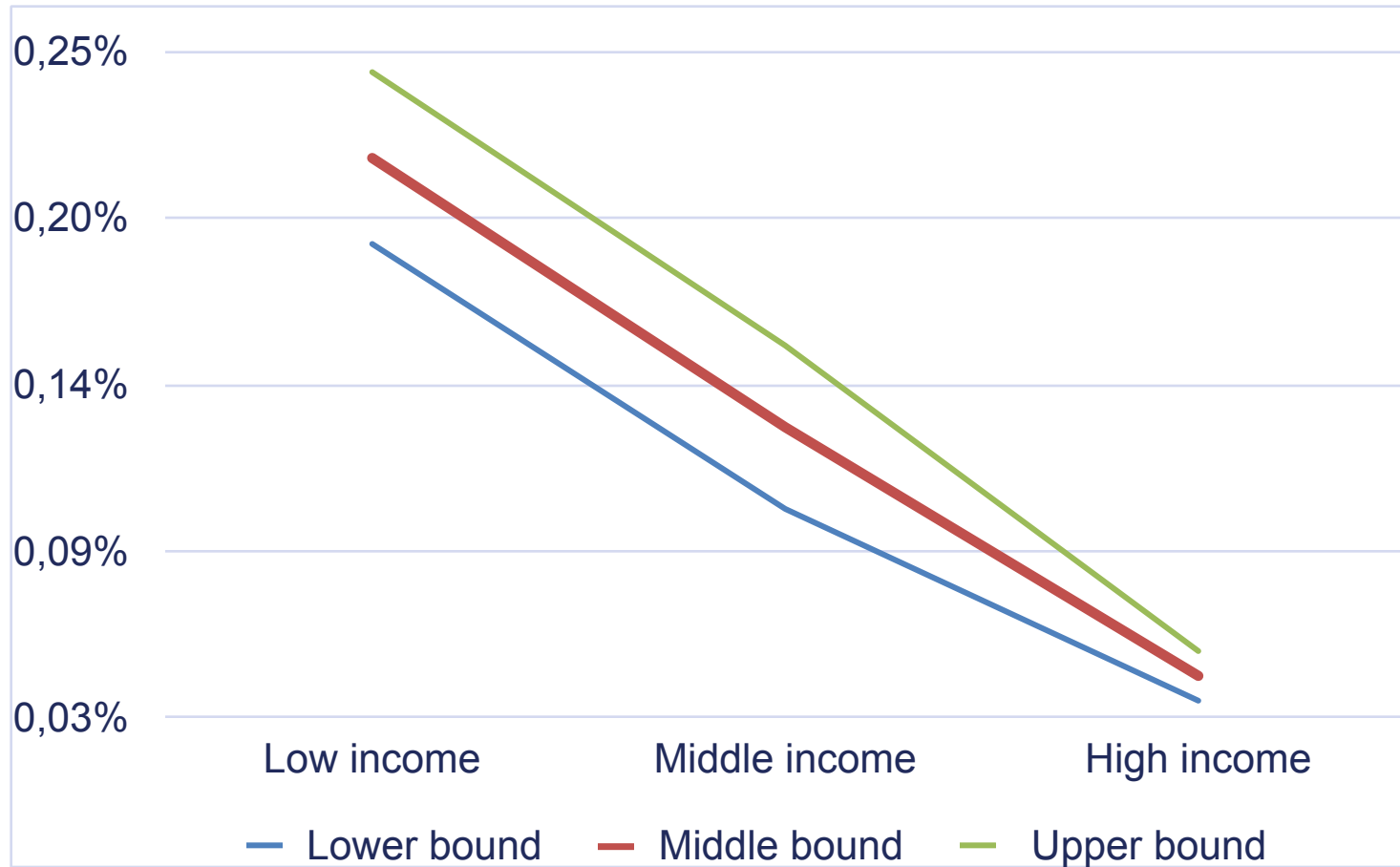


Data

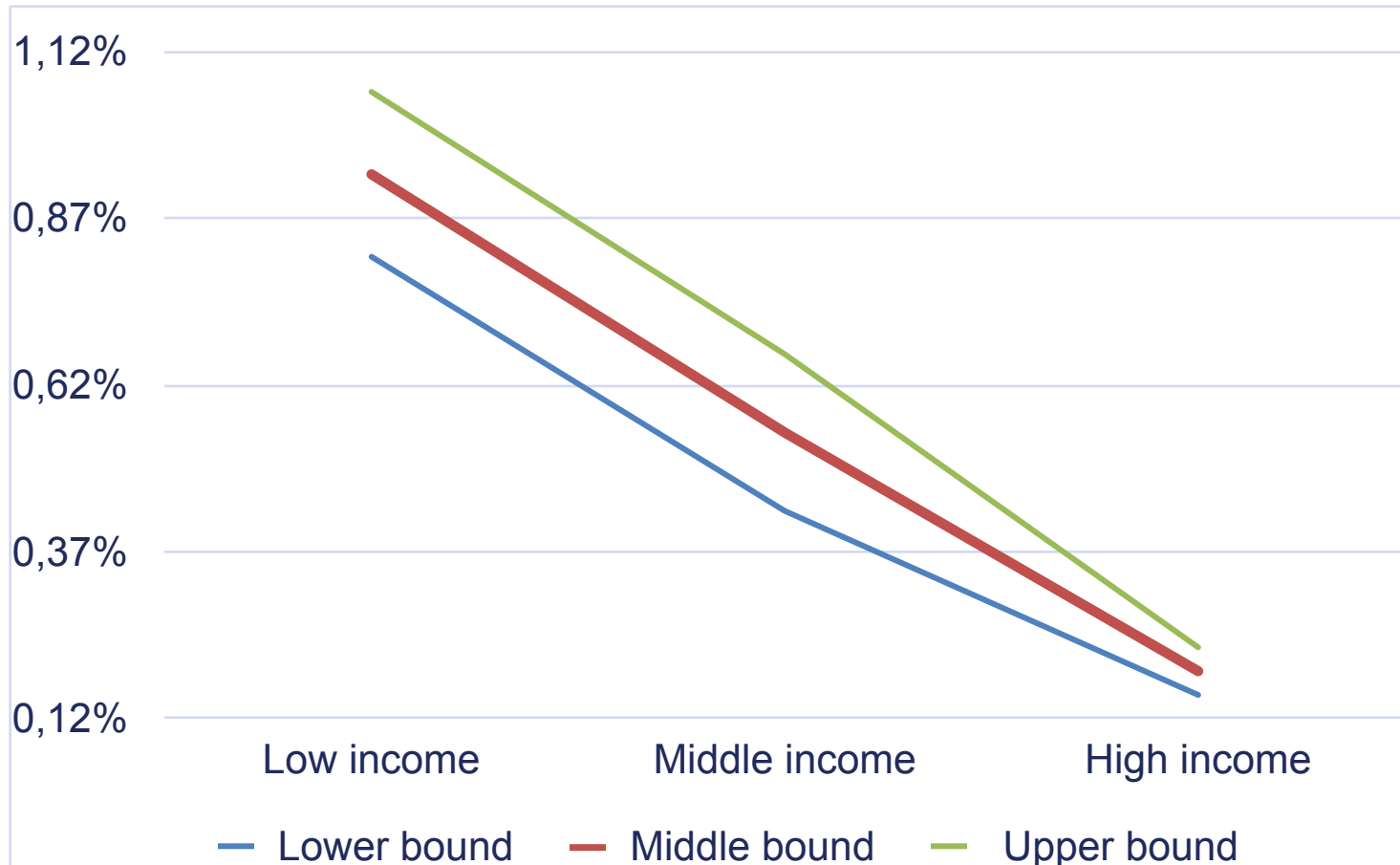
	35-39	40-44	45-49	50-54	55-59	60-64	35-65	65-75	75+	Total
Deaths	57	162	292	622	1,316	2,301	4,751	5,017	6,553	
YWLL	1,604	3,733	5,258	8,086	10,531	6,904	36,117			
YRLL							47,510	21,224	7,089	75,823



Part C – scenario 1



Part C – scenario 2

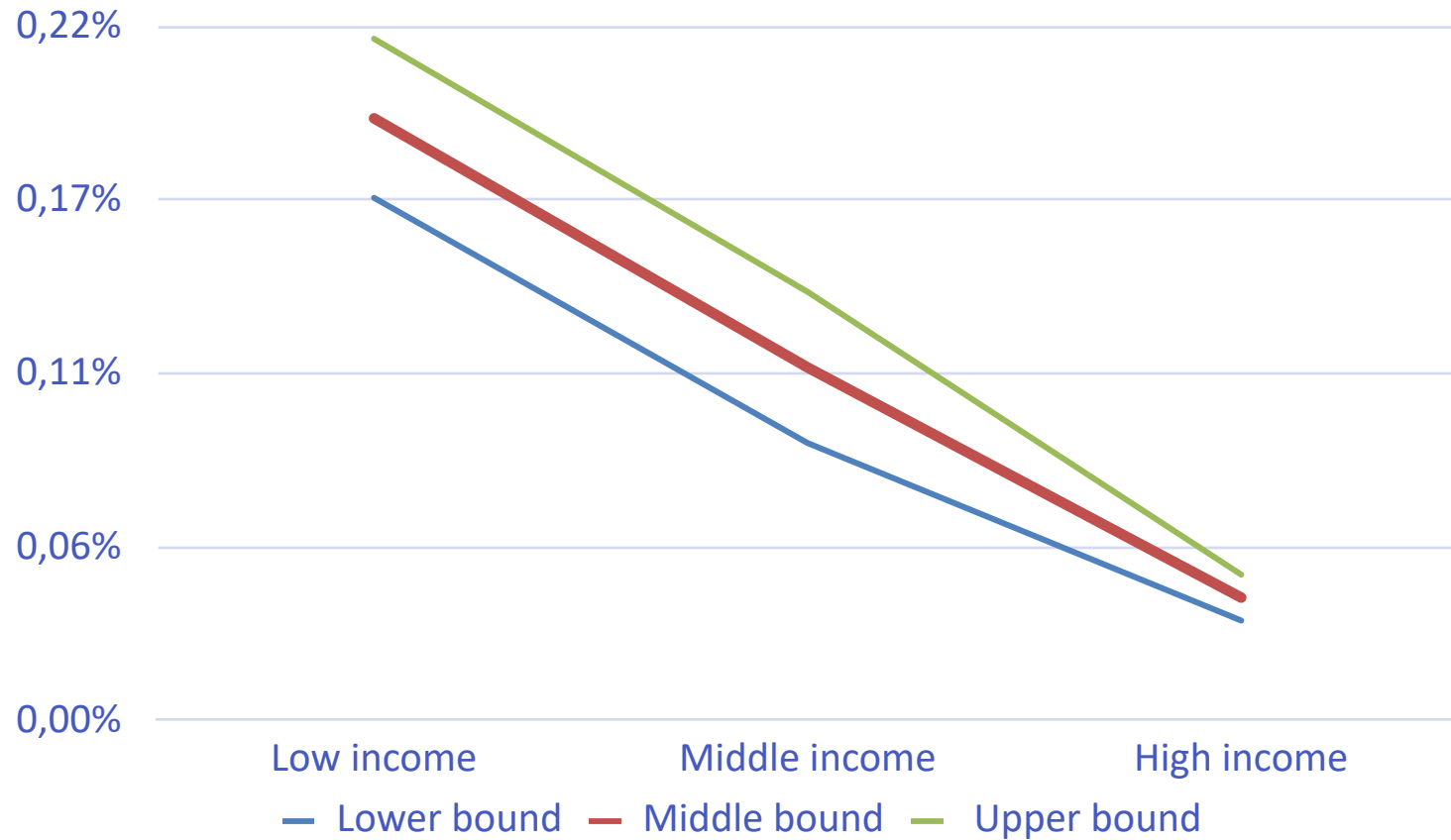


Part C+

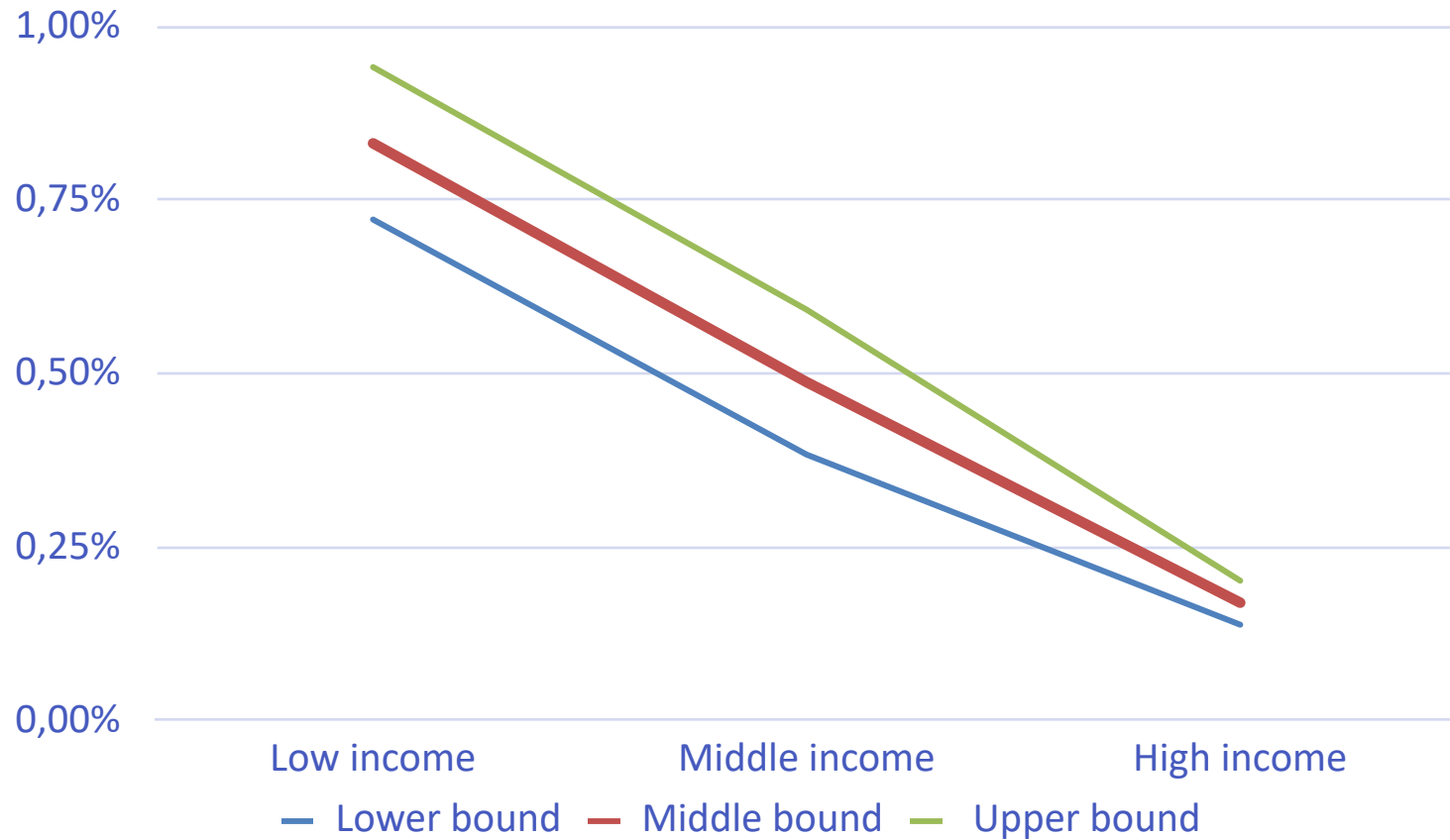
- Additional income earned from increased years of pension income (YRLL)
- We estimated the value of additional pension income that could be earned by all household members resulting from an increase in expected life
- The data included:
 - smoking-attributable death events (SAF * total number of deaths from smoking-related diseases)
 - years of pension life lost among the population up to 75



Part C+ – scenario 1



Part C+ – scenario 2



Net gains

- To estimate the net gains, we sum up the changes in consumption, medical costs, productivity and pensions revenues
- Total income increase by **2.87 percent** for low income and **-0.01** percent for high income group
- Under all assumptions designed in the two scenarios the **income gains are positive**, outweighing the costs, and **tax increase progressivity is confirmed**.



Net gains – scenario 1



Net gains – scenario 2



Net gains summary

- The confirmation of the progressivity of tobacco tax increases
 - the highest gains in disposable income are projected for the low-income group, especially in the case of the higher price increase.
 - In the scenario of a 43.6% specific excise increase the simulated net income gain for low income population magnitude ranges from 2.38 to 3.37%
 - In the scenario of a 10% specific excise increase the simulated net income gain for low income population magnitude ranges from 0.51 to 0.73%
 - For the high-income group, the effect ranges -0.13/+0.14; and -0.03/+ 0.02



Limitations

- All estimations are made **only for manufactured cigarettes**. However, their share in the Serbian tobacco market is 83.1 percent, which is high enough to make general conclusions.
- When increasing cigarette prices, some **substitution** may occur from licit to illicit and from manufactured cigarettes to hand-rolled or novel tobacco products, for which we were not able to control due to lack of data.



Conclusions

- Overall, the **effect of excise increase is positive** for all income groups
- **Raise the specific excise tax in Serbia by at least 43.6 percent**, resulting in the increased retail price by €0.53
 - to reach the EU directive level of an overall excise rate of at least EUR 90 per 1,000 cigarettes in order to effectively reduce consumption and the high prevalence of tobacco use.
- **The poorest group** could have an **increase** in the disposable net income by up to **€193** annually at the upper bound to add to their **€5,718 annual** income



Policy recommendations

- **Raise the specific excise tax in Serbia by 43.6 percent, resulting in the increased retail price by 61 RSD - €0.53**
 - Tobacco excise taxes confirm progressivity - the poorest population would benefit the most from this tax policy, having an increase in the disposable net income by up to 22,623 RSD annually
- **Promote public awareness programs on the health risks and costs of tobacco use**
 - Revenues collected from excise taxes do not cover the externality costs of medical expenses and loss in productivity
- **Ensure strong enforcement of tobacco tax collection to achieve the full benefits of the tax reform to the population**
 - Strong enforcement to minimize illicit sales is critical to efficiently collect taxes and minimize tax avoidance and evasion. This will lead to reduction in tobacco use as well as its negative consequences on health and productivity.

