

Estimation of Price and Income Elasticity of Tobacco Demand in Slovakia¹

Executive Summary

Using a simple policy simulation framework based on estimated price and total expenditure elasticities of cigarette demand, the presented analysis examines recently taken measures to increase taxes on cigarettes. Specifically, the examined change in excise duty, in force as of February 2023, is not expected to decrease cigarette consumption compared to the previous year, although it should increase the tax revenue from cigarettes.

On the other hand, a measure increasing price by 10 percent would be a more effective alternative because it would increase the tax revenue from the excise duty on cigarettes and also decrease consumption of cigarettes compared to 2022 levels. These outcomes would not only have additional positive effects on public health but would also reduce the associated social and economic costs of smoking.

Regardless of the change in the level of consumption, the obtained estimates imply that changes in cigarette demand are predominantly shaped by smokers' adjustment of their personal intake rather than changes in the number of smokers.

The results may also indicate that consumers are prone to substitute smoking for other tobacco alternatives, which might be an argument in favor of the coordination of policy measures regarding the taxation of various tobacco products.

¹ The information summarized in this policy brief is derived from a working paper titled Estimation of Price and Income Elasticity of Demand for Tobacco Cigarettes in Slovakia conducted by the Institute of Economic Research in Bratislava, Slovakia.

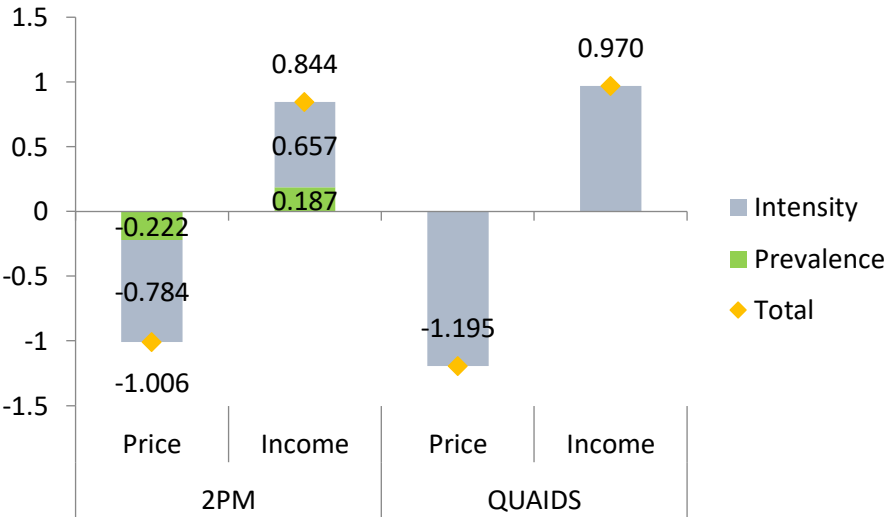
Background and Objective

Following an extended period of relatively mild adjustments to the excise duties on tobacco products, in 2020 the Slovak Government initiated a more substantial, yet gradual, increase in tobacco taxes over the years 2021–2023. Given this renewed attention to tobacco taxation from policy makers, it is the aim of the presented analysis to update the general understanding about cigarette demand in Slovakia.

Results

Drawing upon the 2020 Slovak Household Budget Survey, two alternative approaches were used to provide a measure of own-price and total expenditure elasticities of cigarette demand.

Figure 1. Total cigarette consumption elasticities based on 2PM and QUAIDS estimates



Source: Authors' estimates based on 2020 Slovak HBS data

The results of both approaches tend to converge to a similar conclusion of considerably high price elasticity. Following suit, total expenditure elasticity of cigarette demand also appears formidable, with potential to counteract the reactions of the demand to price increases. This points towards the need for taxation policy to target the affordability of tobacco products. Simple simulations were carried out in this regard to outline potential effects of changes to cigarette prices driven by adjustments to the corresponding excise duty.

The results of simulations presented in Table 1 refer to hypothetical scenarios in which an increase in cigarette prices is entirely driven by an increase in excise duty on cigarettes. In such a case, a 10-percent increase in cigarette prices, driven by an increase in the excise duty by about 13.8 percent, would decrease the consumption of cigarettes roughly by 1.7–2.3 percent and increase the corresponding public budget

revenue by about 11.1–11.9 percent. For a more specific and realistic scenario, we prepared a simulation of a historical cigarette specific duty change, which occurred in February 2023, presented in Table 2.

Table 1. Impact of price on consumption and public finance

		Price per pack	Consumption		Tax revenue	
		(EUR)	(Mil. packs)	(% change)	(Mil. EUR)	(% change)
Baseline		4.25	316.6		811.4	
2PM	Price shock	New price				
	10%	4.67	311.2	-1.7%	907.7	11.9%
	25%	5.31	263.4	-16.8%	908.3	11.9%
QUAIDS	Price shock	New price				
	10%	4.67	309.1	-2.3%	901.8	11.1%
	25%	5.31	252.4	-20.3%	870.3	7.3%

Source: Authors' calculations

In the real-life scenario in Table 2, the specific duty on cigarettes changed from EUR 79.3 per 1000 cigarettes in 2022 to EUR 84.6 per 1000 cigarettes in February 2023—that is, by 6.7 percent, which, along with an average net of taxes price increase by 7.68 percent,² contributed to the following results:

- increase in the average price of one pack of cigarettes from EUR 4.249 to EUR 4.55, or by 7.07 percent;
- increase of the total excise duty from EUR 2.563 per pack of cigarettes to EUR 2.738 per pack of cigarettes, or by 6.84 percent;
- increase in the demand for cigarettes by 1.2 percent compared to the previous year. The increase in price was insufficient to counteract the positive effect of the expected average annual increase in total household consumption by 9.9 percent on cigarette consumption and, thus, resulting in slight net increase in consumption;

² Average growth over period of 2019–2022.

- increase the total revenue from excise duty on cigarettes by 8.1–8.2 percent compared to the previous year.

Table 2. Simulation: Specific duty increase from February 2023

		Unit price per pack (EUR)	Percentage duty per pack 23% (EUR)	Specific duty per pack (EUR)	Total excise duty per pack (EUR)	VAT per pack (EUR)	Net of tax (NOT) price per pack (EUR)	Consumption (Mil. packs)	Tax revenue (Mil. EUR)
2PM	2022	4.249	0.977	1.586	2.563	0.708	0.978	316.568	811.392
	2023	4.550	1.046	1.692	2.738	0.758	1.053	320.496 (+1.2%)	877.643 (+8.2%)
								Change	66.251
QUAIDS	2022	4.249	0.977	1.586	2.563	0.708	0.978	316.568	811.392
	2023	4.550	1.046	1.692	2.738	0.758	1.053	320.214 (+1.2%)	876.869 (+8.1%)
								Change	65.477

- Source: Authors' calculations

The key takeaways from these findings are following:

1. Increasing cigarette prices proportional to gains in living standards, in terms of total consumption, might be necessary to prevent further proliferation of the absolute amount of cigarette packs sold.

The considerable extent of the total expenditure elasticity of cigarettes demand indicates that annual increases in the total household consumption, which are, apart from other drivers, most likely a result of the economic growth, would alone cause a gradual rise in absolute cigarette consumption. Based on the relative vicinity of magnitudes of own-price and total expenditure elasticities of cigarette demand, appropriately setting tobacco excise duties might be an avenue to manage or avert such a trend. Therefore, if policy makers aim to dampen the overall cigarette demand in Slovakia, in an effort to reduce the health care risks of the population and associated social and economic costs, the excise duty on cigarettes should be set at levels that would raise cigarette prices at least proportionally to the growth of total household consumption.

2. There is room within policy measures to increase cigarette excise duties before any negative effects are observed on corresponding tax revenues.

Since the simulations for the real-life scenario suggest that the increase in prices at 6.8 percent appears to be insufficient, higher excise duty rates can be justified if reducing cigarette demand is the aim of the policy measure. Levels of excise duty that result in an increase of cigarette prices by 10 percent are projected to maintain the expected level of tax revenue or even surpass it, while achieving a reduction in cigarette consumption, which most likely provides additional benefits in terms of improving public health as well as reducing associated social and economic costs. Expected additional revenues could be primarily invested in targeted health programs.

Although hypothetical scenarios suggest that an increase in cigarette prices by 25 percent should be sufficiently far off from any potential risk of decreasing the revenues obtained from excise duties on tobacco, one should bear in mind that this is based on the assumption that the change in price is entirely driven by the change in taxation. In reality this is rarely the case, as there are other factors at play as well as the tendency of manufacturers to create a so-called cushion in prices for such shifts. It is, therefore, important for the government to plan the excise calendar efficiently to generate money and reduce consumption, by including not only price but also non-price measures.

3. Despite the expected relative decrease in overall cigarette demand due to the increase in excise duty, only a minor share of that is likely to come from smoking cessation.

Given the relation between obtained values of own-price elasticity of cigarette demand at intensive and extensive margins, it may be assumed that most smokers will reconcile with increased cigarette prices by limiting their cigarette consumption rather than permanently quitting smoking. Nevertheless, smokers also have several types of alternative products such as smokeless cigarettes, heated tobacco, vape, and nicotine pouches, with which they can indulge their addiction. Cigarette taxation, thus, might be a more effective tool for curbing excessive individual dosages rather than for stimulating smoking abstinence. The analysis performed is based on the available data for year 2020 only, which limits the depth and robustness of the estimated elasticities.

4. The results confirm the validity of a more comprehensive approach towards taxation of tobacco products.

Although the examination of a broader range of tobacco products was not conducted within the performed analysis, the relatively high own-price elasticity of cigarette consumption may imply already present tendencies to substitute cigarettes for some of the recently introduced alternatives. Specifically, alternative products such as e-cigarettes, heated tobacco products, and nicotine pouches have become more common in recent years. Therefore, cigarette excise duty changes should not be made

in isolation and should be accompanied by simultaneous excise duty change on these products, which would prevent substitution from one form of smoking to another.

Policy Recommendations

If policy makers are interested in curbing cigarette demand in Slovakia to incentivize healthier lifestyles for the population, the results suggest that a further increase in cigarette excise duty above the rate set in February 2023 would be required to decrease aggregated cigarette consumption below 2022 levels.

If policy makers aim to maximize tax revenue, setting the rate of the excise duty on cigarettes higher than it was in February 2023 may provide an additional stream of funding to the public budget. However, in such a case the space of viable tax rates appears to be naturally more restrictive than when the primary target is limiting cigarette demand.

Acknowledgments

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