On the analysis of tobacco tax reforms in Argentina[♣]

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Key messages

- **Tax increases reduce tobacco consumption, and the reduction is relatively larger among low-income households.** In Argentina, a 10% increase in cigarette prices would decrease consumption by 7.5% for less affluent smokers and by 4.9% for the more affluent ones. As less well-off individuals reduce consumption relatively more, they bear a relatively lower tax burden from higher taxes. Thus, tobacco tax increases in Argentina are not regressive as is often believed.

- **Tobacco tax increases are not regressive.** When considering income group-specific responsiveness to price increases, the distributive incidence of increasing tobacco taxes does not appear to have changed substantially. The short-term impact can be progressive and the medium-term and long-term effect of increasing tobacco taxes benefits lower income groups the most.

- **Using its statutory power, the Ministry of Economy can reduce cigarette consumption by approximately 11% and increase the total tax collection on tobacco products by about 10% (or 0.05% of GDP).** Simulations show that increasing the ad valorem rate of the internal tobacco tax from 70% to 75% would increase cigarette prices by 18%. Increasing cigarette taxes would make cigarettes less affordable, decrease consumption, and boost tax revenues.

- **Reforms of the current tax structure can be implemented through different tax designs.** Higher tax collection and lower consumption can be obtained not only by increasing the ad valorem rate of the current internal tax but also by modifying the current tax structure through the implementation of a specific tax assessed per package.

    - Under a unique specific tax per pack of $ 99.37, the retail price would increase by 15% and consumption would drop by 9.3%. This would generate an increase of around 8.5% in total tax collection (0.04% of GDP).
    - Combining a specific tax per pack of $ 99.37 with the ad valorem component (20%), the retail price would increase 41.6% and consumption would drop 25.8%. This would generate an increase of around 15% in total tax collection (0.08% of GDP).

Executive Summary

Tobacco use imposes high economic costs in terms of direct medical care as well as losses in productivity (WHO, 2015). To effectively reduce tobacco consumption, governments around the world implement tobacco control policies, including regulations to protect the public from tobacco smoke, programs to assist those who want to quit, awareness campaigns publicizing the dangers of tobacco, marketing restrictions and bans, and increased taxes on tobacco products. Among these policies, tobacco taxes are the single most effective and cost-effective instrument to reduce smoking.

How much tobacco consumption decreases after a price increase depends on the tobacco price elasticity (i.e., the responsiveness of the demand for tobacco to a change in its own price, holding all else equal). Thus, price elasticities are relevant for the evaluation of reforms that aim to increase tobacco taxes. For example, if tobacco consumption is price-inelastic (i.e., the consumption decrease is proportionally less than the price increase), higher taxation can also increase fiscal revenues. In addition, if individuals across the income distribution exhibit different price elasticity of demand for tobacco products, the common objection on tobacco taxes regressivity (since less affluent smokers incur proportionately greater expenditures on cigarettes compared with more affluent smokers) likely does not hold. Those individuals with higher elasticity will decrease consumption relatively more against price hikes and will bear relatively less tax burden. If those individuals are the less affluent, then a tax increase is likely to be progressive (Verguet et al., 2020; Cruces et al., 2022).

The tax structure on cigarette consumption in Argentina is very complex with different taxes levied on different tax bases. There are four federal taxes affecting cigarettes: i) the additional emergency tax (IAE); ii) the value-added tax (VAT); iii) the Special Tobacco Fund (FET); and iv) the internal tax (II). The tax burden under the actual tax structure for a pack of 20 cigarettes with the average retail price (e.g., $ 147.69 -in force in May 2021) is 76.6%. In 2020, the total tobacco tax collection was approximately USD 1.9 billion. This represents approximately 2% of total tax collection and 0.5% of GDP.

Despite relatively large recent increases in taxation of tobacco products in Argentina, cigarettes are still among the cheapest and more affordable in the region. In this report, we revisited the price elasticities of demand for tobacco in Argentina estimated in Cruces et al. (2022) to analyze the impact of a tax reform on retail price, change in consumption, tax burden and revenue

collection. We analyze the effect of increasing tobacco taxes assuming the same elasticity for all the income groups and income-specific price elasticity for a set of potential tax reforms.

In this report we develop a tobacco tax simulation, and two alternative reform scenarios. One scenario proposes to raise the ad valorem rate of the II tax from 70% to 75%. A second scenario proposes to modify the structure of the II tax by establishing a unique specific fixed tax (i.e., replacing the ad valorem rate by a fixed specific rate) of $ 99.37 per pack plus an ad valorem component (in three sub-scenarios, we consider alternatives, from of zero to 20%). The results of the simulations are summarized in Table 1.

Table 1. Effect of increasing cigarette taxes in Argentina. Percentage change in price, consumption, and tax collection. Base May 2021.

	Scenario 1 MoF Statutory power	*Scenario 2 Tax reform*		
Variation in	Scenario 1 Internal tax to 75%	Scenario 2a Internal tax $ 99.37 per-pack	Scenario 2b Internal tax $ 99.37 per pack + ad valorem rate of 10%	Scenario 2c Internal tax $ 99.37 per pack + ad valorem rate of 20%
Cigarette prices	18.3%	15.0%	26.8%	41.6%
Consumption (packs)	-11.3%	-9.3%	-16.6%	-25.8%
Total tax collection	9.8%	8.5%	12.5%	14.5%
II tax collection	14.0%	12.0%	18.3%	22.5%

Source: own elaboration based on Cruces et al (2022) and the CEDLAS tobacco tax simulation.

While scenario 1 increases the retail price by 18.3%, when implementing only a specific tax of about 100 pesos, cigarette price increase 15%. Considering the same elasticity of demand for all the income groups (average elasticity -0.6), the drop in consumption would be 11.3% and 9.3% respectively. The total tax burden on cigarettes increases from 76.6% in the current pre-reform context up to 80.3% in scenario 1 and 79.7% of the retail price on scenario 2, and total tax collection on tobacco products increases by around 10% (0.05% of GDP). However, when the fixed specific tax is combined with an ad-valorem rate of 20%, the retail price increases by 41.6%, generating drops in consumption of 25.8%. The total tax burden as a percentage of the retail price would be 85.5%. The newly raised tax collection in II would increase by 22.5% while the total tax collection would increase by 14.5%. Under this structure, tobacco tax collection would represent 2.3% of total tax collection and 0.58% of GDP.

One of the main concerns for implementing higher tobacco taxes is the potential impact on poor smokers. To evaluate the impact of these potential tax hikes we analyze the distributional impacts considering income-specific elasticities. Specifically, we simulate the change in tobacco expenditures as result of the tax increase obtained in the tax simulations. When considering income group-specific price elasticity of demand for cigarettes, higher tobacco taxes have a neutral impact on the income distribution. That means the proposed tax increases are not regressive.

The impact on income distribution would depend on the income-specific elasticities and the tax reform implemented. If Argentina implements a tax increase as described in scenario 1, the impact would be neutral. But with reform 2, the tax increase will be progressive. Thus, our evidence shows there is still room for increasing tobacco taxes, reducing tobacco consumption, reducing health costs, increasing revenue collection, and, at the same time, and improving the income distribution (Cruces et al., 2020 and 2022).

The report provides relevant tools for policymakers and the public debate on potential reforms to tobacco taxation in Argentina, showing how higher tobacco taxes can affect tobacco prices, consumption, and the generation of additional fiscal resources. Finally, it contributes to the discussion on the arguments that commonly block the possibilities of reforming the current tobacco tax structure, showing that alleged regressivity from increasing tobacco taxes is not the empirical reality.

1. Introduction

Tobacco use imposes high economic costs in terms of direct medical care as well as losses in productivity (WHO, 2015). Thus, to reduce this economic and public health problem, in 2014 the World Health Assembly adopted the global target of a 30% relative reduction in the prevalence of tobacco use by 2025, as part of the monitoring framework for noncommunicable diseases.[1] To achieve this target, governments around the world implement tobacco control policies, including regulations to protect the public from tobacco smoke, programs to assist those looking to quit, awareness campaigns publicizing the dangers of tobacco, marketing restrictions and bans, and increased taxes on tobacco products. Although increasing tobacco taxes is the single most cost-effective instrument to reduce smoking, it is the least adopted.[2] The World Health Organization's (WHO) guide on best practices recommends that total taxes on tobacco products should be at least 75% of the retail price and that it is preferable to focus on excise taxes, since they are the component that most influences the relative price of tobacco (WHO, 2021a). Specifically, the WHO (2010) technical manual on tobacco tax administration recommended making excise taxes account for at least a 70% share of excise taxes in the retail price of tobacco products. However, these suggestions are rarely implemented (WHO, 2015).[3]

Worldwide evidence shows that tax increases reduce overall tobacco consumption, lead current users to quit, prevent youth from taking up tobacco, and reduce health and economic consequences (WHO, 2021a). In turn, the effect of taxes to reduce tobacco consumption can be heterogeneous according to the income level of the countries, the income of smokers and their age, among other factors. How much tobacco consumption changes against higher prices depends on the price elasticity of demand for tobacco (i.e., the responsiveness of the demand for tobacco to a change in its own price, holding all else equal), which is a key parameter to evaluate reforms on tobacco taxation. If tobacco consumption is price-inelastic (i.e., the consumption decrease is proportionally less than the price increase) higher taxation can also increase fiscal revenues (Ranson et al. 2000; Gonzalez-Rozada, 2006; Rodriguez-Iglesias et al., 2017).

[1] The World Health Assembly is the decision-making body of WHO. It is attended by delegations from all WHO Member States and focuses on a specific health agenda prepared by the Executive Board. The main functions of the World Health Assembly are to determine the policies of the Organization, appoint the Director-General, supervise financial policies, and review and approve the proposed programme budget. The Health Assembly is held annually in Geneva, Switzerland

[2] See WHO (2017); Laxminarayan and Ashford (2008); Asaria et al. (2007); Ranson et al. (2000).

[3] See also the guidelines for implementation of Article 6 of the WHO Framework Convention on Tobacco Control.

Furthermore, if individuals across the income distribution exhibit different price elasticity of demand for tobacco products, the common objection about the regressivity of increasing tobacco taxes (large increases in price -as a consequence of higher taxes- lead less affluent smokers to incur proportionately greater expenditures on cigarettes compared with more affluent smokers, Verguet et al., 2020) likely does not hold. Those individuals with higher elasticity will decrease consumption relatively more against price hikes and will bear relatively less tax burden. If those individuals are the less affluent, then a tax increase is likely to be progressive (Verguet et al., 2020; Cruces et al., 2022).

In this report we use the price elasticities of demand for tobacco in Argentina, estimated in Cruces et al. (2022), to analyze relevant aspects of potential tax reforms and their distributional impacts. On the one hand, a tobacco tax simulation is developed, and two different reform scenarios are presented focusing on tobacco tax burden and tobacco tax collection. One scenario proposes to raise the ad valorem rate of the II tax from 70% to 75%. A second scenario proposes to modify the structure of the II tax by establishing a unique specific fixed tax (i.e., replacing the ad valorem rate by a fixed specific rate) of $ 99.37 per pack plus an ad valorem component (in three sub-scenarios, we consider alternatives, from of zero to 20%). The level of this specific tax can be set according to the economic costs of smoking, in terms of direct medical care that tobacco use imposes. We also analyze the implications of income group-specific elasticities for the distributional impacts of tobacco taxes. Specifically, we simulate -at the consumer level- changes in tobacco expenditures against a tax hike considering different values of the price elasticity of demand for tobacco and the price changes resulting from the tax simulation. We assume first that all consumers have the same price elasticity and second that consumers have an income group-specific price elasticity.

The remainder of the report is structured as follows. Section 2 presents the related literature. Section 3 describes tobacco consumption in Argentina. Section 4 describes data and methods. Results are presented in Section 5. Final comments are presented in Section 6.

2. Related literature

There exists a robust literature on the price elasticity of demand for tobacco products (Verguet et al., 2020). In HICs, price elasticity ranges from -0.2 to -0.5, with most clustered around -0.4. In

LMICs, users are at least as responsive, and often more responsive[4] to prices than in HICs (Chaloupka et al., 2012). For Latin American and Caribbean (LAC) countries, price elasticity is likely below -0.5 (Guindon et al., 2015), but some studies support higher values. Paraje et al. (2020) find an elasticity of -0.77 for El Salvador; Chavez (2016) -0.87 for Ecuador; and Gonzalez-Rozada and Ramos-Carbajales (2016) -0.73 for Peru. Evidence for Argentina can be found in Gonzalez-Rozada (2006); Martinez et al. (2015); Rodríguez-Iglesias et al. (2017); Gonzalez-Rozada (2019); Cruces et al. (2020; 2022); and Gonzalez-Rozada (2020). The long-term price elasticity of cigarettes ranges between -0.26 and -0.44. Short-term price elasticity ranges between -0.15 in Martinez et al. (2015) and -0.91 in Gonzalez-Rozada (2020).

Heterogeneity on the price elasticity of demand for tobacco is supported when grouping individuals by income level. Lower-income groups are usually more price responsive than higher-income groups (Farrelly et al., 2001; Colman and Remler, 2008; NCI and WHO, 2016; Verguet et al., 2020). For Argentina, Gonzalez-Rozada (2019) finds a price elasticity of -0.35 (-0.21) for the poorest (richest) individuals.[5] Cruces et al. (2020; 2022) show that while the elasticity for a person with the average income in Argentina is -0.62, this value is -0.78 for someone in the poorest decile. An individual in the richest decile of income distribution has a price elasticity of -0.44. Nargis et al. (2015) for Bangladesh support that the elasticity for people belonging to lower (higher) socioeconomic status is -0.75 (-0.36). Similar results are documented by Selvaraj et al. (2015) for India and Choi (2016) for Korea. In line with evidence for low- and middle-income countries, evidence for Latin American countries can be found in CIEP (2020); IEP (2020); CIAD (2020); UCB (2020). Based on different empirical studies, Verguet et al. (2020) support the idea that price elasticity could vary from -1.0 to -0.2 for poor and rich individuals, respectively. In this context, our findings regarding price elasticities by income groups are in line with existing literature.

Several studies had examined the role of income group-specific price elasticities in terms of the distributional implications of tobacco taxes. Remler (2004) qualitatively demonstrates that a tax increase can be progressive for certain income groups in price elasticity of demand for tobacco. Recently, Verguet et al. (2020) developed a mathematical model that finds that for sufficiently

[4] For example, Selvaraj et al. (2015) remark that estimates from LMIC range from −0.50 to −1.00. NCI-WHO (2016) indicates that most estimates fell between –0.2 and –0.8.

[5] Among all the contributions for Argentina, Gonzalez-Rozada (2019) is the only one that uses microdata from household surveys. He uses the Global Adult Tobacco Survey (GATS) combined with the same methodology of this research. Thus, our paper differs from Gonzalez-Rozada (2019) in the source of microdata and in the analyzed time period. The GATS is from 2012 and the ENGHo is from 2004/05.

large price elasticity of demand for tobacco, the distribution in net cigarette expenditures could be progressive. The trend toward more progressive tobacco taxes may be heightened when considering the long-run effects of a tax increase (Vulovic and Chaloupka, 2020). For example, if higher taxes discourage consumption, households can expect to save on future medical expenses associated with smoking-related diseases, and they can also expect an increase in lifetime earnings due to a lower risk of premature death. As lower-income households consume relatively more tobacco, savings in medical expenses and increases in future labor income will be relatively greater for them. When these factors are considered, increasing tobacco taxes could be a progressive policy (Fuchs and Meneses, 2017). In this context, and even when we do not consider long-run effects, our results do not support regressivity of increasing tobacco taxes. This is an important result since several studies that previously examine the distributional incidence of taxes in Argentina indicate the regressivity of tobacco taxes (e.g., Fernandez Felices et al., 2014). [6]

3. Tobacco consumption in Argentina

Consumption. In Argentina, there are 9 million smokers (over a total population of 45 million inhabitants) and tobacco consumption causes 45 thousand deaths per year (Alcaraz et al., 2020). Since 2011, the prevalence of tobacco use (i.e., cigarettes) has diminished. According to the latest National Survey of Risk Factors (ENFR for its acronym in Spanish), in 2018 the prevalence of cigarette consumption[7] in the adult population was 22.2%, 7.5 percentage points below the prevalence registered in 2005. This prevalence in cigarette consumption was 26.1% for men and 18.6% for women, while the lowest prevalence was observed in the two age extremes (under 25 years and 65 years and over). According to the level of education, those with incomplete secondary level had a higher prevalence (26.1%) than those with complete secondary and more (20.1%).

The average cigarette consumption during 2020 was 140 million packs per month. Consumption is mostly concentrated (97.2% of current smokers) on manufactured cigarettes that have few substitute products (e.g., the consumption of bidis, gutka, or loose tobacco is not common

[6] Fernandez Felices et al. (2014) do not analyze the effects of increasing tobacco taxes. The authors only estimate the distribution of tobacco tax burden across income deciles. The tax burden is estimated on smokers' tobacco expenditure. Since less affluent smokers incur proportionately greater expenditures on cigarettes compared with more affluent smokers, the tax burden is relatively higher at the bottom of the income distribution.

[7] Defined from those who smoked more than 100 cigarettes in their lifetime and who currently smoke cigarettes.

in Argentina). Argentina ranks 68 out of 176 countries, in terms of how cheap it is to consume cigarettes (WHO, 2021b).

Taxation. The tax structure on cigarette consumption in Argentina is very complex (Gonzalez-Rozada, 2020). There are four federal taxes affecting cigarettes:

i) the additional emergency tax (IAE), with a rate of 7% of the retail price (RP);

ii) the value-added tax (VAT) with a rate of 21%.

iii) the FET with a rate of 8.35%- and a fixed additional component per cigarette pack-[8]; and

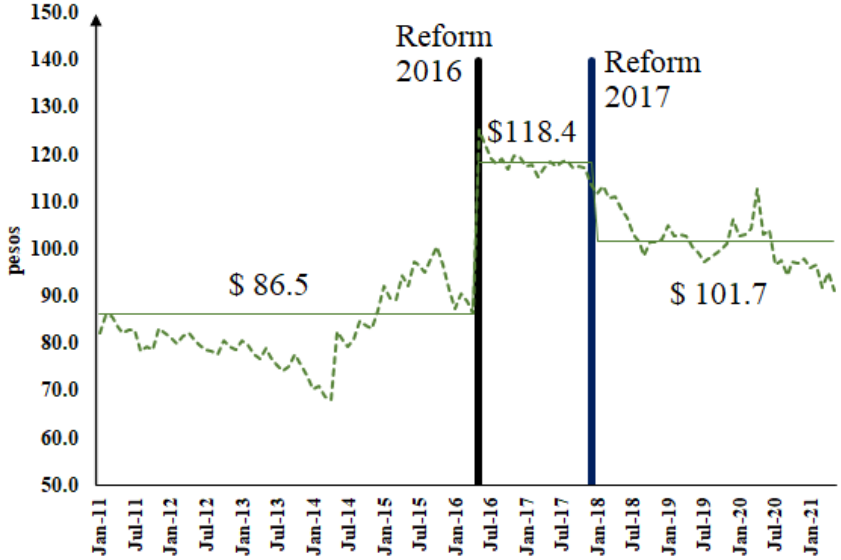
iv) the internal tax (II), with an ad valorem rate of 70%.[9]

The tax base of each tax is different. For example, II is applied over RP excluding IAE, VAT, and FET. VAT´s base is RP excluding IAE, II, and FET. Finally, FET is applied over RP excluding IAE and VAT. One additional tax is levied at the subnational level: the turn-over tax with an ad valorem rate that varies depending on the province.

Since 2016, tobacco taxation has undergone several reforms in Argentina. At the beginning of that year, the II presented an ad valorem rate of 60% of the tax base. In May 2016, this rate was raised to 75% of the tax base (Decree 626/2016). The tax reform promoted in December 2017 set the II at 70% and a minimum tax was established. In May 2021, this minimum tax -as a consequence of the inflation adjustment- was around $ 96. For a long period since the reform, the law was not enforced due to judicial interference by small tobacco companies that produce low-priced cigarettes. Specifically, Tabacalera Sarandí and Espert appealed to the Justice (i.e., first instances Courts), alleging -among other reasons- confiscation and discrimination by the minimum tax. In this context, Courts of different instances granted them precautionary measures (i.e., injunctive relief), which have been maintained over time, exempting these small companies from paying the tax. In mid-May 2020, the Supreme Court of Justice of Argentina ruled against those precautionary measures, forcing the small tobacco companies to pay -not retroactively- the minimum tax (FICA, 2021). The partial blocking of the minimum tax established in 2017 generated a reduction in the price increase with respect to the increase generated by the 2016 reform. For example, at 2020 values, the average price of a pack of cigarettes between 2011 and prior to May 2016 was $ 86.5 (Figure 1). From then until December 2017, it was on average $ 118.4, while between January 2018 and May 2021 it was on average $ 101.7.

[8] This fixed amount was set at around 4 pesos in May 2021. This amount is updated periodically.
[9] The II cannot be less than a minimum tax that is updated by the consumer price index (CPI).

Figure 1. Average retail price for a pack of 20 cigarettes in Argentina. In constant pesos of 2020. Evolution 2011-2021.

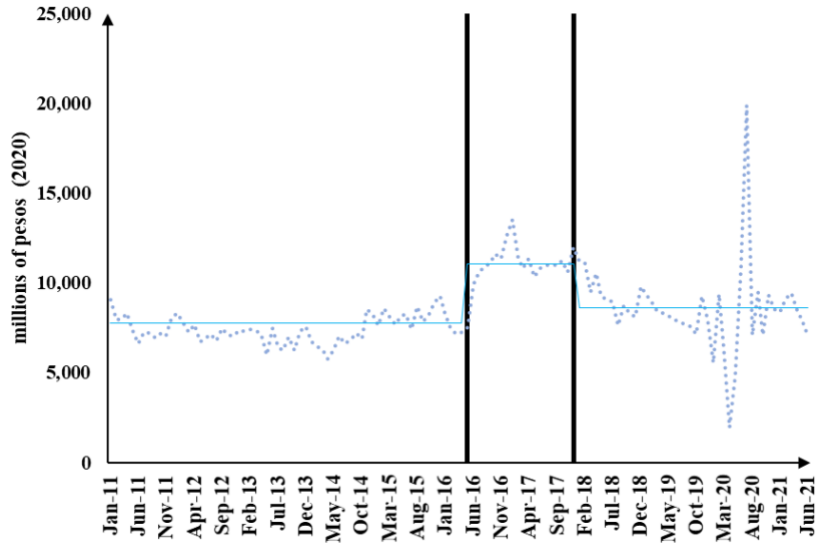


Source: Own elaboration based on data from the Ministry of Agroindustry of Argentina. Note: vertical lines indicate the tax reforms in the tobacco sector for May 2016 and December 2017.

Tobacco tax collection increased after the 2016 reform. However, the partial blocking of the 2017 reform deprived the Argentine treasury of obtaining higher tax collection. As presented in Figure 2[10], the monthly average real collection between May 2016 and December 2017 was around 11 billion pesos, 41.7% higher than the 2011-2015 average (7.7 billion pesos). The average real collection between January 2018 and May 2021 was 8.6 billion pesos, 10.6% higher than the 2011-2015 average. Tobacco tax collection was approximately USD 1.9 billion in 2020. This represents approximately 2% of total tax collection and 0.5% of GDP.

[10] The variation around March 2020 was due to the effects of the beginning of the restrictions imposed by the COVID-19 pandemic and their subsequent relaxation for tobacco activity, as of May 2020. Sales registered a drop in the month of March, which deepened in April (reaching its minimum monthly value of 62 million packages), and then experienced a notable increase in the months of May and June (reaching in this month the monthly maximum of almost 184 million of packages). This situation generated a notable increase in the volatility of the monthly sales series.

Figure 2. Tobacco tax collection in Argentina. In constant pesos of 2020. Evolution 2011-2021. Millions of pesos.



Source: Own elaboration based on data from the Federal Administration of Public Revenue of Argentina. Note: vertical lines indicate the tax reforms in the tobacco sector for May 2016 and December 2017.

4. Data and Methods

Tax simulation. To simulate tax burden on cigarettes, the tax structure of Argentina is modeled through a system of simultaneous equations. The Microsoft Excel software is used, and the equations are solved with the Solver command. Table 2 presents the current tax structure on cigarettes in Argentina, the corresponding equation for each tax, and the resulting system to calculate the total tax burden. It is important to note how certain taxes determine the collection of others. As can be appreciated, the structure involves a system of 5 equations with 6 unknowns. To solve it, one of them is fixed: the retail price (p).

Table 2. Tobacco taxes in Argentina. System of simultaneous equations to determine tax burden.

Tax		Ad Valorem	Specific	Equation
Impuesto Adicional de Emergencia	IAE	7.00%		iae=0.07*p
Impuesto al Valor Agregado	VAT	21.00%		vat = (21/121)*(p -iae - fet -ii)
Fondo Especial del Tabaco Tributario	FET t	8.35%	$ 4.28	fet = 4.28 + 0.0835*(p -iae -vat)
Fondo Especial del Tabaco No Triburario	FET nt	1.00%	$ 0.36	fet_n = 0.36 + 0.01*(p -iae -vat)
Impuesto Interno	II	70.00%	$ 28.00	ii = 0.7*(-iae - vat - fet)

Source: own elaboration based on current regulations on cigarette taxes. Note: p refers to retail price. See Section 3 for further details on each tax.

Data sources included in the simulation are the following. The information on tax collection and tax legislation draws from the Federal Agency of Public Revenues (AFIP) and the Ministry of Agriculture of Argentina. Information on cigarette consumption and prices (i.e., the volume of -cigarette- packs sold by price range) is also obtained from Ministry of Agriculture. The Consumer Price Index data is obtained from the National Institute of Statistic and Censuses (INDEC). Information on total price elasticity of demand for cigarettes, shown in Table 3, is obtained from Cruces et al. (2022).

Table 3. Price elasticities of demand for cigarettes in Argentina, by quintiles of household per capita income: prevalence, consumption, and total elasticities.

	Prevalence	Consumption	**Total Price Elasticty**
1	-0,014	-0,736***	-0,75***
	(0,0137)	(0,0077)	(0,006)
2	-0,01	-0,663***	-0,672***
	(0,0053)	(0,0101)	(0,0048)
3	-0,007	-0,618***	-0,625***
	(0,0001)	(0,0116)	(0,0114)
4	-0,004**	-0,574***	-0,578***
	(0,0049)	(0,0129)	(0,0178)
5	0,001***	-0,498***	-0,497***
	(0,0137)	(0,0155)	(0,0292)
Average	-0,007***	-0,618***	-0,624***
	(0,0001)	(0,0116)	(0,0115)

Source: Cruces et al. (2022). Note: SEs in parentheses, calculated using bootstrap, with 100 repetitions. Statistical significance ***p<0.01, **p<0.05, *p<0.1.

Tax reform scenarios. Using the tax simulation, we analyze the following scenarios:

1. **Base scenario**. Replicates the tax structure and cigarette consumption in Argentina in May 2021, as described in Section 3 and Table 1. This scenario will be useful for benchmarking the two scenarios of reform.
2. **Reform 1**. Simulates an increase in the II rate from 70% up to 75% , in line with the rate in force before December 2017. This scenario maintains the minimum tax. A relevant aspect is that this simulated reform could be implemented by decree of the Executive Power, without consideration of the National Congress. To carry out the simulation, it is necessary to make

assumptions about how the tobacco industry reacts to higher taxes. Here it is assumed that the industry fully passes through the tax increase to consumers.

3. **Reform 2**. Simulates alternative designs of the II. Specifically, the replacement of the current ad valorem rate by a specific (fixed) tax, which is designated monetary value on each unit, in this case, per pack of cigarettes. We define the specific tax considering the healthcare cost of smoking in Argentina. According to the Institute of Clinical and Sanitary Effectiveness (IECS) smoking kills 123 people per day and costs $ 196 billion per year for medical care in hospitals and health centers (IECS, 2020). Considering this monetary cost (i.e., around 196.987 million) and the annual sales of cigarette packs in Argentina (i.e., around 1.982 million) we define the II specific tax at $ 99.37 (i.e., 196.987 / 1.982).[11] Additionally, we analyze the possibility of supplementing this specific tax with an ad valorem rate of 10%, and 20%, respectively. Thus, in the second scenario, we analyze three alternatives: one with only the specific tax (scenario 2a), a scenario in which the specific tax is accompanied by a 10% ad valorem component (scenario 2b), and a scenario in which the specific tax is accompanied by a 20% ad valorem component (scenario 2c). This type of reform must be decided by the National Congress (i.e., cannot be implemented by a decree of the Executive Power) given that requires modifications on the structure of II.[12]

Tax incidence. To analyze the distributional effects of increasing tobacco taxes, we combine the distribution of cigarette consumption among individuals by income level, and the price changes resulting from the tax simulation. Information on the distribution of cigarette consumption draws from National Survey of Household Expenditures (ENGHo) 2017/18 and price elasticities of demand for cigarettes draw from Cruces et al. (2022). We consider four situations.

1. We assume that smokers have the same responsiveness to price increase (all the smokers have the same average price elasticity[13]) and face the same change in the retail price (according to the prediction of the tax simulation). To analyze the change in tobacco expenditure (relative to

[11] Note that this scenario completely changes the structure of the tax, leaving only one specific tax per pack of cigarettes.
[12] Considering all the combinations in this scenario (i.e., fully specific tax, or specific tax supplemented with an ad-valorem tax) we address the discussion on the design of specific consumption taxes since these can be ad valorem, specific, or mixed, where each design has advantages and disadvantages. See Petit and Nagy (2016) and Tobes (2021) for a discussion of the advantages and disadvantages of each type of design.
[13] Following Cruces et al. (2022) the average price elasticity of demand is 0.6.

income) we first assume a 18.3% cigarette price increase for all the smokers, in line with scenario on Reform 1 (also note that this tax increase is close to the 21% price increase observed as result of the 2016 tax reform). Then we assume a 41.6% cigarette price increase for all the smokers, in line with the third scenario on Reform 2.

2. We assume that smokers have an income group-specific price elasticity and face the same variation in the cigarette retail price (according to the prediction of the tax simulation, i.e., 18.3% under Reform 1 and 41.6% under Reform 2).
3. We assume that smokers have the same responsiveness to price increase (all the smokers have the same average price elasticity) and face a group-specific price change (using the variability by quintile on the tax simulation).[14]
4. We assume that smokers have an income group-specific price elasticity and face a group-specific price change.

5. Results

5.1. Tax Reform Scenarios

5.1.1. Base Scenario 1: Tax structure and cigarette demand in May 2021

Base scenario assumes an average price of $ 147.69 -in force in May 2021. For this price 76.6% corresponds to taxes, being the II tax the one that explains a greater share of the tax burden (54.5%). The production and marketing chain retains approximately 25% of the price, which corresponds to $ 34.5.[15] Finally, when combining this tax structure with the number of consumed

[14] Here it is assumed that all smokers pay the average price of their corresponding quintile. So, using the tax simulation, we run Scenario 1 for each quintile-specific price. This variability in price per quintile was obtained using the unit value that arises from the ENGHo 2004/05, which is the same source of information used in Cruces et al. (2022). See Section on Results to appreciate that, the change in prices that faces each quintile is 20.2%, 18.7%, 18.3%, 18.3%, 17.2%, respectively. We considering Scenario 2, we use the third alternative (i.e, fixed tax plus ad valorem rate of 20%). In this case, the change in prices that faces each quintile is 43.5%, 42.0%, 41.6%, 41.6%, 40.5%, respectively.

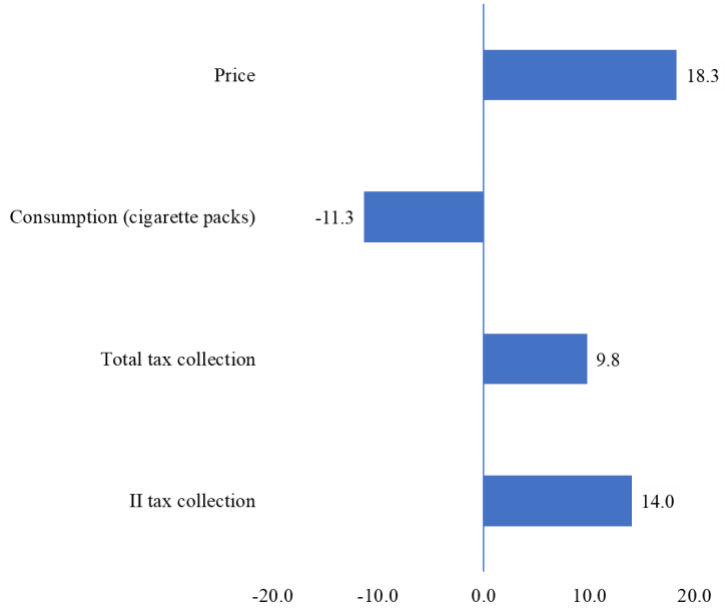
[15] This simulation permits modifications if an alternative price is assumed. This is a relevant point given the dispersion of prices in Argentina. For example, the Ministry of Agriculture presents, in addition to the average price, a series of prices by quartiles (of the price distribution). Thus, for May 2021, the first quartile presents a price of $ 67.66. Note that this price falls below the minimum tax updated on the same date ($ 96.21). The price of the second quartile is $ 115.48, which implies a total tax burden of 76.9%, with the II tax representing 54.0%. In the third quartile of the price distribution there is a value of $ 163.31, corresponding to a total tax burden of 76.6%, with the II tax representing 54.7%. Finally, in the last quartile of the price distribution there is a value of $ 211.11, corresponding to a total tax burden of 76.4%, with the II tax representing 55.1%.

packs in Argentina, the tax collection estimated by the simulation differs only by 3% from the official one published by the Federal Administration of Public Revenue of Argentina (AFIP).

5.1.2. Reform 1: increase the ad valorem rate of the II tax from 70% to 75%

The first scenario simulates an increase on the II tax rate from 70% to 75%, in line with the rate in force prior to December 2017. Under this simulation, the retail price increases from $ 147.69 to $ 174.72, which represents an increase of 18.3% (Figure 3). Combining this price hike with a price elasticity of demand for cigarettes of 0.6 (as calculated in Cruces et al. 2022), it decreases consumption by approximately 16.5 million packs. Given that the average monthly consumption was around 145.5 million packs -in May 2021-, the drop in consumption is 11.3%. This reform raises the total tax burden on cigarettes to 80.3%. The II tax now represents 59.2% of the retail price, and the supply chain preserves 20.8% of the price. The new collection for II increases 14.0% in nominal terms, while the total collection increases 9.8%. Thus, total tobacco tax collection represents approximately 2.2% of total tax collection and 0.55% of GDP.

Figure 3. Effects of increasing the ad valorem rate of the II from 70% to 75%. Percentage change in price, consumption, and tax collection.



Source: own elaboration based on the tax simulation.

5.1.3. Reform 2: modifications to the structure of the II, establishing a specific tax.

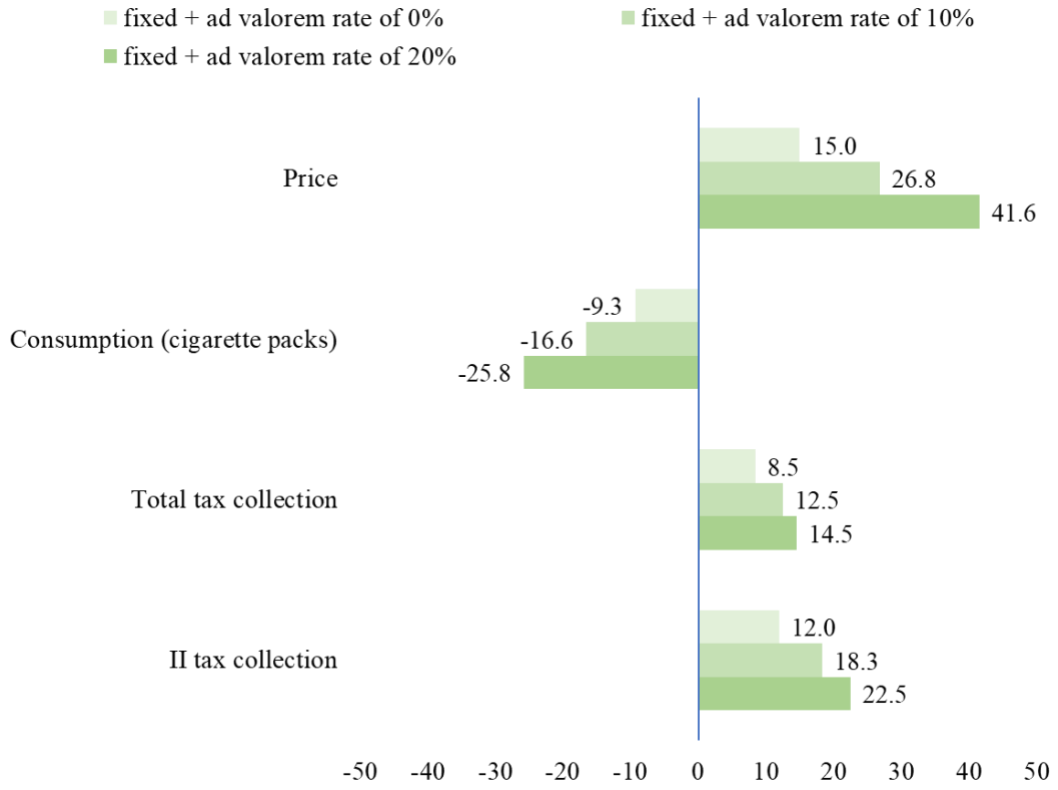
The second scenario simulates the replacement of the ad valorem rate in the II for a fully specific (fixed) tax of $ 99.37 (scenario 2a). Under this simulation, the retail price increases from $ 147.69 to $ 169.87, which represents a 15% increase (Figure 4). Combined with the elasticity of 0.6 this price hike generates a drop in consumption of 9.3%. The resulting tax burden is 79.7% of the retail price, the II representing 58.8%. This generates an increase in II collection of 12% and an increase of 8.5% in the total tax collection. Under this structure, tobacco tax collection represents 2.2% of total tax collection and 0.54% of GDP.

We then analyze the case of supplementing this specific tax of $ 99.37 with an ad valorem rate of 10% (scenario 2a), and 20 % (scenario 2b), respectively. In the first case, the retail price increases by 26.8%, dropping consumption by 16.6%. The total tax burden -as a share of the retail price- is 81.6%. The additional fiscal resources for II collection increases by 18.3% while the total tax collection for tobacco raises by 12.5%. Under this structure, total tobacco tax collection represents 2.3% of total tax collection and 0.56% of GDP.

When supplementing the specific tax with an ad-valorem rate of 20%, the retail price increases by 41.6%, shrinking consumption by 25.8%. The total tax burden -as a share of the retail price- is 83.5%. The additional fiscal resources for II collection increases by 22.5% while the total tax collection for tobacco raises by 14.5%. Under this structure, total tobacco tax collection represents 2.3% of total tax collection and 0.57% of GDP.

Overall, as can be seen in Figure 4, there is enough room for the government to raise cigarette consumption tax rates to increase the resulting revenue.

Figure 4. Effects of modifications on the II's structure by establishing a specific tax that can be supplemented -or not- with an ad valorem rate. Percentage change in price, consumption, and tax collection.



Source: own elaboration based on the tax simulation.

5.2.

5.3. Implications of income group-specific elasticities for the distributional incidence of tobacco taxes.

Figure 5 shows the proportional change in cigarette expenditure given the simulated price increase (i.e., income-share accounting definition as in Cruces et al., 2022). In Panel A, blue bars assume the average elasticity in Cruces et al. (2022) (i.e., -0.6) and the same change in price for all smokers (i.e., 18.3% as obtained through the tax simulation in scenario of Reform 1). Note that all individuals react equally according to the average elasticity. In this case, an increase in the price of cigarettes due to a tax hike would be regressive as it disproportionately affects expenditures of less affluent smokers. The poorest (richest) quintile would increase tobacco expenditures as a share of income by 0.21 (0.03) percentage points.

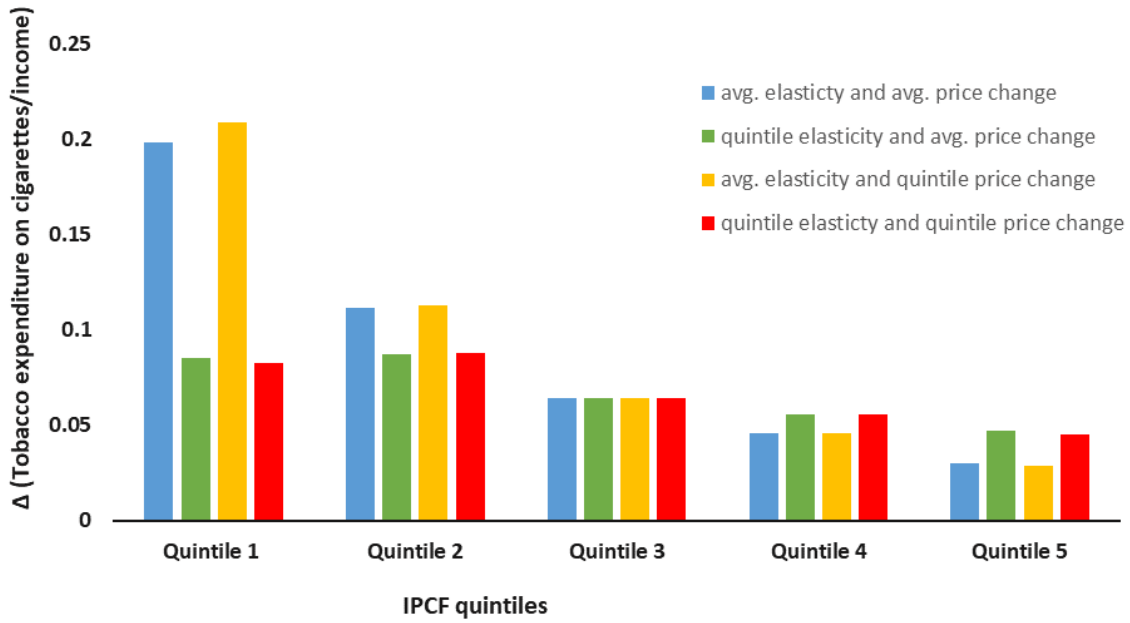
Alternatively, green bars in Figure 5 also show the change in cigarette expenditure but using the price elasticities for each income group and the same change in price for all smokers (i.e., 18.3% as obtained through the tax simulation in Scenario of Reform 1). Note that all individuals react according to the price elasticities corresponding to their income group. Now, the poorest quintile would increase its proportion of tobacco spending in relation to income by 0.08 percentage points, while the richest quintile would increase it by 0.05. The second, third, and fourth quintiles experience changes in tobacco expenditure relative to their income very similar in magnitude relative to quintile 1. Thus, tobacco tax increases are more neutral when the price elasticities of demand for each income group are considered.

Yellow bars and red bars show the proportional change in cigarette expenditure but assume that prices changes are quintile specific.[16] Again, results indicate that tobacco tax increases are more neutral when the income group-specific price elasticity of demand is considered. The results are in line with the aforementioned results and reinforce the relevance of income group-specific price elasticity. Thus, the assumption on the price elasticity of demand for tobacco products shows strong policy implications in terms of tax incidence of increasing tobacco taxes.

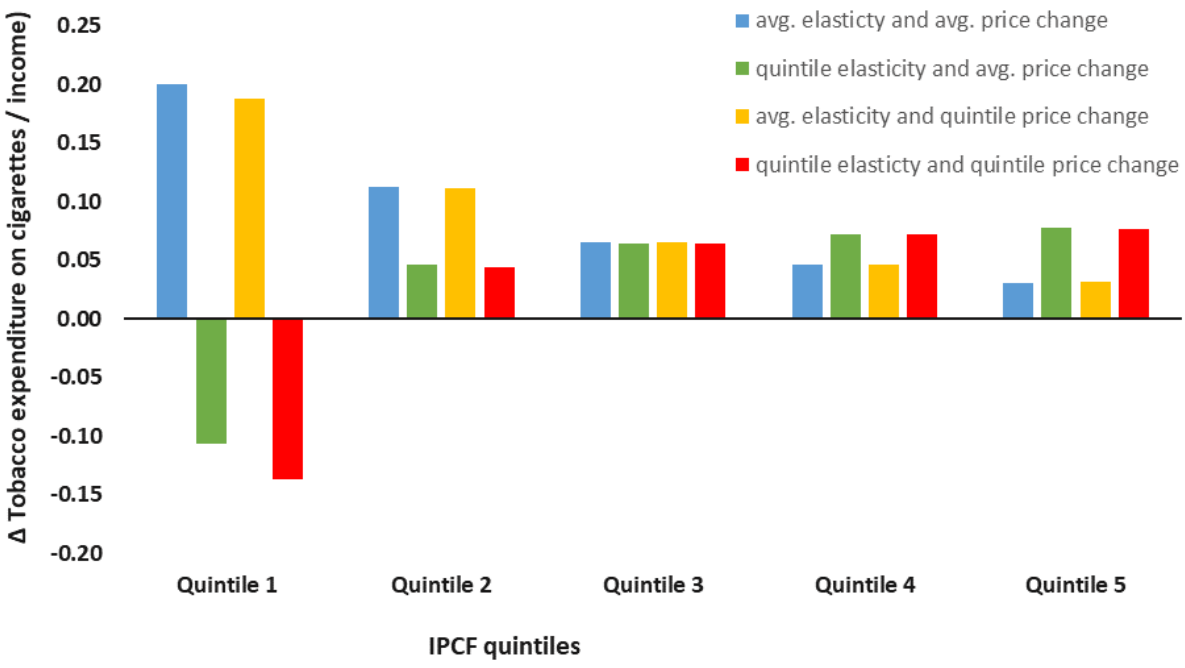
[16] As stated in footnote 14 here it is assumed that all smokers pay the average price of their corresponding quintile. So, using the tax simulation, we run Scenario 1 for each quintile-specific price. This variability in price per quintile was obtained using the unit value that arises from the ENGHo 2004/05, which is the same source of information used in Cruces et al. (2022). The change in prices that faces each quintile is 20.2%, 18.7%, 18.3%, 18.3%, 17.2%, respectively.

Figure 5. Distributional incidence of change on cigarette taxes in Argentina. Change in expenditure on cigarettes as a share of income. By quintiles of household per capita income. In percentage points

Panel A. Change in tobacco spending resulting from the Reform 1



Panel B. Change in tobacco spending resulting from the Reform 2



Source: Own elaboration using data from the National Survey of Household Expenditures (ENGHo)2018, Cruces et al. (2022).

Finally, Panel B replicates the analysis but with the changes in prices resulting from Reform 2 (i.e., 41.6% on average)[17] when considering a fixed tax supplemented with an ad valorem rate of 20%. Although these changes are approximately twice those of Reform 1, the previous conclusion is reinforced by the fact that the changes in tobacco taxes become progressive when the income group-specific price elasticity is considered. Now, the poorest quintile would reduce its proportion of tobacco spending in relation to income by about 0.12 percentage points, while the richest quintile would increase it by 0.08. The reason why smokers in the first quintile reduce their spending is that they are very elastic to changes in cigarette prices and, in turn, face very considerable changes in prices.[18]

6. Final comments

This research analyzes relevant aspects of potential tax reforms in tobacco taxation in Argentina and their distributional impacts. This report provides relevant tools for policy discussion and the public debate on potential reforms to tobacco taxation in the country. It also provides guidelines on how higher tobacco taxes can affect tobacco prices, consumption, and the generation of additional fiscal resources. It also contributes to discussing arguments that commonly block the possibilities of reforming the current tobacco tax structure, such as the argument on the regressivity of increasing tobacco taxes.

According to the simulation results, retail prices would likely increase between 15% and 60.5%, depending on the intensity of the tobacco tax increase. Combined with a demand price elasticity of -0.6, as estimated in Cruces et al. (2022), drops in consumption range from 9.3% up to 37.5%. The total tax burden on cigarettes increases from 76.6% in the current (pre-reform) situation up to 85.5%. Tax collection can be increased from 8.5% up to 14.7% with respect to the current situation. Overall, there is enough room for the government to raise cigarette consumption tax rates in order to increase the resulting revenue.

[17] In this case, the change in prices that faces each quintile is 43.5%, 42.0%, 41.6%, 41.6%, 40.5%, respectively.

[18] Given that the fall in the expenditure of the first quintile may be a priori counterintuitive due to the fact that the price elasticity of demand is less than one in absolute value, in the appendix to this report we show that this result is consistent with certain values of price elasticity demand and price changes. Briefly, while this is the correct way to reason for a marginal change in price, when we are dealing with large changes (as in this scenario, a 40% price change), the marginal analysis is not equal to the exact change in expenditure.

Income group-specific elasticities are relevant for the distributional incidence of tobacco taxes. Results indicate that if lower-income groups respond more than higher incomes ones to price hikes, tobacco tax increases are progressive. The relevance of the differential elasticities in terms of distributional incidence of tobacco taxation could become even more important if further long-run effects -not studied in this report- are also considered. For example, the savings on future medical expenses or the increase in lifetime earnings due to a lower risk of sickness and/or premature death would be even greater for those in the lower-income quintiles, making these reforms even more progressive (Fuchs and Meneses, 2017; Vulovic and Chaloupka, 2020).

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Appendix. On the change in spending on cigarettes in response to changes in prices.

Total expenditure can be easily computed as price multiplied by quantity.

$$e = pq$$

The first, and maybe most used way to compute the change in expenditure when price change, is to compute a total differential of expenditure.

$$\mathrm{d}e = dpq + pdq$$

It is useful to remember that the total differential of a function *f* at a point is the best linear approximation ***near*** this point of the function with respect to its arguments. Unlike partial derivatives, the total differential approximates the function with respect to all its arguments, not just a single one.

Operating, a useful expression can be obtained:

$$\mathrm{d}e = dp\,q + p\,dq$$

$$de = dp\,q + \frac{dq}{dp}\frac{p}{q}\,dp\,q$$

$$de = dp\,q + \epsilon\,dp\,q$$

$$de = dpq(1 + \epsilon)$$

$$\frac{de}{dp} = q(1 + \epsilon)$$

So, when using total differential to compute the change in expenditure, if elasticity is below one in absolute terms, when prices go up, so does expenditure. This is fully suitable for a marginal change in prices. However, the total differential does not replicate the exact change in expenditure, given that is uses derivatives, which are a linear approximation of real changes. To compute the exact change in expenditure, it becomes necessary to define expenditure in two moments, before and after the price change.

$$e_0 = p_0 q_0$$

$$e_1 = (p_0 + \Delta p)(q_0 + \Delta q)$$

Now, computing the change in expenditure:

$$\Delta e = e_1 - e_0$$

$$\Delta e \ = \ (p_0 + \Delta p)(q_0 + \Delta q) \ - \ p_0 q_0$$

$$\Delta e = p_0 q_0 + \Delta p q_0 + \Delta q p_0 + \Delta p \Delta q - p_0 q_0$$

$$\Delta e = \Delta p q_0 + \Delta q p_0 + \Delta p \Delta q$$

Note that the last term of the equation, $\Delta p \Delta q$, is the only difference when comparing with the change calculated using total differential. The term $\Delta p \Delta q$ is a second order effect and is close to zero when the change in prices is small. So, in standard microeconomics, when using marginal change, this term is not computed in the linear approximations. However, in our case in Scenario 2, this term becomes relevant. Operating a little more:

$$\Delta e \ = \ (p_0 + \Delta p)(q_0 + \Delta q) \ - \ p_0 q_0$$

$$\Delta e \ = \ (p_0 + \Delta p)\left(q_0 + \frac{\Delta \mathrm{q} \mathrm{q}_0 \mathrm{p}_0 \Delta \mathrm{p}}{\Delta \mathrm{p} \mathrm{p}_0 \mathrm{q}_0}\right) \ - \ p_0 q_0$$

$$\Delta e \ = \ (p_0 + \Delta p)\left(q_0 + \frac{\Delta \mathrm{q} \mathrm{q}_0 \mathrm{p}_0 \Delta \mathrm{p}}{\Delta \mathrm{p} \mathrm{p}_0 \mathrm{q}_0}\right) \ - \ p_0 q_0$$

$$\Delta e \ = \ (p_0 + \Delta p)\left(q_0 + \epsilon \frac{\mathrm{q}_0 \Delta p}{p_0}\right) \ - \ p_0 q_0$$

$$\Delta e \ = \ p_0 (1 + \Delta p) q_0 \left(1 + \epsilon \frac{\Delta p}{p_0}\right) \ - \ p_0 q_0$$

$$\Delta e \ = \ p_0 (1 + \Delta p) q_0 \left(1 + \epsilon \frac{\Delta p}{p_0}\right) \ - \ p_0 q_0$$

$$\Delta e = p_0 q_0 \left[\left(1 + \frac{\Delta p}{p_0}\right)\left(1 + \epsilon \frac{\Delta p}{p_0}\right) - 1\right]$$

This is the same equation used by Fuchs and Meneses (2017), in their equation (3). As can be appreciated, now the relation with price elasticity is not so clear. The term between brackets could be lower than zero even with an elasticity below one in absolute terms. In fact, it can be demonstrated that given an elasticity of -0.75, which is the value of the first quintile in the report, with changes in prices lower than 34%, expenditure goes up, but with changes above 34%, expenditure goes down. In the simulation, we use a 41.6% increase in prices -on average-. To proof this, we use the last equation,

$$\left[\left(1 + \frac{\Delta p}{p_0}\right)\left(1 + \epsilon \frac{\Delta p}{p_0}\right) - 1\right] \ < \ 0$$

$$\left[\left(1+\frac{\Delta p}{p_0}\right)\left(1+\epsilon\frac{\Delta p}{p_0}\right)\right] < 1$$

$$1+\epsilon\frac{\Delta p}{p_0}+\frac{\Delta p}{p_0}+\epsilon\left(\frac{\Delta p}{p_0}\right)^2 < 1$$

$$\epsilon\frac{\Delta p}{p_0}[1+\frac{\Delta p}{p_0}] < -\frac{\Delta p}{p_0}$$

$$\epsilon[1+\frac{\Delta p}{p_0}] < -1$$

Assuming $\epsilon = -0.75$,

$$\frac{\Delta p}{p_0} > 0.34$$

So, given our price elasticity, for price changes above this cut-off value, total expenditure will reduce.