

The aftermath of the tobacco tax reform in Brazil

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Abstract

Background

Brazil is currently undergoing a comprehensive tax reform. The key elements were defined in the Constitutional Amendment which was ratified in December 2023 (EC 132/2023). The reform introduces a harmonized value-added tax system (VAT) for all goods and services (through a dual VAT tax: IBSs and CBS) along with a selective tax (ST) for products that are harmful to health or the environment, including tobacco. The precise tax structure and tax rates of the ST are currently under discussion in the Senate (PLC 68/2024). This research simulates alternative scenarios for the ST and their effects on prices, consumption, tax collection, and tax burden on cigarettes.

Methodology

We calibrate and simulate a partial equilibrium model using official information on the current tax structure, amount of tax revenue, and microdata from the National Health Survey (PNS) on smoking behavior of the Brazilian population. We propose and analyze three scenarios that have different political appeals. However, they are merely illustrative exercises for the model's application, with no intention of serving as suggestions for tax rates for the tax reform currently under discussion in the Federal Senate.

Results

Assuming a dual VAT of 26.5 percent, the ST could be defined such that no federal state experiences a decrease in cigarette tax burden. Tax revenue would increase by 88 million BRL (equivalent to 8.7%) per month, and overall cigarette consumption would decrease by 25%. This scenario could be reached, for instance, with a specific ST component of 3.75 BRL and an ad valorem component of 92% percent. Other combinations of ad valorem and ad rem components would also be possible. This scenario would bring Brazil close to the World Health Organization's (WHO) recommendation of a 75 percent average tax burden.

Conclusions

The selective tax must be carefully chosen to effectively assume its designated role as an excise tax on harmful products. Maintaining the current tax burden as part of the tax reform could result in certain states experiencing a decline in tax collection, which may lead to decreased prices and an increase in cigarette consumption. To mitigate this possibility, it is essential that the Selective Tax, incorporating both ad valorem and specific components, be designed in a way that prevents any state from losing tax revenue. Such a design would avoid both decrease in prices and increase in cigarette consumption nationwide.

JEL Codes: I18; C21; H29.

Keywords: Tobacco tax reform; Selective tax; Tax increase, Public policy.

Introduction

One of the biggest political issues in Brazil during the year 2024 is the ongoing comprehensive tax reform. The key elements were defined in a Constitutional Amendment which was ratified in December 2023 (EC 132/2023). The reform introduces a harmonized value-added tax system (VAT) for all goods and services along with a selective tax (ST) for products that are harmful to health or the environment, including tobacco. So, one of the main goals of the long-awaited tax reform is to reduce the number of different taxes along the production chain that have plagued firms and accountants. The dual VAT tax is composed by IBS (states and municipalities) and CBS (federal), both under the same regulatory framework aiming simplicity. Yet, the reform introduces important regulatory policy elements. Tax exemptions for elementary goods and tax cashbacks for the lowest income groups are intended to contribute to the reduction of inequality. The ST additionally should incentivize healthier and sustainable consumption of goods.

The precise tax structure and tax rates of the ST are currently under discussion in the Senate and House of Representatives. The Senate is analyzing the Complementary Law Bill (PLC 68/2024), which has already been approved by the House of Representatives. In case of changes, it will return to the House. Another key element under discussion is the expected 10-year transition period of the tax reform to convert the existing tax into the new ones, meaning that the final state of the proposed changes will be fully effective only in 2033.

This research component aims to offer policymakers a rigorous empirical foundation for optimizing tax structures to achieve intended economic outcomes by providing simulations of how different ST values would change prices, consumption, and tax collection on cigarettes in each federal state.¹ Our results are derived from a partial equilibrium model that operates with official

¹ There are other tobacco products, such as cigars or electronic devices. However, by far, cigarette is the most consumed tobacco product, demanding specific public policy measures.

information on the current tax structure, amount of tax revenue, and microdata from the National Health Survey (PNS) on smoking behavior of the Brazilian population. We propose and analyze four scenarios that have different political appeals. However, they should not be interpreted as any suggestions for tax rates for the Selective Tax in the tax reform currently under discussion in the Federal Senate. Specifically, in the scenarios we either, propose ST values to (1) maintain the current tax burden using the different ST components, (2) avoid lower tax collection in all Brazilian states, or (3) decrease cigarette consumption by 25% as compared to the current level. This research extends and refines our previous contributions on the tax reform in Brazil, as discussed in Divino et al. (2021, 2022a, 2022b).

This is a significant change relative to the current tax scheme and could result in a reduction in tax, decrease in price, and increase in cigarette consumption in Brazil if not appropriately elaborated. On the other hand, the ongoing tax reform is also an opportunity to increase cigarette taxes and reduce cigarette consumption in Brazil. Given that the CBS and IBS will be common to all goods and services, the ST on tobacco products must be carefully chosen to avoid a decrease in the tax burden, drop in prices, increase in consumption, and reduction in tax collection on cigarettes. Therefore, the objectives of this research are: i) to simulate the effects of the undergoing tax reform on prices, consumption, and tax collection on cigarettes; (ii) to investigate alternative scenarios for the ad valorem selective tax and illustrate how its choice strongly affects prices, consumption, and tax collection on cigarettes across the Brazilian states; and (iii) to provide data-based arguments and evidence to sustain the government's decision regarding the choice of the special tax on cigarettes in Brazil.

Tax Structure

Summary of the current tax framework

Currently there is a number of taxes that may affect cigarette prices in different ways, such as import and export taxes, the typical Brazilian consumption taxes: ICMS, PIS/COFINS, and IPI, the last one working more as an excise tax. PIS/COFINS is a social contribution levied on the turnover of companies, with a special treatment when it comes to the cigarette sector. Taxes on imports and exports, IPI, and PIS/COFINS are federal taxes, while ICMS is a state tax. There are no local taxes on cigarettes. The IPI applies a mixed tax rate structure (ad rem and ad valorem simultaneously). The tax basis of cigarettes for the IPI is based on 15% of the retail price (special tax regime)². For cigarettes, regardless of the size of the company the PIS/COFINS will be calculated under the cumulative regime³, without tax credits, and the tax incidence is only once (Santos and Zittei, 2015). Because it is levied at the manufacturer and importer levels, a factor of 3.42 is applied for PIS and 2.9169 for the COFINS to adjust the tax basis. Therefore importation will end up with a higher tax burden.⁴ The PIS/COFINS is calculated in a way that the final price also includes the tax itself (the tax is part of its own tax basis). While the tax basis is the company turnover, the IPI and the ICMS shall be excluded of the PIS/COFINS tax basis.

The Tax Structure Proposed by the Tax Reform

The Constitutional Amendment 132/2023 (EC 132/2023) establishes that the current taxes PIS/COFINS, IPI, ISS and ICMS are replaced with three new taxes:

² The tobacco industry can choose using the traditional or the special tax regime, and in practice they choose the special tax regime because it results in a smaller effective tax rate. On the other hand, the special tax regime is subject to a series of control rules. The current rates for the IPI are: 66,67% ad valorem (tax basis 15% of retail price) and BRL 2.25 per pack (from November 1st, 2024, before it was BRL 1.50).

³ Under the cumulative regime, the general rates are PIS: 0,65%, and COFINS: 3%; if the company is under the VAT scheme the rates are: PIS: 1,65%, and COFINS: 7,6%. The tax rates on imports are 2,1%, and 9,65% no matter the tax regime adopted by the importer.

⁴ Additionally, the PIS/COFINS legislation also imposes some restrictions to the cigarette sector. For instance, it is forbidden by law to sell cigarette paper to companies other than cigarette manufacturers (Law no 10.833/2003, art. 54). This prohibition inhibits the supply of inputs to illegal cigarettes manufacturers (inside and outside the country).

the CBS, IBS, and the selective tax (ST). In fact, these three new taxes will replace a very complex consumption tax system which is full of economic distortions. Federal Union levies IPI (tax on industrialized products, a non-cumulative tax, with restrictions), PIS/COFINS (which are actually two taxes on the turnover of companies, it may be non-cumulative or cumulative, depending on the size of company and type of operation), the states the ICMS (tax on goods and certain services, products, a non-cumulative tax, with restrictions) and the municipalities the ISS (a cumulative tax on services). Under the new system, CBS and IBS will be basically the same tax, with the difference being only in the tax rates and the fact that the CBS will be federal revenue and IBS state and local revenues. The tax rates for each good and service must be equivalent across all states to achieve the simplification and harmonization intended by the tax reform.

The EC 132/2023 brings some details regarding how to implement the IBS, CBS and the ST, and deals with the transition period. EC 132/2013 states that the general principles for those taxes will be regulated by means of a complementary law issued by the Congress. This complementary law is meant to address and regulate the IBS and CBS and ST, making sure that the IBS will be levied under the same legislation and regulations across the states. The Executive Power sent this bill of complementary law the Congress in April 2024 and after several discussions and public audiences it was approved by the CR with a few changes on 10 July 2024. It is now under discussion in the Senate as PLC 68/2024,

It is almost a consensus that there will be no fundamental changes in the Senate. Indeed, especially in regards of the Selective Tax, and with a focus on taxation of tobacco products, few changes are expected in the Senate, despite of the fact that by November eleven 2024, there was 1,634 amendment proposals to the PLC 68/2024⁵. However, the CR changed the express mention to inflation index to update the specific component of the selective tax. The previous version

⁵ See at <https://www25.senado.leg.br/web/atividade/materias/-/materia/164914>

mentioned the IPCA (a general inflation index calculated by the IBGE, the National Statistics Institute), however, whereas it is still granting the annual update, the current version does not indicate which index should be used. IBS and CBS are VAT-type of taxes. Their calculation will be made in a way that the tax shall be added to the product/service retail price to find the final value to be paid as the consumer price. The CBS and IBS taxes are not included in the price over which they will be charged. There will be a substantial change to the current tax scheme of tobacco products, not only because of the harmonization across tax rates but also because of the change in the tax basis.

Under the EC 132/2023, CBS and IBS, both VAT taxes, will be levied on the retail price, while the tax burden will be distributed throughout the production and distribution chains, while the ST will be levied at production and importation only once, which is typical for excise taxes.

Book II of the PLC 68/2024 details the ST legal structure. In brief, the ST will be levied only once on the production, extraction, marketing or import of goods and services that are harmful to health or the environment. For tobacco products (also to alcoholic beverages and sweetened beverages) the tax will be levied when the operation involves such products in a consumption packing format. (Arts. 406, 407 and 432 of PLC 68/2024).

Table 1 – Tobacco products subject to the ST

NCM	DESCRIÇÃO
24.01	Tabaco não manufaturado; desperdícios de tabaco.
2401.10	- Tabaco não destalado
2401.10.10	Em folhas, sem secar nem fermentar
2401.10.20	Em folhas secas ou fermentadas tipo capeiro
2401.10.30	Em folhas secas em secador de ar quente (<i>flue cured</i>), do tipo Virgínia
2401.10.40	Em folhas secas, com um conteúdo de óleos voláteis superior a 0,2 %, em peso, do tipo turco
2401.10.90	Outros
2401.20	- Tabaco total ou parcialmente destalado
2401.20.10	Em folhas, sem secar nem fermentar
2401.20.20	Em folhas secas ou fermentadas tipo capeiro
2401.20.30	Em folhas secas em secador de ar quente (<i>flue cured</i>), do tipo Virgínia
2401.20.40	Em folhas secas (<i>light air cured</i>), do tipo Burley
2401.20.90	Outros
2401.30.00	- Desperdícios de tabaco
24.02	Charutos, cigarrilhas e cigarros, de tabaco ou dos seus sucedâneos.
2402.10.00	- Charutos e cigarrilhas, que contenham tabaco

	Ex 01 - Cigarrilhas
2402.20.00	- Cigarros que contenham tabaco
	Ex 01 - Feitos à mão
2402.90.00	- Outros
	Ex 01 - Cigarros não contendo tabaco, exceto os feitos à mão
24.03	Outros produtos de tabaco e seus sucedâneos, manufaturados; tabaco "homogeneizado" ou "reconstituído"; extratos e molhos de tabaco.
2403.1	- Tabaco para fumar, mesmo que contenha sucedâneos do tabaco em qualquer proporção:
2403.11.00	-- Tabaco para narguilé (cachimbo de água) mencionado na Nota de subposição 1 do presente Capítulo
2403.19.00	-- Outros
2403.9	- Outros:
2403.91.00	-- Tabaco "homogeneizado" ou "reconstituído"
2403.99	-- Outros
2403.99.10	Extratos e molhos
2403.99.90	Outros
24.04	Produtos que contenham tabaco, tabaco reconstituído, nicotina ou sucedâneos do tabaco ou da nicotina, destinados à inalação sem combustão; outros produtos que contenham nicotina destinados à absorção da nicotina pelo corpo humano.
2404.1	- Produtos destinados à inalação sem combustão:
2404.11.00	-- Que contenham tabaco ou tabaco reconstituído
2404.12.00	-- Outros, que contenham nicotina
2404.19.00	-- Outros
2404.9	- Outros:
2404.91.00	-- Para aplicação oral
2404.92.00	-- Para aplicação percutânea
2404.99.00	-- Outros

In general, the ST taxable event occurs when the products and services are first sold or otherwise transferred, or even exported, or subject to consumption, depending on the case. The products subject to ST tax incidence are listed in the Annex XVII of the bill, that contains the tax code (international nomenclature - NCM/SH⁶), tobacco products (*Produtos fumígenos*) subject to ST are under codes: 2401, 2402, 2403 and 2404. Therefore, not only cigarettes (NCM Code 2402.20.00) are subject to the ST, but other tobacco products too will be subject to this tax. The breakdown of these headings across different products is detailed below.

In other words, all products derived from tobacco under Chapter 24 of the NCM (Tobacco and manufactured tobacco substitutes; products, whether or not

⁶ NCM stands for Nomenclatura Comum do Mercosul, and SH for Harmonized System - HS).

containing nicotine, intended for inhalation without combustion; other nicotine containing products intended for the intake of nicotine into the human body)⁷ may be subject to selective tax.

ST on tobacco products under heading code (NCM) 2402, which are cigars, cheroots, cigarillos and cigarettes, of tobacco or of tobacco substitutes, will be levied through two components: specific and ad valorem tax rates (art. 419, § 1º, I – PLC 68/2024). The other tobacco products are subject only to ad valorem tax rates; however, they may be subject depending on ordinary law (art. 419, § 4º – PLC 68/2024).

The tax base for the *ad valorem* component of the ST applicable to tobacco products is the resale price which is deemed the reference price (art. 412, § 3º – PLC 68/2024). The ST tax base does not include the IBS, the CBS and the ST itself, nor unconditional discounts (art. 415 – PLC 68/2024) (despite of the law terms “unconditional discount” does not make sense for cigarettes because the price is pre-determined at the retail level).

Under the specific component, the tax rate will be levied by 20 sticks pack for cigarettes, for others (cigars, etc.), the tax rate may be different. As aforementioned, the precise tax rates will be fixed by ordinary law, yet to be approved, that will also bring more details regarding tax administration and levying of the ST.

Methodology

The present section describes how we build our static partial equilibrium model based on data provided by official sources that is used to simulate the effects of the tax reform on the cigarette market and the associated tax collection.

⁷ It is correspondent to Chapter 24 of HS Nomenclature (WCO), available at https://www.wcoomd.org/-/media/wco/public/global/pdf/topics/nomenclature/instruments-and-tools/hs-nomenclature-2022/2022/0424_2022e.pdf?la=en

First, we collect information on cigarette tax collection and tax rates. Unfortunately, the tax collection in the recent years does not accurately reflect cigarette consumption in Brazil because of an Extraordinary Appeal to the Brazilian Supreme Court (STF), RE 574706 (Theme 59, with general repercussion)⁸ regarding the calculation of PIS/COFINS had a huge impact on federal revenue collection. The decision of the STF, dating back to the initial decision in 2017, ruled that ICMS should be excluded from the PIS/COFINS tax basis, favoring taxpayers by reducing the taxable amount for the PIS/COFINS. However, the ruling led to multiple follow-up legal and procedural challenges. Indeed, after the 2017 decisions, the government and tax authorities filed motions (*embargos de declaração*) requesting clarification and modulation of the ruling's effects. Due to the huge impact in the federal tax collection the STF did not allowed the effects of the Theme 69 to be applied immediately, except for those who had already filled a complaint (before the judgment in 2017).

The STF modulation judgment issued in 2021 would limit the impact of the ruling retroactively, protecting public finances by controlling the reimbursement of past tax credits claimed by companies (five years period). In 2021, the STF confirmed that only post 2017 calculations would be affected, therefore retroactive claims before 2017 were not allowed, subject to the aforementioned exception. Indeed, some taxpayers, which includes the cigarette manufacturers had already filled complaints to exclude the ICMS of the PIS/COFINS before 2017, therefore they would not be subject to the “modulation”. There are still some pending issues in regards to the calculation of the credits and how to reimburse or compensate it with pending taxes (e.g., REsp 2054759/RS and REsp 2066696/RS decided by the Superior Court of Justice – STJ). These facts made the revenue collection of tobacco a bit blurry when on consider the production related to such tax collection. In the end of the day, it affects not only the PIS/COFINS collection but also the IPI, because the taxpayer may

⁸ This means that the decision applies not only to that particular case, but to everyone (*erga omnes*).

compensate the IPI tax debts with PIS/COFINS tax credits. This aspect needs to be further addressed as a particular issue.

However, we can consider 2019 as the year to set the baseline because in this year the tax collection was not yet fully contaminated by such change in the PIS/COFINS tax basis, and there was a good database on the health data side (PNS, 2019). In this year the cigarette tax collection from IPI and PIS/COFINS under the current tax regime was equal to 6.9 billion BRL. We use this reference value to calibrate our model and thus align the predicted tax collection to its real correspondence according to the RFB data. On the other hand, we can adjust the model for the future tax system (IBS, CBS and ST) considering that these taxes do not allow for a tax to be included in the tax basis of the other, except for the ST to be included in IBS and CBS tax basis.

We retrieve the IPI, PIS/COFINS rates in 2019 from the federal tax legislation. The ICMS is a VAT-type consumption tax that is set by the states. It presents variation between 25% and 35% of the retail price, see Divino et al. (2022b) for the detailed rates and tax collection by state and for further details on the current tax system.

We assume that the IBS and CBS rates will sum up to 26.5% (Orair, Gobetti, 2021). It will probably change in the future, but the model is flexible to allow those changes to be incorporated without modification in the methodology.

Cigarette prices and consumption are obtained from the National Health Survey (PNS) carried out by IBGE. We use the latest available edition from 2019 which corresponds perfectly with the year of the tax collection data. The PNS is a very detailed, nationally representative survey which aims to obtain information on health care, lifestyle, and the financing of health care. For the present research, we extract the individuals' responses surrounding the price, quantity, and brand of their latest cigarette purchase. Based on this information, we divide the cigarette market into three categories, as follows: (1) illicit cigarettes which are mostly sold below the official minimum price of 5.00 BRL (Divino et al., 2023).

(2) Cheaper brands which are defined as having a price below the median price in the cigarette price distribution in the PNS data. (3) Premium brands with a price above the median. Our simulations do not include the illicit cigarette market because these products evade the due taxes. Moreover, research by Divino et al. (2022b) shows that changes in prices of legal cigarettes affect the price of illegal cigarettes but do not affect consumption of illegal cigarettes. In other words, a higher tax burden would not induce smokers to switch to illegal products because their prices also tend to increase.

Note that before the tax reform both cigarette taxes and cigarette prices vary significantly across Brazilian states. The following simulations explore these differences among the states. Based on the PNS data, we calculate the share of smokers among inhabitants aged 15 years and older and multiply this share by the respective population size in each state to obtain the number of smokers in each federal state. Multiplying the number of smokers by the average consumption of cigarettes per month from the PNS data gives us the total amount of cigarette consumption by state.

The National Health Survey (PNS) offers socioeconomic data enabling the calculation of cigarette demand price elasticities, employing the methodological framework comprehensively detailed in Divino et al. (2022b). These elasticity estimates are differentiated by geographic region and price segment, ranging between -0.55 and -0.90, quantifying the anticipated percentage reduction in total cigarette consumption corresponding to a one-percent price increase. Consequently, the research simulations incorporate behavioral consumer responses, acknowledging that smokers modify their purchasing patterns in reaction to tax reform-induced price fluctuations.

The final step in the simulation procedure is to change the tax structure according to the PLC 68/2024, which is currently under discussion in the Senate. According to the text in this proposal, we simulate a ST with both an ad valorem and a specific component. We will also consider the most recent value of the minimum price for a 20-cigarette pack which has been updated to 6.50

BRL in 2024. We understand that the tax reform, and the discussion about the tobacco ST, is not only driven by technical considerations but also by political power, the scenarios consider the tax collection / tax burden, consumption / health, and the distribution of tax collection among states as the primary objectives relevant for the debate.

The first scenario (Scenario I) defines a ST on cigarettes to match the average tax burden from the current baseline scenario. The second scenario (Scenario II) maintains that objective but changes the composition of ad valorem and specific ST to illustrate how different weights on these tax components change the results. The third scenario (Scenario III) assumes a ST such that the tax burden does not decrease in any of the states. Finally, the ST in the fourth scenario (Scenario IV) is set to reach an overall decrease of 25% in cigarette consumption. In summary:

- Scenario I: ST replicates the average tax burden in the baseline with greater weight on the ad valorem ST component.
- Scenario II: ST replicates the average tax burden in the baseline with greater weight on the specific ST component.
- Scenario III: ST is chosen to have higher or equal tax burden in each state.
- Scenario IV: ST is set to decrease consumption by 25%.

In all scenarios, we assume a combined CBS (federal VAT) and IBS (state VAT) of 26.5%, which will be applied to all goods and services. The CBS and IBS tax rates may slightly change in the final version of the tax reform because their levels will be set to maintain overall tax collection comparable to the pre-reform total tax collection. The CBS/IBS tax rate when the new system starts in three years will depend on the volume of products and sectors that will benefit from preferential tax treatment (including staple foodstuffs, medical services, and additional categories), necessitating an increase in the standard tax rate to offset the numerous fiscal exemptions. A crucial methodological distinction of

this research compared to prior tax reform modeling approaches (Divino et al., 2022a, 2022b) lies in the tax assessment basis: while the dual VAT system (CBS and IBS) utilizes the transparently determinable retail price, the Selective Tax (ST) relies on the ex-factory price, which presents significant observational challenges. The latter, however, can be obtained implicitly once the tax burden and average retail profit margin are known, see Divino et al. (2024). We estimate the average industry profit margin to be nine percent. Note that the results in the present simulations are not significantly different when other values between zero and 15 percent are used.

These scenarios are merely illustrative exercises for the model's application and flexibility for policy simulations. They do not have any intention of serving as suggestions for tax rates for the tax reform currently under discussion in the Federal Senate.

Results

Table 2 provides a comprehensive overview of the baseline and three proposed reform scenarios. In the baseline scenario for 2019, monthly tax revenue from legal cigarette sales in Brazil amounts to 1,001.97 million BRL. The tax burden for low-price category cigarettes (price category 2) stands at 72.6%, with an average pack of 20 cigarettes priced at 6.81 BRL. This low-price segment represents 62 percent of total revenue, indicating that the majority of smokers opt for more affordable cigarette options. Conversely, high-price category cigarettes average around 11.00 BRL per pack. Due to the current Industrial Product Tax (IPI) structure, which includes a specific (ad rem) component, the tax burden for high-price cigarettes (price category 3) is lower at 64.3% compared to the 72.64% in the low-price category. Disregarding the differences between price categories, we find an average tax burden of 68.43%. Table 2 also shows that the share of smokers in the baseline scenario is equal to 12.39% and the total number of legal cigarettes smoked in Brazil per month, on aggregate and in each of the price categories.

In Scenarios I and II, we simulate the effects of a selective tax that maintains the current average tax burden at 68.43%. Notwithstanding, we observe interesting changes because the tax rates become equal in all states. The implication of the leveling plus the constant tax burden is that taxes will increase in some states and fall in others where the tax burden is above average. It also turns out that the composition of ad valorem and specific component shifts the share of cigarette consumption between the two price categories.

In Scenario I, we start by setting the specific ST to 2.25 BRL which is a reference value that corresponds to the specific component of the current IPI. To maintain the average tax burden as in the baseline scenario, the ad valorem ST needs to be equal to 77% of the ex-factory price. The fourth row shows that in this case the specific component accounts for 56.2% of the total ST. Compared to Scenario II, where the tax burden is also at the baseline level, the weight of the specific component is low. The upper part in table 2 presents the aggregate changes in relation to the baseline. We observe that with the new ST monthly cigarette consumption declines by about 2 million. Despite the lower consumption, tax collection would increase by 10 million BRL per month. This double dividend in both public health and the national accounts stems from a higher tax burden and higher prices in some of the largest states like Rio de Janeiro and Minas Gerais. Obviously, the average smoking prevalence among the population decreases in Scenario I; from 12.39% to 12.30%. This seemingly small number of 0.09%, applied to the 155.4 million inhabitants aged 15 years or older, corresponds to a reduction of about 140 thousand smokers.

Table 2. Summary of tax reform scenarios

Description	Baseline	Scenario I	Scenario II	Scenario III	Scenario IV
Selective Tax (ad valorem)	.	77%	55%	90%	92%
Selective Tax (specific - BRL per pack)	.	2,25	2,75	3,00	3,75
<i>Specific component (share of the ST)</i>	.	<i>56,20%</i>	<i>68,57%</i>	<i>59,29%</i>	<i>64,02%</i>

Total tax revenue (millions BRL/month)	1001,97	1019,02	1022,32	1080,08	1089,21
% Change	.	1,70%	2,03%	7,80%	8,71%
Average tax burden	68,43%	68,43%	68,43%	73,25%	75,63%
Total consumption (millions/month)	179,92	177,96	178,11	152,96	134,95
% Change	.	-1,09%	-1,01%	-14,99%	-25,00%
Average Prevalence	12,39%	12,30%	12,32%	11,83%	11,46%
Average % Change	.	-0,73%	-0,50%	-4,50%	-7,44%
Price category 2 - Cheaper brands	6,81	6,99	7,09	8,11	9,10
Standard deviation	0,27	0,44	0,43	0,67	0,68
Average tax burden	72,61%	71,57%	72,74%	76,97%	79,47%
Share of tax revenue	62,07%	57,16%	56,94%	57,72%	57,75%
Total consumption (millions/month)	124,52	122,98	121,09	106,09	93,09
% Change	.	-1,24%	-2,76%	-14,80%	-25,24%
Price category 3 - Premium brands	10,96	11,28	10,91	12,84	13,87
Standard deviation	0,86	1,09	0,96	1,17	1,18
Average tax burden	64,26%	65,29%	64,12%	69,52%	71,79%
Share of tax revenue	37,93%	42,84%	43,06%	42,28%	42,25%
Total consumption (millions/month)	55,40	54,98	57,02	46,86	41,85
% Change	.	-0,75%	2,93%	-15,41%	-24,44%

Source: authors' calculations.

Taking a closer look at the changes distinguishing the two price categories reveals that the simulated ST in Scenario I leads to higher prices among premium brands and cheaper cigarettes. Cheaper cigarettes become 0.18 BRL more expensive and will be sold at an average price of 6.99 BRL. Premium brand cigarette prices increase by 0.32 BRL cost 11.28 BRL, on average. Note that despite the leveling of the tax burden through the tax reform, cigarette prices still vary by state, in all reform scenarios, because production and distribution costs remain different. The majority of cigarette consumption decline, amounting to 2 million cigarettes per month, is attributable to lower-priced brands. Specifically, consumption in these brands decreases by approximately 1.6

million, while premium brands experience a more modest decline of 0.4 million per month. Notably, the consumption in the second price category represents approximately 70% of the total market share before the reform.

In Scenario II, we increase the specific tax component to 2.75 BRL and reduce the ad valorem ST from 77% to 55% to maintain the baseline tax burden. Despite this adjustment, tax revenues increase by an additional 3.3 million BRL monthly, representing a 2% rise compared to the current situation. Interestingly, total consumption remains slightly higher than in Scenario I, and the reduction in smoking prevalence is less pronounced. We can thus state that Scenario II should be avoided from a welfare perspective.

The observed differences between Scenarios I and II can be attributed to the composition of the ST. The low ad valorem tax rate and the high weight of the specific part of the ST in Scenario II favor premium brands, whose prices even decline in relation to the baseline. Although the average price decreases by only 0.05 BRL, the respective consumption of premium brands increases by 2.9%. The increased specific tax component in Scenario II has a more significant price effect on lower-priced brands, which become 0.10 BRL more expensive, resulting in a consumption decline that is twice as high as in Scenario I.

Scenario III is designed to address the policy objective of none of the states having a lower tax burden after the reform. One of the possible combinations of the ST components is implementing a specific ST of 3.00 BRL and a 90% ad valorem rate on the ex-factory price. This approach resembles Scenario I, with the specific component representing 59.3% of the total excise tax. The proposed configuration would generate tax revenues 7.8% higher, equivalent to an additional 78 million BRL monthly. The average tax burden would increase from 68.4% to 73.2%, accompanied by a substantial reduction in consumption and smoking prevalence. The tax reform would reduce smoking prevalence from 12.4% to 11.83%. Additionally, the monthly consumption among continuing smokers would decline so that total consumption declines by 15%, reaching 153 million cigarettes per month.

In Scenario III, the differences in price changes between categories become less pronounced. Both categories would experience a price increase and a significant consumption reduction of approximately 15%. Cheaper brands' average price would increase to 8.11 BRL, while premium cigarettes would be priced at 12.80 BRL. The tax burden for the premium category would be 69.5%, while the rate of taxes to retail price of cheaper cigarettes would exceed the World Health Organization's recommended threshold of 75%, reaching nearly 77%. A notable aspect of Scenario III is the increased contribution of higher-priced cigarettes to the total tax revenue. The tax share from premium brands would rise from 37.9% to 42%, indicating a more progressive taxation approach where higher-income consumers who tend to buy these products proportionally contribute a larger share of the tax collection.

Scenario IV aims to achieve a 25% reduction in cigarette consumption, significantly higher than the 15% reduction in Scenario III. A potential configuration involves a 92% ad valorem rate and a fixed rate of 3.75 BRL per package. The fixed component's relative share of 64% is closer to Scenario II, implying that lower-priced cigarettes would experience a proportionally higher price increase. Compared to Scenario III, prices would increase by approximately 1.00 BRL per package across both categories, with cheaper brands averaging 9.10 BRL and premium brands reaching 13.87 BRL.

In aggregate, Scenario IV would generate tax revenues 8.7% higher, equivalent to an additional tax collection of 87 million BRL monthly. This is notably more than the maximum revenue increase of 4.2% reported in a previous study by Divino et al. (2024) where the ST is composed of only an ad valorem tax without a specific component. The smoking prevalence would decrease by nearly 1 percentage point, representing 1.55 million quitters. The average tax proportion of the final price in Scenario IV slightly exceeds the WHO-recommended 75%. Legal cigarette consumption would decline by a substantial 45 million per month.

Similar to Scenario III, Scenario IV demonstrates comparable changes across price categories: consumption declines range between 24.4% and 25.2%, with tax burdens increasing by approximately 7 percentage points relative to the baseline. The tax burden for lower-priced brands remains approximately 8 percentage points higher than for premium brands. Given the significant positive implications for public health and the state's budget, Scenario IV emerges as our preferred configuration. Consequently, we will provide additional details of this scenario in Figure 1.

Figure 1. Changes in Scenario IV compared to the baseline

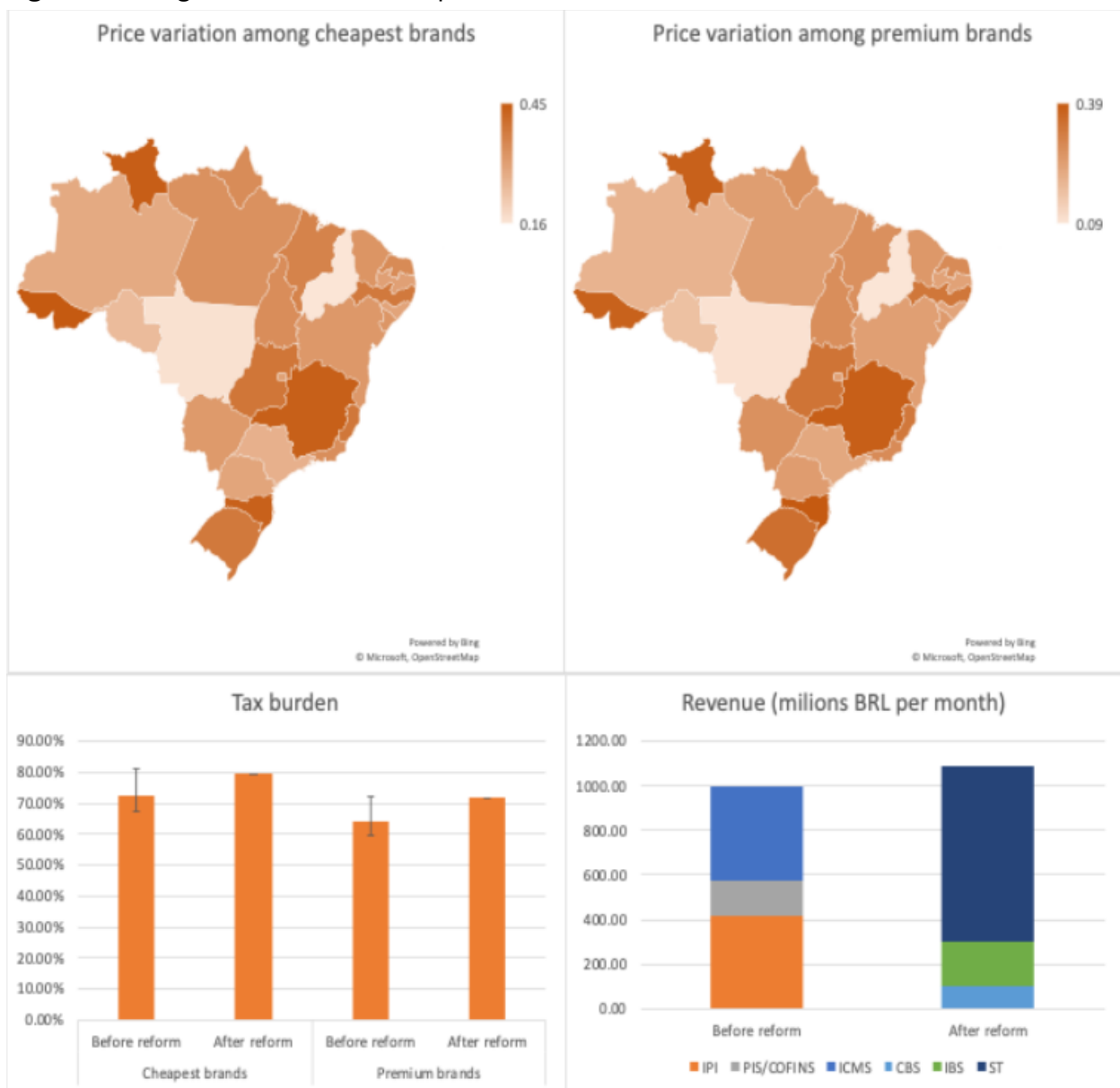


Figure 1 consists of four panels, illustrating the price variation of both types of brands, changes in tax rates and tax revenues in Scenario IV compared to the baseline. It is particularly interesting to examine the differences in percentage price variation among Brazilian states, which range from 16% to 45%, indicating significant regional disparities without a clear geographical pattern. The states with the highest percentage increases are Acre and Roraima in the northern part of the country. Furthermore, we observe Minas Gerais in the central region, along with the two southern states of Santa Catarina and Rio Grande do Sul, which also exhibit considerable increases.

When comparing the top two panels depicting price variation, we note great similarity between the types of brands. However, the percentage increases for premium brands, ranging from 9% to 39%, are lower. The similarity can be attributed to the initial conditions related to the state ICMS tax rates, and the new standardized ST implemented nationwide. The two states with the lowest tax rate increases are Mato Grosso and Piauí, which previously recorded the highest ICMS taxes before the tax reform.

In the lower-left panel, we observe the tax burden for both low-cost and premium cigarette brands, both before and after the reform. There are substantial increases in both tax burdens after the tax reform relative to the pre-reform baseline scenario.

In the second panel of Figure 1, located at the bottom right, we present a comparison of total tax revenues in millions of BRL per month, before and after the reform, categorized by the different tax types. The revenues from the IPI and the state-specific ICMS are approximately equal at 400 million BRL. Additionally, around 200 million BRL are generated from the PIS/COFINS tax, which is also collected at the federal level. Post-reform, the combination of the general CBS and IBS is projected to reach about 300 million BRL per month, with the majority stemming from the new sin tax ST. This fact further underscores the necessity of establishing an adequately high ST to prevent the prices of harmful products,

such as cigarettes, from becoming lower than before the reform, which would undermine the rationale behind the ST.

Conclusion and Recommendations

This study examined the potential effects of Brazil's extensive tax reform on the cigarette market and the resulting tax revenues. Cigarettes are categorized in Brazil as products detrimental to health and the environment. Under the proposed tax reform, these harmful products will be subject to a selective tax, enabling the government to generate additional revenue to address the healthcare costs and other negative externalities associated with their consumption.

Overall, this research demonstrates that the tax reform presents a tangible opportunity to achieve a dual dividend: by implementing a sufficiently high ST, it is possible to increase tax revenues while simultaneously reducing cigarette consumption. This considers both the reduction in consumption among existing smokers and the deterrence of primarily young individuals from initiating smoking due to higher cigarette prices. In one of the scenarios, this could lead to over 1.5 million individuals quitting smoking, resulting in significant positive impacts on individual health and public healthcare expenditures.

Several important considerations regarding the framework of the tax reform merit attention: this study is based on the current version of the bill under discussion at the Senate. However, it is important to note that further political discussions may lead to substantial amendments. We emphasize several key points that the new framework should encompass to maximize benefits for the population. First, the mixed structure of the ST, comprising both a fixed and an ad valorem component, should be maintained. This approach can generate significant additional tax revenues while ensuring that cheaper cigarettes do not become excessively affordable. Second, although this topic falls outside the scope of the present study, we advocate for annual adjustments to the ST.

To avoid any increase in cigarette affordability, it is crucial that tax rates and cigarette prices are adjusted annually to account for inflation and changes in the purchasing power of the population. Without such adjustments, harmful products like cigarettes could become relatively more affordable over time and experience an increase in consumption. This issue has been observed in other countries, and the Brazilian government should learn from these negative examples to prevent an increase in cigarette consumption in the future.

Additionally, it is prudent to consider applying these findings to other harmful products. Substitutes for cigarettes, particularly the increasingly popular vaping products and non-combustible tobacco alternatives, deserve attention. If these products are not subjected to the ST, they could become more attractive, potentially leading former cigarette smokers to switch, thereby negating some of the positive effects of the tax reform.

As a limitation of this study, we note that the transition period was not addressed. This omission is due to the lack of publicly available details and the complexity of the upcoming transitional phase, which extends until 2033. It is particularly critical that, during the transition between different tax types, the overall tax burden for cigarettes does not fall below the current level. In other words, it is essential to avoid a temporary decrease in cigarette prices, which could pose a significant risk of increased smoking prevalence. This phenomenon could establish a higher level of smoking within the population that may persist for an extended period. We therefore recommend that the transitional phase either be suspended for products under the ST or be regulated separately to ensure that a price decline is prevented. Another issue to be further addressed is the impact of the change in the PIS/COFINS tax basis and its impact on revenue collection, cigarette prices and consumption.

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