Tax Reform and Selective Tax on Tobacco in Brazil

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Abstract

Background

Brazil is currently undergoing a comprehensive tax reform, with the goals of reducing the number of different taxes along the production chain as well as harmonizing tax rates and simplifying the country's tax system. The House of Representatives has already approved the Constitutional Amendment (PEC 45-A/2019), which is currently under analysis by the Senate. As of early February 2024, the tax reform foresees 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. 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. Estimates of own- and cross-price elasticities of cigarette consumption by price category and federal states in Brazil come from our previous studies. This analysis only simulates the ST considering alternative ad valorem tax structures, as other tax structures including specific component or alternative minimum price levels are in preparation.

Results

Assuming a dual VAT of 27 percent, the ST ad valorem rate should be 171 percent to replicate the total tax collection from the baseline. Some states, however, would reduce tax revenue with respect to the baseline scenario. If the goal is to make sure that no individual state loses revenue, then the ST should be set at 232 percent. In this case, consumption would decrease by about nine percent in the low-price category while total tax collection would increase by 4.3 percent relative to the baseline.

Conclusions

The selective tax must be carefully chosen to be higher than the 171-percent rate needed to replicate the baseline (that is, at least 232 percent) to avoid reduction of the tax burden, drops in prices, higher consumption, and declining tax collection on cigarettes. Alternative tax structures (including specific component on the ST and a minimum cigarette price) may result in higher revenues and higher decrease in cigarette consumption. The 10-year tax-reform transition period should not be applied to cigarettes, since it might result in a significantly long period with lower taxes, reduced prices, and higher cigarette consumption. Moreover, using the revenue from the selective tax to bolster the public health system's tobacco control efforts would be a sound investment by the government, as it would result in further reduction of the costs associated with tobacco-related diseases.

Introduction

In July 2023 the House of Representatives approved the Brazilian tax reform under Constitutional Amendment (PEC 45-A/2019) and remitted it to the Republic Senate. On 24 October 2023 the Senate Constitutional, Justice, and Citizenship Commission issued the final report, which was approved by the plenary on 9 November 2023.[1] The major goal of the reform is to simplify the country's tax structure by unifying different consumption taxes under a unique and harmonized VAT-type tax for all goods and services along with a selective tax for products that are harmful to health or the environment, including tobacco. The tax reform is expected to have a 10-year transition period, meaning that it will be fully effective only in 2033. Table 1 summarizes the changes with respect to the current tax scheme for tobacco.

Table 1. Tax reform for tobacco products.

	Current	**Replace into**	**Note**
Constitutional Amendment (PEC 45-A/2019)	**ICMS** (a VAT-type state level tax, unharmonized across states) **IPI**, and **PIS/COFINS**, are also VAT type taxes, but under different tax schemes. The **IPI** also works as an excise tax.	A harmonized VAT-type tax, comprising the Contribution on Goods and Services (**CBS**) at the federal level and the Tax on Goods and Services (**IBS**) at the state level. A unique ad-valorem selective tax (**ST**) on tobacco products	(i) CBS at the federal level is charged at the retail price and common to all goods and services. (ii) IBS at the state level is charged at the retail price and common to all goods and services. (iii) ST on tobacco products is charged at the ex-factory price and common across states and cigarette price categories.

The tax reform will affect cigarette taxation by replacing the current tax scheme and changing the tax basis, which is currently mostly based on the retail cigarette price. After the reform, the CBS and IBS will be levied on the retail price while the ST will be charged at the ex-factory price.[2] This is a significant change relative to the current tax scheme and might imply a reduction in tax, decrease in price, and increase in cigarette consumption in Brazil, on the other hand, this revision of the tax structure is also an opportunity to increase cigarette taxes in Brazil. Therefore, as 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.

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[1] In fact, the Commission´s Report refers to the constitutional amendment bills 45/2019, 110/209 and 46/2022, which were discussed along with the process.
[2] By retail price we mean the price that includes the selective tax (charged on the ex-factory price) and the distribution/retailer profit margins. This is different from the consumer price, which includes the CBS and IBS charged on the retail price.

The objectives of this research component 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 selective tax (this preliminary analysis only considers alternative ad valorem rates for the ST, as other tax structures including specific component or alternative minimum price levels are in preparation) 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.

Current tobacco tax structure: A summary

There are a number of taxes that may affect cigarette prices in different ways, such as import and export taxes, the consumption tax (ICMS), PIS/COFINS, and IPI, which works 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.

This report will not address taxes on imports (tariffs) of cigarettes, currently at a rate of 20 percent ad valorem (there is no specific tax levied on imports). This tax is added to the import price to become the tax basis for IPI and ICMS, which, along with PIS/COFINS, are levied on imports. The export tax is levied on exportation of cigarettes to neighboring countries at below 150 percent of the tax rate. It is aimed to avoid the triangular scheme known as "carousel" fraud on exports, since IPI, PIS/COFINS, and ICMS are not levied on exports. These aspects are worth mentioning but are not the focus of this report. Following is a brief description of the taxes internally levied on cigarettes, which will be subject to change through the tax reform.

IPI
The IPI (tax on manufactured goods, also called tax on industrialized products) is a federal tax. It is considered the closest to an excise tax, being levied under different tax rates depending on the product. The tax incidence is only at the production chain. It is not levied on the commerce chain. The IPI is a sort of value-added tax. The ad valorem rates for the IPI are listed in the tax schedule (TIPI)[3].

For some products the IPI can also be levied under a specific rate (ad rem taxation), which is the case for cigarettes. The ad valorem tax rate for cigarettes in the TIPI is 300 percent; however, the current methodology, under a special tax regime[4], applies an ad valorem

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[3] Currently under Federal Decree 11.158/2022.
[4] 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.

rate levied on 15 percent of the retail price, which results in a lower effective tax rate. The IPI applies a mixed tax rate structure (ad rem and ad valorem simultaneously). Currently the tax rates for the IPI are as follows:

- specific: 1.50 BRL per pack and
- ad valorem: 66.7%, with the tax basis being 15% of the retail price.

The IPI calculation is made in a way that the tax shall be added to the product price to find the value to be paid (the IPI is not included in the price at factory level). It is important to say that the retail prices must be published by the tobacco companies before they sell the cigarettes. The price may vary among states due to logistics costs, pricing strategy of the producers, and differences in ICMS tax rates, among other factors. One important point is that the IPI legislation brings a series of regulations to the cigarette market. It requires that only cigarettes in packs of twenty sticks can be sold in Brazil. It also imposes a minimum price for cigarettes (currently 5 BRL). Therefore, any cigarette sold under this minimum price is illegal.

PIS/COFINS

These taxes are social contributions.[5] The PIS/COFINS is charged on the turnover of juridical persons and is levied under two tax regimes, depending on the size of the company: it is a "pure" turnover tax for smaller companies and a VAT-type tax for bigger companies. It is also levied on imports but not on exports.[6]

For the cigarette sector, however, the PIS/COFINS calculation is subject to a special tax regime called tax anticipation (which works similar to a withholding tax at the source of production) at the manufacturer or importer level. For cigarettes, regardless of the size of the company the PIS/COFINS will be calculated under the cumulative regime, 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. The final tax rates are as follows:

- PIS = 0.65% x 3.42 x retail price and
- COFINS = 3% x 2.9169 x retail price.

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[5] The name of different two social contributions levied on the turnover of the companies (Silva, 2017, p. 163-173), plus the PASEP (other social contribution), which we together PIS/COFINS. The legal names of these social contributions are Contribution for the Social Integration Program (PIS); Contribution to Public Servants' Patrimony Building Program (PASEP); Contribution for Financing Social Security (COFINS). The tax revenue of the PIS has a different destination of the COFINS; while the PIS has a specific destination (for example, the unemployment insurance system), the COFINS is used to fund general expenses of the social security system. The PASEP is levied on the public revenue of public juridical persons (this is not of interest for this research).

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

Imports are levied by the PIS/COFINS under the cumulative rate of 11.75 percent, but this tax paid will not be admitted as tax credit for the importer when calculating the PIS/COFINS due to domestic sales, therefore importation will end up with a higher tax burden.[7] 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.

ICMS

The ICMS (tax on the circulation of goods, interstate and intermunicipal transportation, and communication services) is a state tax. It is the most important source of tax revenue for the states. It is a VAT-type tax, governed by Complementary Law 87/1996, but states have room to apply different tax rates, except when it comes to interstate commerce. Therefore, tax rates for cigarettes vary between the states. Table 2 shows the ICMS tax rates for 2019 (the baseline scenario we use in this report) and the current rates. The fourth column of the table shows the total ICMS tax rate on cigarettes (breaking down cigarette rate + FFEP[8] surtax) for 2019, and for the current rates (2023).

The ICMS is also levied on imports, but exports are fully exempt. The tax rates on imports are the same for internal transactions. ICMS is a VAT-type tax. However, cigarettes are submitted to a similar simplification tax measure applied to PIS/COFINS, which is the tax substitution or tax anticipation (Silva, 2017, 393-394). Under this special tax regime, the ICMS tax rate is applied to the retail price, but the tax is collected at the cigarette manufacturer or the importer.[9]

The variation of ICMS rates is one of the reasons why cigarette prices vary among the states. The prices of cigarettes in the different states are published by the cigarette manufacturers because it is mandatory under IPI Regulations. States use this price as the tax basis to calculate the ICMS, which is embedded in the final price.

Table 2. ICMS tax rates per Brazilian state: 2019 and 2023

States	ICMS	FFEP	Total (2019)	Total (2023)
Acre	25%	0%	**25%**	30%

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[7] 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).

[8] States can levy an additional ICMS tax rate (a surtax) on non-essential goods (superfluous) to fund public policy addressing poverty (named as Fund to Fight and Eradicate Poverty - FFEP) (Queiroz at al 2016). Cigarettes are included. However, not all states adopt this measure.

[9] There is an interstate compact, negotiated by the states to regulate this activity. This compact is necessary because the ICMS of one state is collected at the manufacturer states on behalf of the consuming state. Most of cigarette manufacturers are in the South and Southeast Regions (closer to the tobacco farms), and the cigarettes are distributed to the whole country.

Alagoas	29%	2%	**31%**	31%
Amapá	29%	0%	**29%**	29%
Amazonas	30%	2%	**32%**	32%
Bahia	28%	2%	**30%**	30%
Ceará	28%	2%	**30%**	30%
Distrito Federal	29%	2%	**31%**	31%
Espírito Santo	25%	2%	**27%**	27%
Goiás	25%	2%	**27%**	27%
Maranhão	27%	2%	**29%**	29%
Mato Grosso	35%	2%	**37%**	37%
Mato Grosso do Sul	28%	2%	**30%**	30%
Minas Gerais	25%	0%	**25%**	25%
Pará	30%	0%	**30%**	30%
Paraíba	29%	2%	**31%**	31%
Paraná	29%	2%	**31%**	31%
Pernambuco	25%	2%	**27%**	27%
Piauí	35%	2%	**37%**	35%
Rio de Janeiro	27%	2%	**29%**	29%
Rio Grande do Norte	27%	2%	**29%**	29%
Rio Grande do Sul	27%	0%	**27%**	27%
Rondônia	32%	2%	**34%**	34%
Roraima	25%	0%	**25%**	25%
Santa Catarina	25%	0%	**25%**	25%
São Paulo	30%	2%	**32%**	32%
Sergipe	28%	2%	**30%**	30%
Tocantins	27%	2%	**29%**	29%

Source: State legislation available on state´s websites

The Tax Structure Proposed by the Tax Reform

The Constitutional Amendment PEC 45-A/2019 intends to replace the PIS/COFINS, IPI, and ICMS with three taxes: the CBS, IBS, and the selective tax (ST). The 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 per good/service must be equal among the states. The aims are simplification and harmonization.

The tax structure for tobacco products, especially cigarettes, is not detailed in the tax reform proposal at the current stage. The detailed legislation will come up after the constitutional amendment approval, which took place in December 2023, in the form of

a complementary law. However, the PEC 45-A/2019 provides some details that allow us to foresee the future tax scheme.

IBS and CBS are VAT-type 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. Despite not specifically defined on the Constitutional Amendment, the ST would be charged on the ex-factory price. In that case it will be included in the tax basis of the CBS and IBS. The constitutional amendment does not provide many details on the ST calculation. 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.[10]

CBS and IBS will be levied on the retail price, and 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.

In terms of tax rates for IBS and CBS, there are still ongoing discussions. This report adopts Orair and Gobetti's (2021) approach to estimate the future tax rates and considers that the CBS and IBS taxes will sum up to 27 percent, with the CBS at 10.3 percent and the IBS at 16.7 percent. The simulation of the ST rate is the focus of this report and may vary depending on the scenario and public policy objectives.

In relation to other issues such as the format of the ST rates, we consider for now that it will be levied only ad valorem. However, a specific rate (ad rem) would be advisable as recommended by the specialized literature (see Chaloupka et al., 2010; Lee et al., 2023). The same logic applies to the minimum price. This aspect will be defined by the new ST legislation, while for now the constitutional amendment proposal does not address that aspect. It is important to remember that the minimum price for cigarettes is under the IPI legislation; therefore, it must also be replaced in the new ST legislation in order to preserve the gains from this type of tobacco control policy.

Methodology

The present section describes how we analyze the effects of the tax reform on the cigarette market and the associated tax collection by applying a static partial equilibrium model based on data provided by official sources.

First, the model is calibrated to reproduce the actual federal tax collection from IPI and PIS/COFINS under the current tax regime. According to the Brazilian Federal Revenue

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[10] The equation (7) in the appendix A describes it explicitly.

Service (RFB), the sum of these two taxes in the reference year 2019 was 6.9 billion BRL. The tax burden is easily calculated from the IPI, PIS/COFINS, and ICMS rates as a fraction of the retail price. Cigarette prices and consumption are obtained from the National Health Survey (PNS) carried out by IBGE in 2019.

The PNS is a nationally representative survey that, among many other questions, asks individuals about the price, quantity, and brand of their latest cigarette purchase. To conduct the simulations, cigarettes are classified into three price categories. The first category (PC1) represents the illegal market. This information is provided in the proper PNS data and is obtained by a combination of the price and the declared brand, according to the official brand classification as licit or illicit by the National Health Surveillance Agency (ANVISA). Most of the illegal cigarettes are sold below the official minimum price of 5.00 BRL, as reported in Divino et al. (2022a, 2022b). Price categories 2 and 3 are defined according to the median price in the legal cigarette market and represent low- and high- price cigarettes, respectively. The share of smokers in each federal state observed in the PNS data is multiplied by the number of inhabitants aged 15 years and older, so that the simulation can use the total number of smokers and their average per capita cigarette consumption in each price category and Brazilian state.

The PNS also provides socioeconomic information that allows us to estimate the price elasticities of cigarette demand, following the methodology exposed in detail in Divino et al. (2022b). These elasticities are also specific by federal state and price category. They range from -0.55 to -0.90 and indicate by how many percentage points total cigarette consumption would decrease if prices rose by one percent. That is, the present simulations account for the fact that smokers adjust their consumption to price changes induced by the tax reform. Finally, the calibration of the model yields the baseline scenario that replicates the total tax collection in the year of 2019.

The second step in the simulation procedure is to change the tax structure according to the Constitutional Amendment proposal PEC 45-A/2019. The focus of our simulations is on the selective tax (ST) on cigarettes, which will be defined by a complementary law. This analysis only simulates the ST considering alternative ad valorem tax structures, as other tax structures including specific component or alternative minimum price levels are in preparation. This analysis assumes the ST would be applied on the ex-factory price. The first scenario (Scenario I) assumes ST on cigarettes is defined to match the overall total revenue collection from the baseline. The second scenario (Scenario II) assumes ST is defined to maximize total tax collection (assuming the revenues will be allocated across States according to the tobacco consumption on each State[11]). Finally, the third scenario (Scenario III) assumes no ST on cigarettes; that is, ST is equal to zero. Therefore, we simulate the following three scenarios:

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[11] The constitution al amendment does not define tax sharing mechanisms. This is a strong assumption as States with high population and high tobacco consumption drive the maximization of revenues.

- Scenario I: ST replicates the total tax collection from the baseline.
- Scenario II: ST is chosen to maximize total tax collection.
- Scenario III: ST is set equal to zero.

In all scenarios, we assume a CBS (federal VAT) component of 10.3 percent and an IBS (state VAT) of 16.7 percent according to the comprehensive study by Orair and Gobetti (2021). 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 current discussion involves the definition of goods and services that will receive reduced tax rates (basic foods, health care, and others) so that the base rate must go up to compensate for the many tax exemptions. An important detail that distinguishes the present study from other related tax reform simulations (Divino et al., 2022a, 2022b) is that the tax basis for the dual VAT (CBS and IBS) is the retail price, which is known, whereas the tax basis of the ST is the ex-factory price, which is unobservable. The latter can be obtained implicitly once the tax burden and average retail profit margin are known. 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.

This is an important finding not only because the simulation results will not be too sensitive to changes in industry profit margins but also because the ex-factory price is not observable, being obtained implicitly. That is, once the retail price, the taxes, and the profit margins are known, the ex-factory price can be calculated. The mathematical details on how the ex-factory price, tax burden, and price changes are calculated can be found in Appendix A.

A relevant aspect of the cigarette market, which is the illicit trade, was not considered in this research for the following reason. Although the share of the illegal cigarette market can be calculated from the PNS data, it is disregarded here because the tax reform does not directly affect prices of these illegal products and, obviously, their contribution to the tax revenue is zero. In addition, there is a robust result by Divino et al. (2022b) showing that there is no switching demand effect from the licit to the illicit market when there is an increase in the licit cigarette prices. Thus, we do not have to consider any impact on the licit cigarette market caused by the selective tax on cigarettes after the tax reform.

Results

A summary of the baseline and the three reform scenarios is displayed in Table 3. In the baseline scenario, the overall monthly tax revenue from legal cigarettes sales in Brazil in the reference year of 2019 is equal to 1.002 billion BRL per month. The tax burden for cigarettes in the low-price category (PC2) is estimated at 72.6 percent, with an average

price of 6.81 BRL for a pack with 20 cigarettes. The low-price category accounts for 62 percent of total revenue, meaning that most smokers buy low-price cigarettes. Cigarettes in the high-price category are sold for around 11.00 BRL, on average, per pack. Because the current IPI tax has a specific (ad rem) component, the tax burden in this category is lower (64.3 percent) than in PC2 (72.64 percent).

In Scenario I, the selective tax rate is set at 171 percent to match the current overall total tax collection on cigarettes, which implies that total revenue remains unchanged after the tax reform. It is worth mentioning that this result takes into account the legal minimum price currently in place in Brazil of 5.00 BRL per pack. This is quite important in Scenario I, since after the reform the new tax burden can decrease far enough below the one under the current tax structure such that the price charged per pack could drop below the legal minimum price. Therefore, the ST needed to match the current total tobacco tax revenue should be higher.

Table 3. Summary of tax reform scenarios

	Baseline	Scenario I	Scenario II	Scenario III
Selective tax (calibrated)	-	171%	232%	0%
Tax revenue (m. BRL / month)	1001.97	1001.96	1044.86	195.04
Change (Baseline ref)	-	0.00%	4.28%	-80.53%
Price category 2 (BRL / pack)	6.81	6.19	7.42	5.00
Standard deviation	0.27	0.78	1.16	0.00
Tax burden	72.64%	69.39%	74.83%	21.26%
Standard deviation	3.62%	0%	0%	0%
Share of tax revenue	62.07%	59.99%	62.95%	45.45%
Consumption (% Change)	-	8.31%	-9.43%	32.71%
Price category 3 (BRL / pack)	10.96	12.79	15.55	5.25
Standard deviation	0.86	1.66	2.01	0.33
Tax burden	64.34%	69.39%	74.83%	21.26%
Standard deviation	3.20%	0%	0%	0%
Share of tax revenue	37.93%	40.01%	37.05%	54.55%
Consumption (% Change)	-	-12.34%	-35.12%	93.75%

Source: authors' calculations.

The seemingly high nominal tax rate stems from the fact that the ST is levied on the ex-factory price, which is much lower than the retail price used as the tax basis before the tax reform. In the absence of a specific tax component, the tax burden in Scenario I is the same for both PC2 and PC3 (69.4 percent). Consequently, we observe that prices of low-price brands would fall to 6.19 BRL, and those of high-price cigarettes would rise to 12.79 BRL, on average. The price reduction for PC2 yields an 8.3-percent increase of low-price cigarette sales, while the demand for cigarettes in PC3 decreases by 12.3 percent. Another

consequence of the tax reform is that tax rates become fully harmonized across the Brazilian states, as can be seen from the zero-standard deviation of the tax burden in Table 3.

Figures 1, 2, and 4 in the Appendix illustrate the changes in tax revenue, tax burden, and cigarette consumption for each federal state in Scenario I. It is worth noting that 12 of the 27 Brazilian states would register a lower tax collection from cigarette consumption under Scenario I. Given that severe disagreements about distribution conflicts have led to previous reform efforts failing, a scenario where almost half of the states lose tax revenue while the others materialize gains seems unlikely to obtain political support. We account for this misalignment by considering a second scenario, which ensures that each state continues to collect at least the same total revenue as in the baseline.

Scenario II shows that tax revenue from cigarette sales can be increased by 4.28 percent if the ST is set to 232 percent. In this case, cigarette consumption in price categories 2 and 3 would drop by 9.43 percent and 35.12 percent, respectively. Prices in the low-price category would increase by 0.61 BRL per pack, while in the high-price category a 20-cigarette pack would be sold at about 15.55 BRL. The share of both categories in terms of tax collection would be roughly equal to the baseline scenario. Figures 1, 3, and 5 in the Appendix illustrate the changes in tax revenue, tax burden, and cigarette consumption across the Brazilian states under Scenario II.

The third scenario evaluates the undesirable scenario in which the government fails to implement a selective tax on cigarettes. A ST equal to zero implies that the tax burden would fall to 21.26 percent in both price categories. Note that the average price in the low-price category could drop below the official minimum price of 5.00 BRL per pack. This price, however, is unfeasible because it is forbidden by the law to sell legal cigarettes below the minimum price in Brazil, and the tax reform does not deal with the minimum cigarette price. Therefore, cigarettes in the low-price category would be sold at the lowest allowed price under the current legislation, which is 5.00 BRL per pack. The crucial difference to the previous scenarios is that the industry would end up with the difference between the much lower production price including taxes and the retail minimum price. Cigarette industry profits would increase while tax revenue would drop by 80.5 percent, from 1.002 billion BRL to only 195.0 million BRL per month.

Cigarettes in the high-price category would decrease from 10.96 BRL to 5.25 BRL per pack, on average. In some states, the minimum price of 5.00 BRL would be binding in the high-price category. In this case, cigarette consumption would rise by 93.75 percent. Note that despite the sharp increase in cigarette sales, the tax collection without a ST component could fall by more than 80 percent when compared to the baseline scenario. Therefore, the zero ST scenario is by far the worst one by any aspects one might consider and should be avoided under any circumstances.

Conclusions and Recommendations

The present research analyzes how Brazil's comprehensive tax reform may impact the cigarette market and the associated tax collection. Cigarettes are among the products classified by Brazil as harmful to health or the environment. Those harmful products will be subject to a selective tax in the tax reform, so that the government can collect additional taxes to bear the costs from the related diseases and other negative externalities that arise from their consumption. In fact, the current legislation already includes a specific component and additional ad valorem rates in the IPI tax that are particular for cigarettes. To keep the recommended and successful tobacco control public policy of using tax policy to reduce cigarette consumption, it is crucial to set the selective tax in such a way that prevalence and cigarette consumption will not increase after the tax reform.

Simulations based on official tax information and microdata on smoking behavior show that the selective tax 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. In the worst case—that is, without a selective tax—the government's tax collection from cigarette sales would fall by 80 percent and consumption of high-price cigarettes may increase by as much as 93.75 percent.

Despite this paper did not analyze the impact of pure specific ST or mix tax structures that combine specific and ad valorem components for the ST, it clearly shows that Brazil has enough room to implement a new ST that simplifies the tobacco tax structure, and at the same time reduce cigarette consumption and increase revenues. In the most favorable scenario, where we assume that the government's objective is to ensure each state's total tax collection is at least the same as the baseline, the selective tax on cigarettes should be equal to 232 percent. In this case, tax collection would increase by 44 million BRL per month (4.3 percent rise in relation to the baseline) and cigarette consumption would fall by nine percent for the low-price category and 35 percent for the high-price category of cigarettes. These tax rates would be harmonized among states, which is another advantage of the ongoing tax reform.

A delicate issue for the cigarette market, however, is the 10-year transition period of gradual implementation of the tax reform until complete fulfilment of the tax reform. During this transition period, tax would be gradually changed from the current tax scheme to the new VAT-type tax regime under the tax reform. There is a real and very high risk of reduction in taxes on cigarettes due to the difficulty of replicating the current tax scheme into the new one. To avoid such undesirable misalignment, we recommend that the tax reform is immediately applied to harmful products, including cigarettes, with no transition period between the current and the new tax regime. It does not make any

sense to allow for a transition period during which prices, tax collection, and tax burden decrease while cigarette consumption increases over time.

It is also important that the IPI regulations for packaging and pricing of cigarettes should remain under the ST legislation. Keeping the regulation imposing sales only in packs of 20 cigarettes is essential. We also recommend maintaining the mandatory minimum price for cigarettes in Brazil, which upon closer inspection should be increased such that it follows the evolution of purchasing power and other relative price changes over time, as suggested by Divino et al. (2023). The minimum price policy sets a floor price at the retail level, has a positive effect on revenue collection, and at the same time it increases price and reduces cigarette consumption. The positive effects of setting a minimum price and regularly revising its appropriateness as part of an effective tobacco control policy are well known in Brazil (Divino et al. 2022b). Despite sufficiently high enough tax rates will make any minimum price levels irrelevant, in particular when implemented as part of specific tax increases, evidence from Brazil shows the relevance of regularly raising the minimum prices.

Without a minimum price, the government may risk decreasing cigarette prices in some federal states, depending on the exact value of the dual VAT and the selective tax. It would be wise for the government to dedicate the tax revenue from the selective tax to cover costs from treatment of tobacco-related diseases within the public health system.

Another important topic is how the tax reform and potential price changes affect the size of the notoriously large illicit cigarette market in Brazil. According to the estimations in Divino et al. (2022b), the market share of illicit cigarettes in 2019 was 49.3 percent, with a mean price of 4.40 BRL per pack. The authors also report that a price increase of legal cigarettes would not increase sales of illegal cigarettes. That is to say that the cross-price elasticity from the licit to illicit cigarette market is statistically equal to zero, and so there is no switching demand effect from the licit to the illicit market under any increase in the licit cigarette prices. Therefore, one should not expect any increase in the illicit cigarette market after the tax reform that eventually raises taxes and cigarette prices.

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Appendix

A – Simulation notes

- Consider the amount of tax paid by an agent (firm, consumer, country, etc.), in each period, as proportion of the retail price,

$$B = \frac{Amount\ of\ tax}{P_r} \tag{1}$$

where B is the tax burden, P_r is the retail price.

- In general, the retail price is computed as

$$P_r = Amount\ of\ tax + P_f(1 + m), \tag{2}$$

where P_f is the factory value of the product, and m is the industry average profit margin over the factory value.

- Dividing (2) by P_r, and solving for the tax burden one gets

$$B = 1 - \frac{P_f}{P_r}(1 + m). \tag{3}$$

- Considering the Brazilian current tax structure, in a very simple way, the retail price is

$$P_r = \tau_0 + \tau_r P_r + P_f(1 + m) \tag{4}$$

where τ_0 is a fixed amount charged per pack, and τ_r is the tax rate applied over the retail price. Thus, the prices ratio is given by

$$\frac{P_f}{P_r} = \frac{1 - \tau_r - (\tau_0/P_r)}{1 + m}, \tag{5}$$

- Replacing (5) into (3) the tax burden is given by

$$B = \tau_r + \frac{\tau_0}{P_r}. \tag{6}$$

- Since the retail price, the tax rates, and the profit margin are known, the factory value can be implicitly obtained through (5) and (6).

- This result enables us to construct the baseline scenario.

- The tax burden after tax reform is not that given by (6) since the tax structure will be different.

- Thus, to obtain B_i, the tax burden for the simulating scenario i, consider the following:

  o According to the Constitutional amendment approved by the lower house, the retail price can be computed by

  $$P_r = (1 + \tau_{ST} + m)P_f + (1 + \tau_{ST} + m)P_f \cdot \tau_{GST} \qquad (7)$$

  which solving for the prices' ratio,

  $$\frac{P_f}{P_r} = \frac{1}{(1 + \tau_{GST})(1 + \tau_{ST} + m)}. \qquad (8)$$

  o Again, replacing (8) into (3) and solving for B

  $$B_i = 1 - \frac{(1 + m)}{(1 + \tau_{GST})(1 + \tau_{ST} + m)}. \qquad (9)$$

- From (3) is quite easy to see that, in general,

$$P_r = \frac{1 + m}{1 - B}P_f. \qquad (10)$$

- Considering P_f and m fixed, i. e., the firms' production costs, and profit margin do not change with the tax reform, using (10), the retail price change due to a tax reform can be expressed as

$$\frac{\Delta P_r}{P_r} = \frac{P_r^i - P_r^0}{P_r^0}$$

$$\frac{\Delta P_r}{P_r} = \left(P_f\left(\frac{1 + m}{1 - B_i}\right) - P_f\left(\frac{1 + m}{1 - B_0}\right)\right)\frac{1}{P_f}\left(\frac{1 - B_0}{1 + m}\right)$$

$$\frac{\Delta P_r}{P_r} = \frac{B_i - B_0}{1 - B_i}.$$

- The superscript 0 indicates baseline scenario values and i any of the reform scenarios. Therefore, the only sort of price changing is the tax burden change.
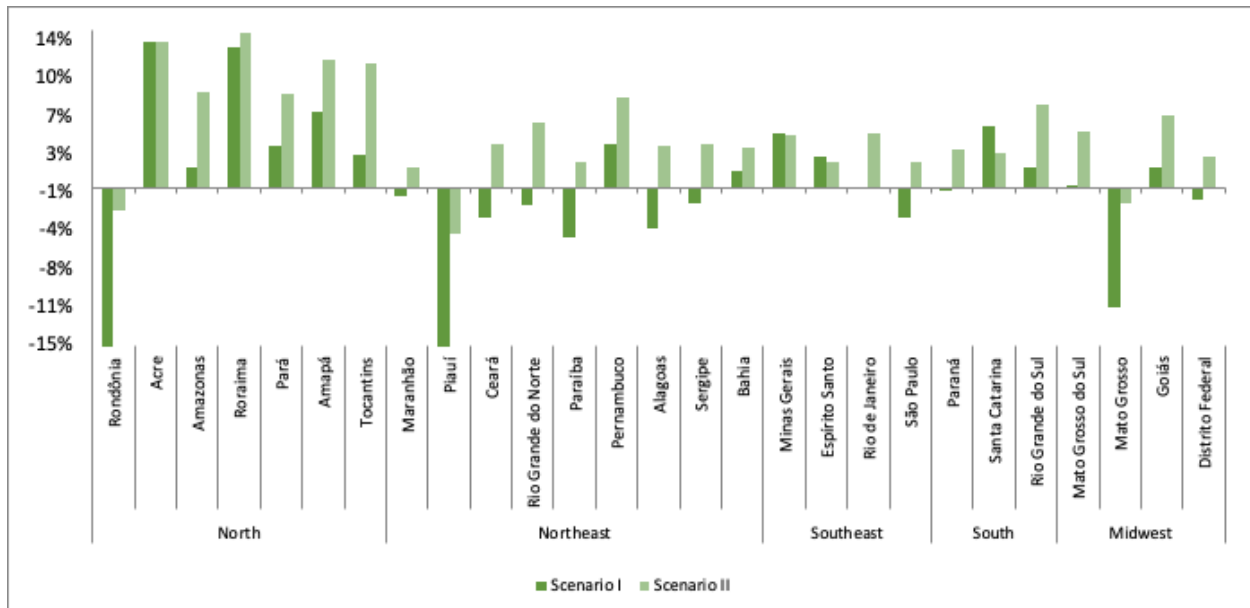
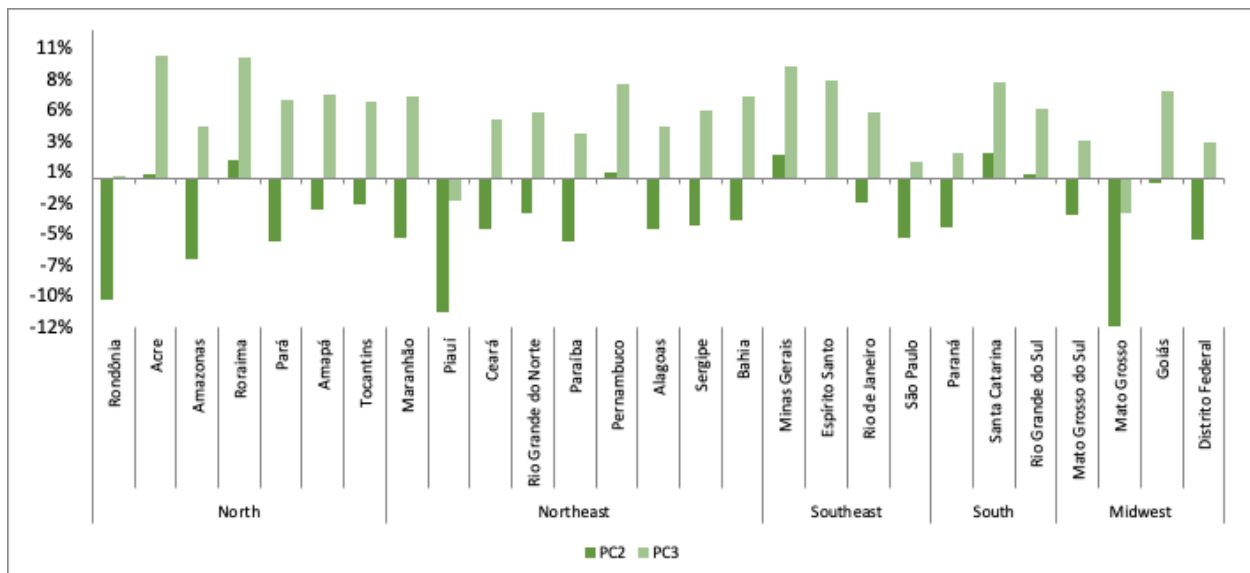Figure 1: Tax revenue change across Brazilian states

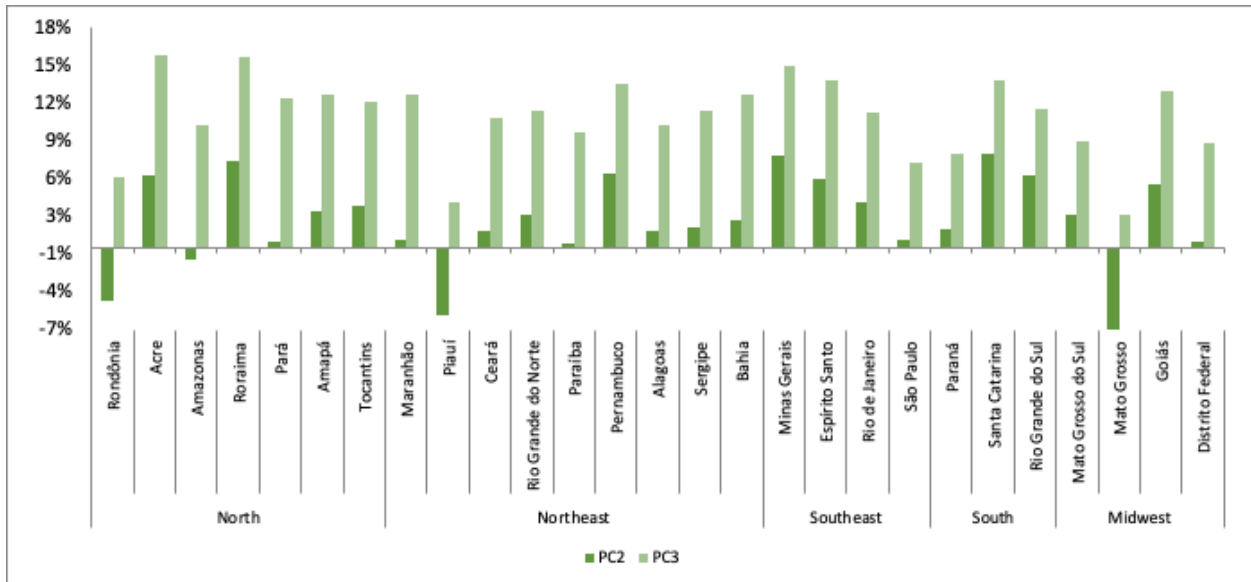Figure 2: Tax burden change across Brazilian states for Scenario I

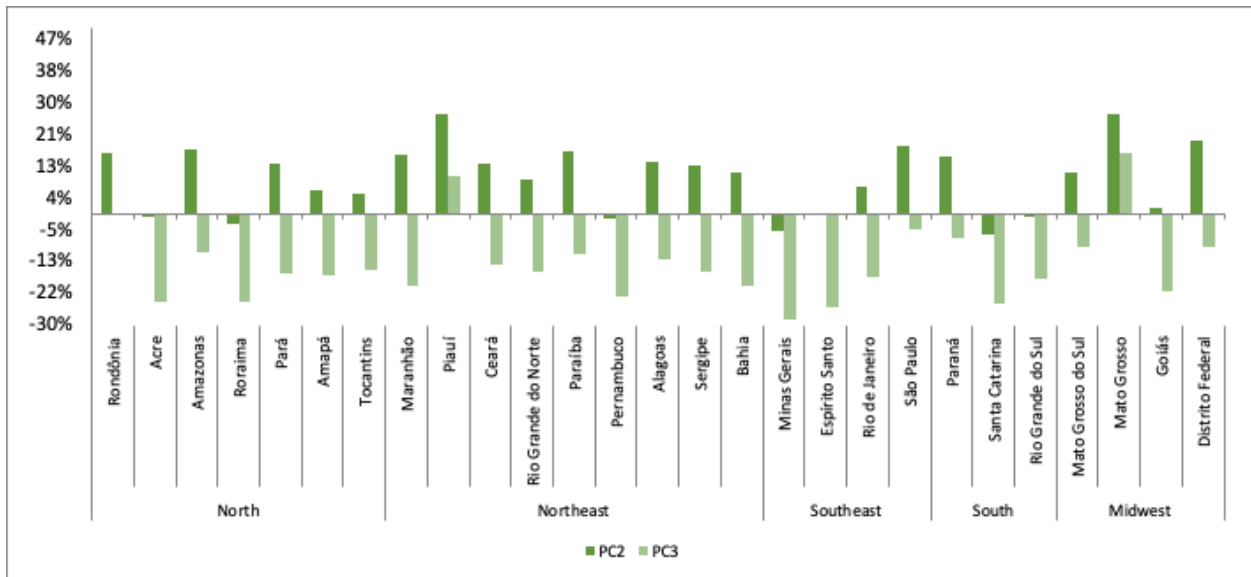Figure 3: Tax burden change across Brazilian states for Scenario II

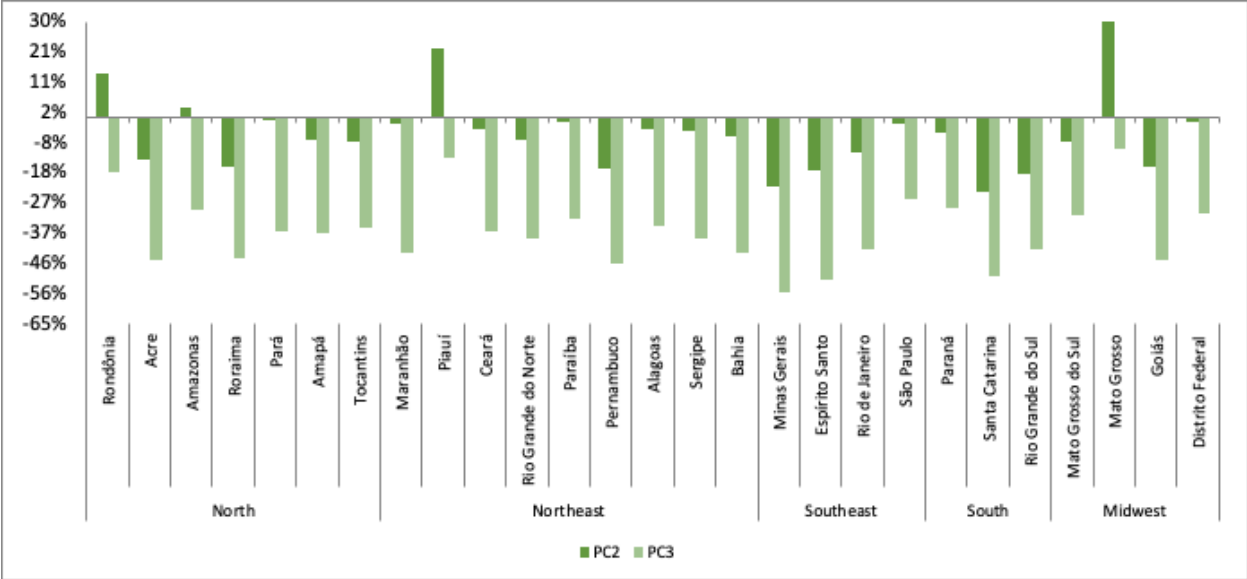Figure 4: Consumption change across Brazilian states by price categories - Scenario I

Figure 5: Consumption change across Brazilian states by price categories - Scenario II