

# Effect of Introducing a New Low-Tier Cigarette Brand on Cigarette Tax Revenue in Bangladesh: Evidence from cigarette sales by British American Tobacco (BAT) in Bangladesh, 2019–2020

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## Abstract

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### Background

A substantial body of evidence demonstrates that significantly increasing cigarette prices via cigarette tax increases is the most effective way to reduce cigarette smoking in addition to producing higher tax revenue. In Bangladesh, the complicated tiered ad valorem cigarette tax system, with a low base price for each tier, has made tobacco tax a less effective instrument to control smoking while also creating opportunities for cigarette manufacturers to avoid taxes. In addition to these existing challenges, in fiscal year (FY) 2019-20 the Bangladesh government increased the difference between low- and medium-tier base prices, making low-tier cigarettes even more affordable. This price change, together with a significantly lower ad valorem excise tax for low-tier cigarettes, created a window for manufacturers to expand the market for low-tier cigarettes, which not only made low-tier cigarettes more accessible to low-income smokers but also resulted in revenue loss for the government. This study attempts to estimate the possible reduction in government tax revenue resulting from British American Tobacco (BAT)'s expansion of the low-tier market and its reduction in supply of medium-tier brands. Additionally, this study analyzes the impacts of cigarette tax policies and makes policy recommendations to prevent cigarette companies' further attempts to avoid taxes by expanding the low-tier cigarette market.

### Methodology

To estimate the loss in tax revenue and to analyze the effect of different tax policies, this study utilizes the WHO Tobacco Tax Simulation Model (TaXSiM), applying brand prices and sales volumes of BAT's cigarette brands for FY 2019-20 provided by the National Board of Revenue (NBR). First, the baseline tax revenue and industry revenue from BAT's cigarette brands are estimated. Then different scenarios are designed, comprising different actions from BAT and different tax policies by the government. Using TaXSiM, this study estimates the tax revenue and industry revenue under different simulated scenarios. Comparison of results from different scenarios with the baseline results are made to estimate the tax revenue gap and to estimate the effect of different tax policies on preventing manufacturers from expanding the low-tier market and on increasing tax revenues.

### Results

This study estimates that the government revenue gap due to BAT's introduction of a new low-tier brand in FY 2019-20 is around 2.73 billion to 9.84 billion Bangladeshi taka. This study also finds that increases in cigarette price without a change in excise tax rates

would result in a large increase of industry revenue (ranging from 2.13 billion to 7.73 billion taka), which might induce BAT to further expand its low-tier market, which in turn would result in a higher tax revenue gap. Comparing the baseline results with the results of the simulation scenario where the government increases the base price of low-tier cigarettes along with imposing a uniform ad valorem excise tax rate for all tiers, this study finds the estimated revenue gap to be 34.90 billion to 42.01 billion taka. Also, under this scenario BAT's revenue is estimated to be lower compared to the baseline results. This implies that BAT would be less motivated to introduce a new brand to the low tier with this policy intervention. The game theoretical analysis also confirms that imposing the uniform ad valorem excise tax along with an increase in the base price of low-tier cigarettes would be a dominant strategy for the government, discouraging cigarette manufacturers like BAT from expanding low-tier brands while ensuring significant increases in tax revenue.

## Conclusions

There is a high level of commitment from the government to control tobacco use in Bangladesh, and cigarette taxes are a major source of revenue for the Bangladesh government. To control tobacco use and increase cigarette tax revenue, the findings from this study lead the authors to strongly recommend that the Bangladesh government should simplify the cigarette tax structure by imposing a uniform tax for all tiers along with a significant increase in the base price of each tier. Further, this study finds that the least effective policy option is to increase only the base price of cigarettes without increasing the excise tax rates, which would induce cigarette manufacturers to expand the low-tier market and in turn would result in higher tax revenue loss.

**JEL Codes:** H26, H32, I32, L66, O23. **Keywords:** Tax Avoidance, Brand Repositioning, Tobacco Use, Cigarette Manufacturing, Excise tax policy.

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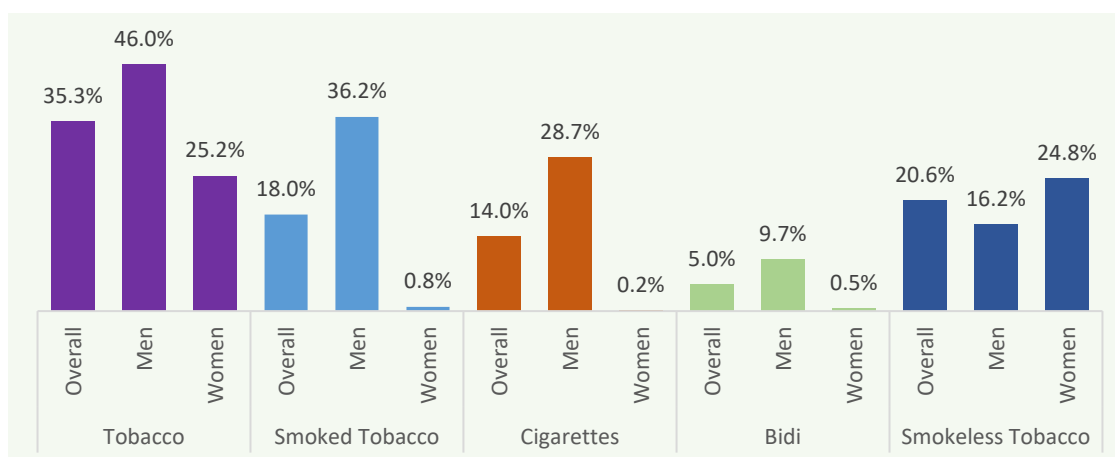
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## 1. Introduction

### *The tobacco epidemic and its health, economic, and environmental consequences in Bangladesh*

The use of tobacco products, in smoke or smokeless form, is a major risk factor for many chronic non-communicable diseases and one of the major causes of premature death. Bangladesh, a lower-middle-income country with a very high-density population, bears a huge burden of the tobacco epidemic. According to the report on Global Adult Tobacco Survey 2017 (GATS 2017), 35.3 percent of all adults (age 15+) in Bangladesh use tobacco products (smoked or smokeless). The prevalence of tobacco use is significantly higher among men (46.0 percent) than among women (25.2 percent)<sup>1</sup>. Overall, 18.0 percent of all adults (15+) smoke tobacco products, predominantly cigarettes and bidis. The prevalence of cigarette smoking among adults is 14.0 percent (28.7 percent among men and 0.2 percent among women). The prevalence of bidi smoking among adults is 5 percent (9.7 percent among men and 0.5 percent among women).

**Figure 1.1** Prevalence of tobacco use, overall and by product, among adults (age 15+) in Bangladesh



Source: Global Adult Tobacco Survey (GATS) Bangladesh Report 2017

The high prevalence of tobacco use has significant health and economic costs for Bangladesh. According to a comprehensive study on the cost of tobacco use in Bangladesh (Nargis et al., 2021), in 2018 the use of tobacco caused the premature deaths of nearly 126,000 people in Bangladesh, accounting for 13.5 percent of deaths from any cause and around 350 deaths each day. Also, more than 61,000 children (below age 15) suffered from various diseases resulting from exposure to secondhand smoke. The total

<sup>1</sup> Global Adult Tobacco Survey (GATS) Bangladesh Report 2017

annual economic cost due to tobacco-related deaths and diseases in Bangladesh was calculated to be around 305.6 billion Bangladeshi taka (US\$ 3.6 billion). Comparing this cost to the total economic contribution of the tobacco industry, around 229.1 billion taka, reveals a significant net economic loss of 76.5 billion taka. Moreover, Bangladesh is the 12th largest tobacco producer in the world. In Bangladesh, the estimated environmental cost of tobacco farming is around 26,200 taka (equivalent to US\$ 310) per acre of land used for tobacco cultivation (Hussain et al., 2020).

### ***WHO FCTC and tobacco taxation***

The World Health Organization Framework Convention on Tobacco Control (FCTC) is the first international treaty to propose a comprehensive framework for tobacco consumption control through demand and supply reduction measures including monitoring tobacco use; smoke-free air; cessation support; graphic warning labels and building awareness of the harms of tobacco use; bans on tobacco advertising, promotion, and sponsorship; and raising taxes on tobacco products. The most effective and cost-effective way to control tobacco use is to increase the prices of tobacco products by raising tobacco taxes, thereby making tobacco products less affordable, especially for low-income groups and the youth.

Evidence demonstrates that increases in tobacco taxes reduce tobacco use by preventing initiation (and subsequent addiction), increasing the likelihood of cessation among current users, reducing relapse among former users, and reducing consumption among continuing users. Research confirms an inverse relationship between price elasticity and age, with estimates for youth price elasticity of demand up to two times higher than those obtained for adults (Gruber, 2000; Ross & Chaloupka, 2003; Harris & Chan, 1999). Evidence also suggests higher price responsiveness among individuals with lower socioeconomic status (Chaloupka et al., 2000). The estimates of price elasticity of cigarette demand for low- and middle-income countries (LMICs) are higher than the price elasticity estimates for high-income countries (IARC, 2011; USNCI & WHO, 2016). This indicates that considerable increases in tobacco taxes in LMICs would be very effective in reducing tobacco use.

### ***Commitment for tobacco-free Bangladesh***

There is a high level of commitment from the government to control tobacco use in Bangladesh. Bangladesh was the first country to sign the FCTC in 2003 and followed up with the enactment of the Tobacco Control Act in 2005, with subsequent amendments to the Act in 2013. Over time, to reduce the use of tobacco products, Bangladesh has implemented various measures compliant with FCTC guidelines such as the introduction of large graphic health warnings on tobacco products, national mass-media campaigns,



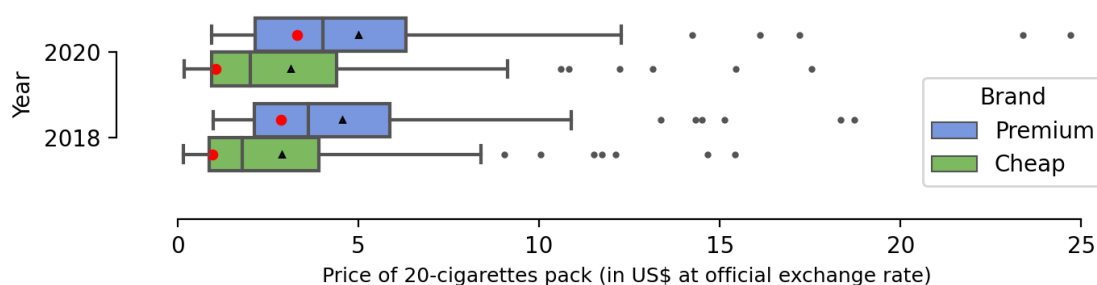
and increasing tobacco taxes to discourage tobacco use. In the South Asian Speakers' Summit on Achieving the Sustainable Development Goals (SDGs) in 2016, the Honorable Prime Minister of Bangladesh stated the vision of reducing tobacco use substantially in Bangladesh, making the country tobacco-free by the year 2040.

### *Cigarette price, tax, and tax structure in Bangladesh*

Tobacco taxes are a major source of revenue for the Bangladesh government. In FY 2017-18, the National Board of Revenue (NBR) collected around 11 percent of its total tax revenue from tobacco companies. A large portion, around 96.1 percent, of tobacco tax revenue comes from the cigarette industry (Ahmed et al., 2019). Nargis et al. (2014) suggest that raising cigarette prices through increased taxation could lead to a win-win-win situation in Bangladesh: it would reduce cigarette consumption, increase tax revenue, and potentially decrease socioeconomic inequities.

However, cigarette prices in Bangladesh are still among the lowest in the world, as depicted in Figure 1.2. In the years 2018 and 2020, the prices in Bangladesh (red dots) for both premium and cheap brands of cigarettes are significantly lower than the average (black triangles) and the median (vertical line inside the boxes) cigarette prices from 144 countries. In the last decade, the price (in international dollars at purchasing power parity (PPP)) of the most-sold cigarette brand in Bangladesh is much lower than the global average price of the most-sold cigarette brand (Annex Figure A1).

**Figure 1.2** Distribution of 20-cigarette pack prices from 144 countries in 2018 and 2020



The tobacco tax structure in Bangladesh is one of the most complex tax systems in the world. Tax rates vary significantly across tobacco products (including cigarettes, bidis, and smokeless tobacco products) and product characteristics (such as cigarette brands or filtered and non-filtered bidis). The complex cigarette tax structure has four tiers—low,

medium, high, and premium—depending on the price range of each tier. For each tier, a supplementary duty (SD) is imposed as a percentage of final retail price classified in four tiers (Table 1.1). In addition to SD, a value added tax (VAT) of 15 percent and a health development surcharge (HDS) of one percent are imposed on all manufactured cigarettes (Table 1.1).

**Table 1.1** Cigarette tax structure in FY 2018-19 and FY 2019-20

	FY 2018-19				FY 2019-20			
	Price	SD	VAT	HDS	Price	SD	VAT	HDS
Premium	101	65%	15%	1%	123	65%	15%	1%
High	75	65%	15%	1%	93	65%	15%	1%
Medium	48	65%	15%	1%	63	65%	15%	1%
Low	32	55%	15%	1%	37	55%	15%	1%

Note: Prices are in Bangladeshi taka. SD is supplementary duty (excise duty), VAT is value added tax (sales tax) and HDS is health development surcharge.

Source: National Board of Revenue, Ministry of Finance, Bangladesh

The tiered tax structure contributes to a low level of price and widening of the price gap between tiers that creates the counterproductive incentive to switch between tiers when prices increase. Additionally, the tiered tax structure in which a low excise tax is imposed on low-tier cigarettes creates incentives for the manufacturer to focus on low-tier cigarettes sales—to avoid higher tax liabilities—which leads to government revenue loss.

### ***Expansion of low-tier cigarettes market and evidence from BAT***

Over the years, the excise tax for the low-price tier of cigarettes has remained low in Bangladesh (Annex Table A2), which resulted in the expansion of the market for low-price cigarettes. Also, Table 1.1 shows that the price gap between low- and medium-tier cigarettes increased in FY 2019-20, which created another window for cigarette companies to expand the market of low-tier cigarettes. This situation is evident in Table 1.2, where the cigarette sales volume distribution of British American Tobacco (BAT) Bangladesh, by tier and by brand, is presented. In 2019-20, the market share of BAT's low-tier brands is 69.0 percent, a considerable increase from the 2018-19 low-tier share of 36.78 percent. Also, BAT's sales volume share of mid-tier brands fell drastically to 10.08 percent in FY 2019-20 from 37.34 percent in FY 2018-19. The lower price and lower tax rate on low-tier cigarette brands generated a lower tax burden for low-tier brands, which induced cigarette manufacturers like BAT to increase their sales volume of low-tier cigarette brands.

**Table 1.2** Sales volume share of British American Tobacco (BAT) in Bangladesh, by tier and brand, FY 2018-19 and FY 2019-20

Tiers and brands	Sales volume share	
	FY 2018-19	FY 2019-20
<b>Premium</b>	<b>15.16%</b>	<b>10.12%</b>
Benson & Hedges	15.16%	10.12%
<b>High</b>	<b>10.72%</b>	<b>10.80%</b>
Capstan	0.46%	0.36%
John Player Gold Leaf	10.26%	10.44%
<b>Medium</b>	<b>37.34%</b>	<b>10.08%</b>
Star	37.34%	10.08%
<b>Low</b>	<b>36.78%</b>	<b>69.00%</b>
Derby	23.97%	40.74%
Hollywood	5.70%	9.53%
Pilot	7.11%	9.91%
Royals	0.00%	8.83%

Source: Authors' calculations from National Board of Revenue data

Though historically the market for low-price cigarettes had been dominated by two large domestic manufacturers, BAT captured the market for low-price cigarettes in the last few years (Annex Table A1). The annual profit of BAT from cigarette sales in Bangladesh increased by 121 percent between 2009 and 2016, which is largely attributable to the sales volume growth of 103 percent in that time period, driven by the increasing share of low-price brands from 9 percent in 2009 to 74 percent of the total production of the company by 2015 (Nargis et al., 2019).

In 2019 BAT introduced a new cigarette brand (named Royals) in the low tier and decreased the supply of its brand (named Star) in the medium tier, as evident in Table 1.2. This incident is expected to have resulted in a loss of revenue for the NBR due to the large differentials in price levels and SD rates between the two tiers (Table 1.1). This may also increase the opportunity for tobacco users to switch to low-priced cigarettes. To the authors' knowledge, no systematic analysis has been done of the impact of this repositioning of cigarette brands by BAT on NBR's revenue earnings.

### *Objective of the study*

This study aims to estimate the impact of BAT's introduction of a new low-tier brand and its cutback in supply of its medium-tier brand on NBR's cigarette tax revenue earnings for FY 2019-20. This study also analyzes the impacts of the cigarette tax structure on preventing cigarette companies from expanding the low-tier cigarette market to avoid taxes. This evidence can help the government to make informed decisions regarding

tobacco taxation to prevent tax avoidance and subsequent revenue loss, which is particularly important during the pandemic and post-COVID-19 situation where the government is under increasing pressure to generate revenue.

## 2. Analytical Framework

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The WHO tax simulation model (TaXSiM) is used to simulate the effects of changes in prices, tax rates, and tax structure on cigarette sales volume, government tax revenue, and industry revenue by price tiers and for all cigarette brands.

### 2.1. Data and measures

The measures used for the analysis are described in Table 2.1.

**Table 2.1** Description and sources of measures used in the simulation model

<b>Variables</b>	<b>Rationale and sources</b>
Cigarette sales volume by brand	This information is required to calculate cigarette tax revenue by brand. These data are collected from NBR.
NBR-recommended cigarette retail price by brand	Price is the ultimate determinant of consumption through which tax increases are passed onto consumers. The NBR authority recommends the minimum retail price of cigarettes for each price tier. These data are collected from NBR.
Price range for each tier	This information is required to define the tier for a cigarette brand using retail price data. This information is collected from budget reports of the Ministry of Finance.
Different tax rates (SD, VAT, HDS) on manufactured cigarettes	The tax rates as a percentage of the recommended retail price for different price tiers formulate the cigarette tax structure. This information is collected from budget reports of the Ministry of Finance.
Own-price elasticities of cigarette demand	We used the midpoint (-0.60) of the recent estimates of own price elasticity of cigarette demand in Bangladesh varying from -0.49 (Nargis et al., 2014) to -0.71 (Huque et al., 2021).

## 2.2. Simulation

### 2.2.1. Baseline calculations

#### Tax type, tax base, tax tier, and total tax

Currently in Bangladesh the NBR levies three types of taxes on cigarette sales: the excise tax or supplementary duty (SD), the value added tax (VAT), and the health development surcharge (HDS). For all types of taxes, the base is the market retail price of a ten-stick cigarette pack ( $P_R$ ).

In Bangladesh the excise tax is ad valorem in nature. Assume the ad valorem excise tax for a ten-stick pack is denoted as  $E_b$ , whose rate is defined as  $t_e$ . Since there are four tiers (premium, high, medium, and low) in Bangladesh, there are four excise tax rates ( $e_k$ ) where  $k = 1, 2, 3, 4$ . The tier of each brand is defined using the information of the retailer price of a brand  $b$  ( $P_b^R$ ) and the price range of each tier. Thus, the amount of ad valorem excise tax for a ten-stick cigarette pack is calculated as follows:

$$E_b = e_k * P_b^R$$

The rate of excise tax differs for different tiers. But the VAT rate ( $v$ ) is uniform for all tiers. The amount of VAT per unit ( $V$ ) is calculated as follows:

$$V_b = v * P_b^R$$

Like the VAT rate, the HDS rate ( $h$ ) is also flat across all tiers, and the amount of health development surcharge ( $H$ ) for a ten-stick pack is calculated as follows:

$$H_b = h * P_b^R$$

Thus, the total tax on a ten-stick pack of a cigarette brand is determined as follows:

$$T_b = E_b + V_b + H_b$$

The excise tax revenue, the VAT revenue, and the HDS revenue for each brand ( $b$ ) can also be calculated as follows:

$$E_b^{Total} = E_b * S_b$$

$$V_b^{Total} = V_b * S_b$$

$$H_b^{Total} = H_b * S_b$$

where  $S_b$  is the sales volume of a ten-stick pack of a brand ( $b$ ). Subsequently, the total amount of tax revenue from a cigarette brand is calculated as follows:

$$TR_b = T_b * S_b \equiv E_b^{Total} + V_b^{Total} + H_b^{Total}$$

### *Consumer and producer price per ten-pack of cigarettes and distribution margin*

In this simulation model, there are three components in the final retail price of a cigarette brand that a consumer pays. They are as follows:

$$P_b^R = P_b^P + M_b + T_b$$

where  $P_b^P$  is the producer price,  $M_b$  is the distribution margin, and  $T_b$  is the total tax per pack of cigarette brands  $b$ . From the factory gate to the point of retail sale, cigarettes pass through different market actors (including wholesalers, distributors, and retailers) in the supply chain, and each actor receives a margin from the cigarette price. For simplicity, rather than separating the margin of each actor in the supply chain, this study combines them into the total “distribution margin ( $M_b$ )”. The distribution margin information is not available from the individual actors. So, for simplicity, the distribution margin rate is assumed to be  $t_M = 10\%$ . Thus, the distribution margin for a cigarette brand is calculated as follows:

$$M_b = t_M * P_b^R$$

This simulation framework requires the producer price to calculate the producer’s revenue. Based on the final retail price, tax, and distribution margin, the producer price per pack of cigarettes can be calculated as follows:

$$P_b^P = P_b^R - M_b - T_b$$

### *Aggregation by tier*

Assume that there are  $n_k$  number of brands in tier  $k$ . Since the sales value and sales volume data are known for each brand, and the tier of each brand has been defined, the average retail price for each tier can be calculated by dividing the total sales value of all brands in a tier by the total sales volume of each tier as follows:

$$P_k^R = \frac{\sum_{b=1}^{n_k} (P_b^R * S_b)}{\sum_{b=1}^{n_k} S_b}$$

Using the average price for each tier, the excise tax, VAT, HDS, and total tax by tier for a 10-stick pack can be calculated as follows:

$$E_k = e_k * P_k^R$$

$$V_k = v * P_k^R$$

$$H_k = h * P_k^R$$

$$T_k = E_k + V_k + H_k$$

Now, the excise tax revenue, the VAT revenue, and the HDS revenue for each tier ( $k$ ) can be calculated as follows:

$$E_k^{Total} = E_k * S_k \equiv \sum_{b=1}^{n_k} (E_b * S_b)$$

$$V_k^{Total} = V_k * S_k \equiv \sum_{b=1}^{n_k} (V_b * S_b)$$

$$H_k^{Total} = H_k * S_k \equiv \sum_{b=1}^{n_k} (H_b * S_b)$$

where  $S_k = \sum_{b=1}^{n_k} S_b$  is the total sales volume of each tier.

The total tax revenue—including excise tax, VAT, and HDS—for each tier can be calculated as follows:

$$TR_k = E_k^{Total} + V_k^{Total} + H_k^{Total} \equiv \sum_{b=1}^{n_k} TR_b$$

where  $k = 1, 2, 3, 4$  denotes the four tiers of cigarettes and  $n_k$  denotes the number of cigarette brands in tier  $k$ . Finally, total excise tax revenue ( $E$ ), total VAT revenue ( $V$ ), total HDS revenue ( $H$ ), and total tax revenue ( $TR$ ) from cigarettes are calculated as follows:

$$E = \sum_{k=1}^4 E_k^{Total} \equiv \sum_{b=1}^N E_b^{Total}$$



$$V = \sum_{k=1}^4 V_k^{Total} \equiv \sum_{b=1}^N V_b^{Total}$$

$$H = \sum_{k=1}^4 H_k^{Total} \equiv \sum_{b=1}^N H_b^{Total}$$

$$TR = \sum_{k=1}^4 TR_k \equiv \sum_{b=1}^N TR_b$$

where  $N = \sum_{k=1}^4 n_k$ .

Now, to calculate the industry revenue, the producer revenue and distribution margin must be calculated. For each tier, the distribution margin and the producer price for a ten-stick pack will be:

$$M_k = t_M * P_k^R$$

$$P_k^P = P_k^R - M_k - T_k$$

Hence, the total distribution margin ( $M_k^{Total}$ ), total producer revenue ( $C_k^{Total}$ ), and total industry revenue ( $IR_k$ ) for each tier will be as follows:

$$M_k^{Total} = M_k * S_k$$

$$C_k^{Total} = P_k^P * S_k$$

$$IR_k = M_k^{Total} + C_k^{Total}$$

Finally, the total industry revenue ( $IR$ ) will be:

$$IR = \sum_{k=1}^4 IR_k$$

### 2.2.2. Simulation scenarios

This study aims to estimate the impact on tax revenue of introducing a new low-tier brand and curtailing the supply of a medium-tier brand. This study also estimates how

alternative tax policies could have prevented incentivizing cigarette companies to avoid taxes by manipulating tier market shares in this way. Up to this point, the base of the simulation framework has been established so that the current tax revenue and industry revenue can be calculated. In this section, now that the base is set up, the framework is implemented to calculate tax revenue and industry revenue under different scenarios. The description and objective of each scenario is given in Table 2.2.

### Scenario 1

First, assume that the introduction of a new brand Royal in the low tier induced some smokers of the Star brand in the medium tier to switch to the Royal brand. Had BAT not introduced Royal in the low tier, smokers who are now consuming the Royal brand would have continued to consume the Star brand in the medium tier. The number of cigarettes consumed under this scenario may, however, vary depending on how smokers respond to the price differential between Royal and Star. We identify two sub-scenarios to cover these possibilities.

#### Scenario 1a:

- The lower price of Royals in the low tier compared to Star in the medium tier does not affect the number of cigarettes smoked. This means, for example, that the smoker who was smoking ten cigarettes of a medium-tier brand daily, after the introduction of the new low-tier brand, still smokes ten cigarettes of the new low-tier brand daily.
- There is no change in tax structure—that is, the price range of each tier, excise tax, VAT, and HDS rates remain unchanged.

Since cigarette consumption is assumed to be unchanged under simulation 1a, the new sales volume for the medium-tier brand,  $S_{b(Star)}^*$ , is calculated by simply adding the sales volume of the newly introduced low-tier brand to the sales volume of the medium-tier brand.

$$S_{b(Star)}^* = S_{b(Star)} + S_{b(Royals)}$$

Thus, the new sales volume of that specific low-tier brand will be  $S_{b(Royals)}^* = 0$ . The retail price for the Star brand will be at the same level as in the baseline.

The formulas for calculating excise tax revenue, VAT revenue, HDS revenue, total tax revenue, distribution margin, producer profit, and total industry revenue by brand and by tier remain the same as in the baseline calculations.

**Table 2.2** Description and objective of different scenarios in the simulation model

<b>Scenarios</b>	<b>Description of scenarios</b>	<b>Objective</b>
Baseline	<p>This is the status quo scenario.</p> <ul style="list-style-type: none"> <li>• BAT introduces a new low-tier cigarette brand and decreases supply of medium-tier cigarette brand</li> <li>• Government increases the price gap between low-tier and medium-tier brands</li> <li>• Excise tax rate for low-tier brands is much lower than other tiers' tax rate.</li> </ul>	Calculate the tax revenue and industry revenue.
Scenario 1	<ul style="list-style-type: none"> <li>• BAT has not introduced a new low-tier cigarette brand nor decreased supply of a medium-tier cigarette brand.</li> <li>• Tax policies as in status quo scenario</li> </ul>	Estimate the revenue gap <sup>2</sup> due to BAT's action.
Scenario 2	<ul style="list-style-type: none"> <li>• BAT's action as in status quo scenario</li> <li>• The price gap between the medium and low tier is lower in FY 2019-20 (Policy Intervention 1).</li> </ul>	Estimate the revenue gap due to wider price differences.
Scenario 3	<ul style="list-style-type: none"> <li>• BAT's action as in status quo scenario</li> <li>• The price gap between the medium and low tier is lower in FY 2019-20 and the government has imposed uniform excise tax for all tiers (Policy Intervention 2).</li> </ul>	Estimate the revenue gap due to lower price and lower excise tax rates in low tier.
Scenario 4	<ul style="list-style-type: none"> <li>• BAT has not introduced a new low-tier cigarette brand nor decreased supply of a medium-tier cigarette brand (as in Scenario 1).</li> <li>• The price gap between the medium and low tier is lower in FY 2019-20 and the government has imposed uniform excise tax for all tiers (Policy Intervention 2).</li> </ul>	Estimate the revenue gap due to brand repositioning by BAT and lower price and excise tax rates for low-tier cigarettes.

<sup>2</sup> Revenue gap is defined as the difference between potential revenue from the simulated scenario and actual revenue - that is, *Revenue Gap = Potential Revenue - Baseline Revenue*.

Scenario 1b:

- The lower price of Royal brand induces the consumer to consume a larger amount of the Royal brand compared to the Star brand. This means, for example, the smoker who was smoking ten cigarettes of the Star brand daily, smokes more than ten cigarettes of the Royal brand after they switch from Star to Royal brand.
- This increase in the consumption of cigarettes is estimated using the price elasticity of cigarette demand of -0.60 as reported in Table 2.1.
- There is no change in tax structure—that is, the price range of each tier, excise tax, VAT, and HDS rates remain unchanged.

The formula for the adjustment for price differential is as follows:

$$S_{b(Star)}^* = S_{b(Star)} + S_{b(Royals)} \left( 1 + \frac{P_{b(Star)}^R - P_{b(Royals)}^R}{P_{b(Royals)}^R} * \varepsilon \right)$$

where  $\varepsilon$  is the price elasticity of cigarette demand.

Also, the new sales volume of that specific low-tier brand will be  $S_{b(Royals)}^* = 0$ . The retail price for the Star brand will be at the same level as in the baseline.

The formulas for calculating excise tax revenue, VAT revenue, HDS revenue, total tax revenue, distribution margin, producer profit, and total industry revenue by brand and by tier remain the same as in the baseline calculations.

## Scenario 2

The price differential between the medium and the low tier widened from BDT 16 in FY 2018-19 to BDT 26 in 2019-20. Now we consider the case where the price differential between the medium and low tier in FY 2019-20 is lower at BDT 18 (Table 2.3).

**Table 2.3** Cigarette prices, by tier, in FY 2018-19 and FY 2019-20 and under simulated Scenario 2 in FY 2019-20

Tier	FY 2018-19		FY 2019-20		Scenario 2: FY 2019-20	
	Price	Difference	Price	Difference	VAT	Difference
Premium	101		123		123	
High	75		93		93	
Medium	48	16	63	26	63	18
Low	32		37		45	

Note: Prices are in Bangladeshi taka.

Similar to Scenario 1, we consider two sub-scenarios to allow for differential responses of smokers to the price differential:

- Scenario 2a: The lower price of Royal in the low tier compared to Star in the medium tier does not affect the number of cigarettes smoked. This means, for example, that the smoker who was smoking ten cigarettes of a medium-tier brand daily, after the introduction of the new low-tier brand, still smokes ten cigarettes of the new low-tier brand daily.
- Scenario 2b: The lower price of Royal brand induces the consumer to consume a larger amount of the Royal brand compared to the Star brand. This means, for example, the smoker who was smoking ten cigarettes of the Star brand daily, smokes more than ten cigarettes of the Royal brand after they switch from Star to Royal brand.

This increase in the consumption of cigarettes is estimated using the price elasticity of cigarette demand of -0.60 as reported in Table 2.1.

### Scenario 3

In Bangladesh, the excise tax imposed for low-tier cigarettes is much lower than that of the other three tiers. Researchers and advocacy groups for a tobacco-free Bangladesh have advocated for years that the government should impose a uniform excise tax. Under Scenario 3, along with an increased price for low-tier cigarettes, it is assumed that the government has imposed a uniform ad valorem excise tax for all tiers. As with the previous two scenarios, here two sub-scenarios (scenario 3a and scenario 3b) are implemented to allow for differential responses of smokers to the price differential. Moreover, as with Scenario 2, it is assumed that BAT's action is the same as in the baseline, where BAT repositioned its brand.

**Table 2.4** Cigarette prices and excise tax, by tier, in FY 2018-19 and FY 2019-20 and under simulated Scenario 2 in FY 2019-20

	FY 2018-19		FY 2019-20		Scenario 3: FY 2019-20	
	Price	SD	Price	SD	Price	SD
Premium	101	65%	123	65%	123	65%
High	75	65%	93	65%	93	65%
Medium	48	65%	63	65%	63	65%
Low	32	55%	37	55%	45	65%

Note: Prices are in Bangladeshi taka.

## Scenario 4

Until now, in all scenarios (Scenario 1, Scenario 2, and Scenario 3) the action by at least one of the two parties (the government and BAT) is assumed to be the same as in the status quo scenario. Under Scenario 4, however, actions from both the government and BAT are assumed to be different than in the status quo scenario. Under this simulated Scenario 4, it is assumed that BAT has not repositioned its brand (as in Scenario 1) and that the government has imposed a uniform ad valorem excise tax for all tiers along with a price increase for low-tier cigarettes (Table 2.4). The comparison of results from this scenario with the status quo scenario provides insight into how government policy can impact cigarette companies' decisions to expand the low-tier market by introducing a new brand and decreasing the supply of medium-tier brands. Like in the previous scenarios, two sub-scenarios (Scenario 4a and Scenario 4b) are implemented considering that the number of cigarettes consumed may vary depending on how smokers respond to the price differential between Royal and Star.

### 3. Results and Analysis

Applying the WHO TaXSiM model, government tax revenue and industry revenue for BAT's cigarette brands are calculated under the different scenarios presented in Table 2.2.

#### 3.1. Baseline results

Government tax revenue and industry revenue for the status quo (baseline) scenario are calculated first, and the results are presented in Table 3.1. Overall government earning is around 219.88 billion taka, and the industry received a revenue amount of 68.42 billion taka. Even though the prices and excise taxes of low-tier cigarettes are substantially lower in FY 2019-20 than that of other tiers, a lion's share of tax revenue (57.88 percent) and industry revenue (44.12 percent) come from the low-tier cigarettes sales (Figure 3.1). This is due to the large share of low-tier cigarettes in total sales of cigarettes.

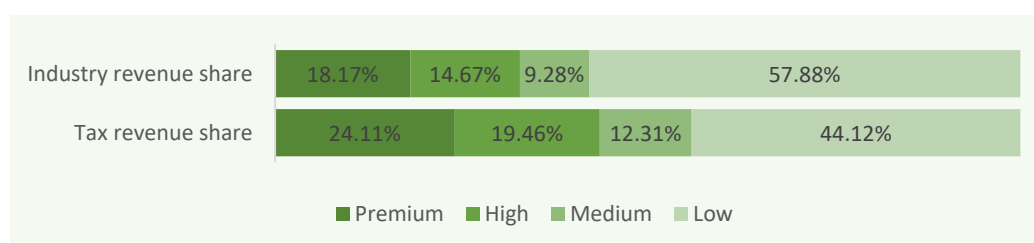
**Table 3.1** Cigarette tax revenue and industry revenue, by tier, in FY 2019-20 for BAT's cigarette brands under status quo scenario

Tier	Tax revenue				Industry revenue		
	Excise revenue	HDS revenue	Sales tax revenue	Total tax revenue	Distribution revenue	Producer revenue	Total industry revenue
Premium	42.54	0.65	9.82	53.01	6.54	5.89	12.43
High	34.34	0.53	7.93	42.80	5.28	4.76	10.04
Medium	21.71	0.33	5.01	27.06	3.34	3.01	6.35
Low	75.16	1.37	20.49	97.02	13.66	25.94	39.60
Total	173.75	2.88	43.25	219.88	28.82	39.60	68.42

Note: Amounts are in billions taka

Source: Authors' calculations from NBR data

**Figure 3.1** Share of cigarette tax revenue and industry revenue, by tier, from BAT's cigarette brands



Source: Authors' calculations from NBR data

### 3.2. Results of scenario 1: Assuming BAT had not introduced a new low-tier brand

Next the tax revenue and industry revenue are estimated for a simulated scenario assuming that BAT has not introduced a new brand in the low tier. The comparison of results under the Scenario 1 simulation with the baseline is presented in Table 3.2. Since two different sub-scenarios are assumed under each scenario, the baseline results are compared with results from each of the sub-scenarios.

**Table 3.2** Cigarette tax revenue and industry revenue under simulation of Scenario 1

	Tax revenue	Comparison with baseline	Industry revenue	Comparison with baseline
Baseline	219.88		68.42	
Scenario 1a	229.72	9.84	68.33	(0.09)
Scenario 1b	222.61	2.73	66.66	(1.76)

Note: Amounts are in billions taka  
Source: Authors' calculations from NBR data

Under the simulation of Scenario 1a, the estimated tax revenue is 229.72 billion taka, which is 9.84 billion taka more than the baseline tax revenue amount. This implies that government tax revenue would have been around 4.5 percent (9.84 billion taka) higher if BAT had not expanded its low-tier sales by introducing a new brand in the low tier. In the simulation of Scenario 1b, government tax revenue is estimated to be 222.61 billion taka, which results in a tax revenue gap of about 2.73 billion taka. This suggests that brand introduction at low-tier by BAT in FY 2019-20 caused a substantial revenue gap of about 2.73–9.84 billion taka for the Bangladesh government. Also, BAT's brand introduction at low tier helped the company to earn more, as the simulation shows that industry revenue increased by 0.09–1.76 billion taka. Therefore, the increase in low-tier cigarettes sales benefited BAT by reducing their tax payment to the government and increasing their revenue.

### 3.3. Results of scenario 2: Assuming higher price had been set for low-tier cigarettes in FY 2019-20

Scenario 2 is the first policy intervention scenario. In FY 2019-20, the price difference between the low and medium tiers had been increased (Table 2.3). Under Scenario 2, it is assumed that a higher price, 45 taka instead of 37 taka, for the low tier had been set. (Table 2.3). As in section 3.2, there are two sub-scenarios named 2a and 2b.



**Table 3.3** Cigarette tax revenue and industry revenue under simulation of Scenario 2

	Tax revenue	Comparison with baseline	Industry revenue	Comparison with baseline
Baseline	219.88		68.42	
Scenario 2a	238.82	18.94	76.15	7.73
Scenario 2b	225.08	5.20	70.55	2.13

Note: Amounts are in billions taka

Source: Authors' calculations from NBR data

Under Scenario 2a, the estimated tax revenue is 238.82 billion taka. This implies that the estimated government revenue gap is around 18.94 billion taka, which is 8.61 percent of the baseline government tax revenue. Similarly, comparing the estimated tax revenue of Scenario 2b with the baseline tax revenue, the government revenue gap is estimated to be around 5.20 billion taka. This suggests that if the government had not increased the price difference between the two tiers, BAT would have had to pay 5.20–18.94 billion taka more in taxes. Interestingly, under both scenarios (2a and 2b), industry revenue is also estimated to increase, which might induce BAT to expand its low-tier market share more. This is a very important finding because it shows that only increasing price without increasing the tax rate might not be an effective policy intervention to control low-tier market expansion and tax avoidance.

### 3.4. Results of scenario 3:

#### *Assuming higher price and higher excise tax had been set for low-tier cigarettes in FY 2019-20*

Scenario 3 is the second policy intervention scenario. In Bangladesh, the price and excise tax for low-tier cigarettes is substantially lower than for other cigarette tiers (Table 1.1), which induces cigarette companies to expand their market share of low-tier cigarette sales. Under this policy intervention scenario, it is assumed that the government increases the base price of low-tier cigarette brands (from 37 taka to 45 taka) while also imposing a uniform ad valorem excise tax rate (65 percent) for all tiers of cigarettes (Table 2.4). The simulation results are presented in Table 3.4. As in sections 3.2 and 3.3, there are two sub-scenarios named 3a and 3b.

Under Scenario 3a, the estimated tax revenue is 255.13 billion taka, which is substantially larger, by 35.25 billion taka, than the baseline tax revenue of 219.88 billion taka. This indicates a substantial government revenue gap of around 16 percent of baseline tax revenue. In Scenario 3b, the estimated government revenue gap is 19.58 billion taka.

**Table 3.4** Cigarette tax revenue and industry revenue under simulation of Scenario 3

	Tax revenue	Comparison with baseline	Industry revenue	Comparison with baseline
Baseline	219.88		68.42	
Scenario 3a	255.13	35.25	59.84	(8.58)
Scenario 3b	239.46	19.58	56.16	(12.26)

Note: Amounts are in billions taka

Source: Authors' calculations from NBR data

Moreover, BAT's revenue under Scenario 3a is 59.84 billion taka, which is 8.58 billion taka lower than the baseline revenue. The situation is worse for BAT under Scenario 3b, where BAT's revenue is estimated to be 56.16 billion taka, which is 12.26 billion taka lower than the baseline revenue. Therefore, under both sub-scenarios, BAT would have to pay more taxes and earn less revenue. Hence, the government policy intervention in this scenario—increasing the low-tier cigarettes price and imposing a uniform excise tax—would result in less incentive for BAT to expand its market share of low-tier cigarettes.

### 3.5. Results of scenario 4:

*Assuming higher price and higher excise tax rate had been set for low-tier cigarettes, and in response BAT had not introduced a new low-tier brand*

The outcomes pattern under Scenario 4 is similar to that under Scenario 3. The estimated government revenue gaps are 42.01 billion taka and 34.90 billion taka, respectively, under Scenario 4a and Scenario 4b. Also, BAT's revenue is estimated to be reduced by about 6.99 billion taka under Scenario 4a and by 8.66 billion taka under Scenario 4b. Hence, again, the findings show that a price increase along with an excise tax increase would result in less incentive for BAT to introduce a brand in the low-tier market and to decrease supply of a mid-tier brand.

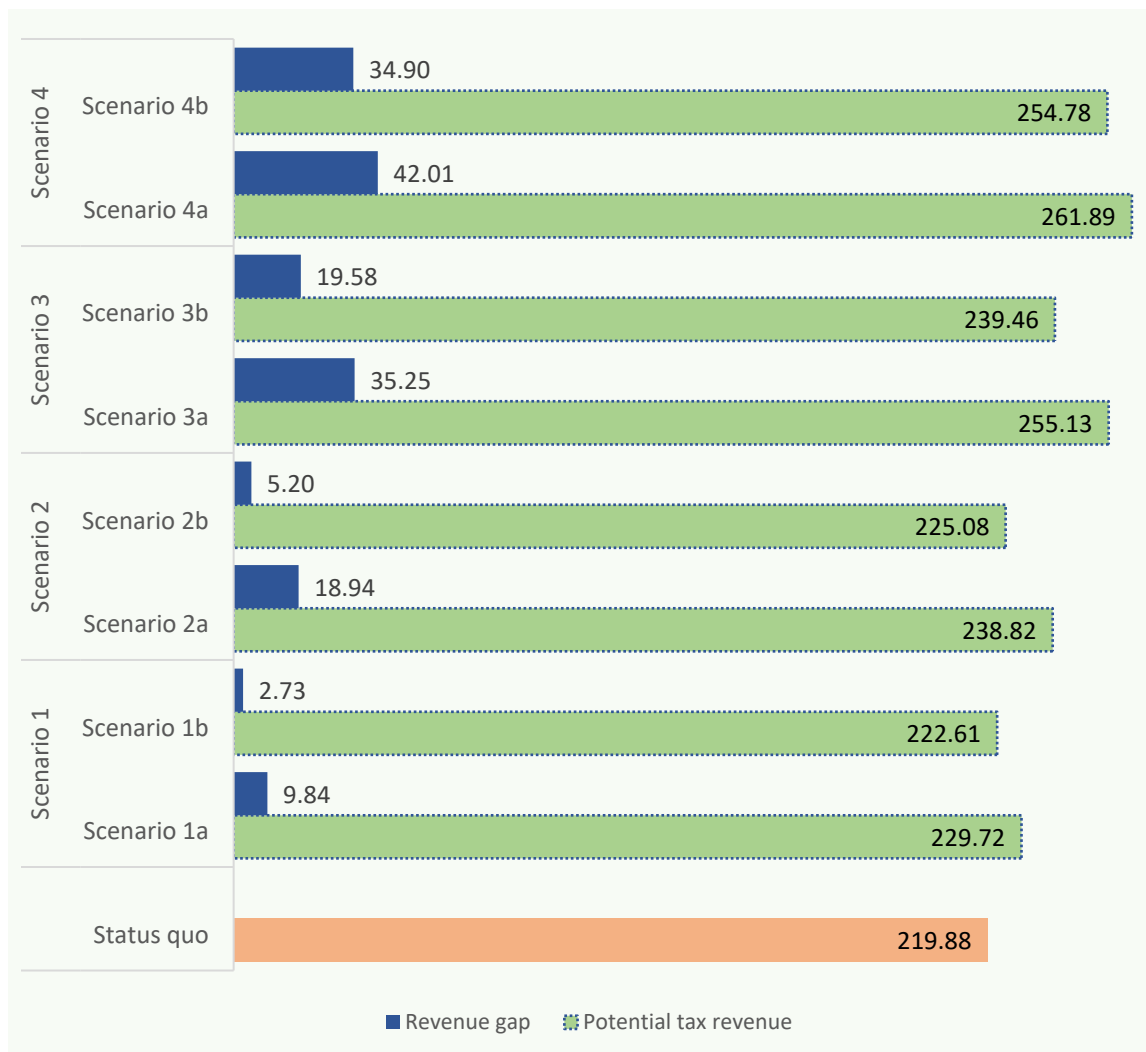
**Table 3.5** Cigarette tax revenue and industry revenue under simulation of Scenario 4

	Tax revenue	Comparison with baseline	Industry revenue	Comparison with baseline
Baseline	219.88		68.42	
Scenario 4a	261.89	42.01	61.43	(6.99)
Scenario 4b	254.78	34.90	59.76	(8.66)

Note: Amounts are in billions taka

Source: Authors' calculations from NBR data

**Figure 3.2** Cigarette tax revenue gap under different simulation scenarios



Note: All amounts are in billions taka

Revenue Gap = Potential tax revenue – Status quo tax revenue

### 3.6. Game theoretical analysis of the results

The results of all the scenarios can be analyzed using a strategic decision making model approach.<sup>3</sup> Assume the government and BAT as two players. The government can be considered as the “leader” since government sets the policy through the budget at the beginning of each fiscal year before any action is taken by the cigarette manufacturers. Similarly, the role of BAT (or other cigarette manufacturer) can be considered as a “follower” since they make their decisions after knowing the policy strategies of government. Now, assume that each player has two strategies. The government, the leader in the game, can increase low-tier cigarette prices along with imposing a uniform ad valorem excise tax or it can keep the low-tier cigarette price low along with a lower ad valorem excise tax for low-tier cigarettes. BAT, the follower in the game, can reposition its brands to the low tier or it can refrain from brand repositioning. The tax revenues and industry revenues from a scenario can be thought of as the payoff for the players, respectively, for the government and BAT. As a leader, it is assumed that the government knows the reaction payoffs for each of its policy strategies. Based on this game theoretical setup, the following table represents the game and all of the simulated scenarios’ results together.

**Table 3.6** Game theoretical representation (in payoff matrix) of scenario results

		Government	
		Substantially low price along with lower ad valorem excise tax for low tier (status quo policy)	Increase low-tier price along with uniform ad valorem excise tax (policy intervention 2)
BAT	Introduce a new brand in low tier (status quo strategy)	Baseline 68.42 ; 219.88	Scenario 3 56.17 ; 239.46
	Do not introduce a new brand in low tier	Scenario 1 66.66 ; 222.61	Scenario 4 59.76 ; 254.78

Note: All payoff amounts are in billions taka. Also, all amounts under Scenario 1, Scenario 3, and Scenario 4 correspond to the second sub-scenarios of each scenario.

<sup>3</sup> Most microeconomics textbooks describe the basic idea of game theory. For example, *Microeconomics*, by David A. Besanko and Ronald R. Braeutigam, 5<sup>th</sup> Ed., Chapter 14. The definition of “dominant strategy” and “Nash equilibrium” below is taken from this textbook.

In the above payoff matrix representation, each cell (named Baseline, Scenario 1, Scenario 3, and Scenario 4) has two payoffs. The first amount in each cell, which is the industry revenue for that specific scenario, represents the payoffs for BAT. Similarly, the second amount in each cell, which is the tax revenue for that specific scenario, represents the payoffs for the government.

From the government’s perspective, if BAT introduces a new brand in the low tier, the government would be better off by taking policy intervention 2 since its payoff (tax revenue) for policy intervention 2 (239.46 billion taka) is more than the payoff for the status quo policy (219.88 billion taka). A similar conclusion is true for the government when BAT does not introduce a brand in the low tier. Therefore, policy intervention 2 is the “dominant strategy”<sup>4</sup> for the government.

From BAT’s perspective, under the government’s current tax policy BAT has an incentive to introduce a new brand in the low tier since its payoff (industry revenue) in the baseline, 68.42 billion taka, is greater than 66.66 billion taka, the payoff when it does not introduce a new brand in the low tier. But under policy intervention 2, BAT’s payoff when it does not introduce a brand in the low tier is 59.76 billion taka, which is greater than 56.17 billion taka, the payoff when it introduces a brand to the low tier. Therefore, under policy intervention 2 BAT would be better off by not introducing a new brand to the low tier.

Since policy intervention 2 is the dominant strategy for the government, the government should enact this policy. In this situation, BAT would be better off when it does not introduce a new brand in the low tier. Therefore, the outcomes of Scenario 4—where the government imposes a uniform ad valorem excise tax along with a higher price for low-tier cigarettes and BAT does not introduce a new brand in the low tier—are the equilibrium outcomes for both. This is also the Nash equilibrium<sup>5</sup> of the game.

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<sup>4</sup> Dominant strategy is a strategy that is better than any other a player might choose, no matter what strategy the other player follows (Besanko & Braeutigam, 2014).

<sup>5</sup> Nash equilibrium is a situation in which each player in a game chooses the strategy that yields the highest payoff, given the strategies chosen by the other players (Besanko & Braeutigam, 2014).

## 4. Conclusions

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In 2017, 35.3 percent of all adults (age 15+) in Bangladesh used tobacco products in smoked or smokeless form. The use of tobacco products kills about 126,000 people in Bangladesh and has a significant economic cost of 305.6 billion taka in the year 2018 (Nargis et al., 2021). The high prevalence of tobacco use in Bangladesh is largely driven by cigarette smoking. The prevalence of cigarette smoking in Bangladesh in 2017 was 14.0 percent, which did not change at all compared to the year 2009 (GATS 2009, 2017). A substantial body of evidence demonstrates that significant increases in cigarette taxes resulting in higher cigarette prices is the most effective way to control cigarette smoking, and, at the same time, it increases tax revenue. But the complicated tiered ad valorem cigarette tax system in Bangladesh, with a low base price for each tier, has made tobacco tax a less effective instrument to control cigarette smoking while also creating an opportunity for the manufacturers to avoid taxes.

Over time, the base price of each tier of cigarettes in Bangladesh has lowered significantly compared to other countries.<sup>6</sup> Manufacturers are able to alter their pricing or production decisions, like introducing a new brand in the low tier, to avoid higher tax liabilities, which also leads to revenue loss for the government (Ahmed et al., 2019). Adding to these existing challenges, in FY 2019-20 the Bangladesh government increased the price differential between the low and medium tiers, making low-tier cigarettes even more affordable. This policy change, together with a significantly lower ad valorem excise tax for low-tier cigarettes, created a window for manufacturers to expand the market for low-tier cigarettes—an opportunity the cigarette companies seized—which ultimately resulted in lower revenue for the government.

As a consequence of the policy changes mentioned above, in FY 2019-20 BAT, a major player in the tobacco industry of Bangladesh,<sup>7</sup> repositioned its brand by introducing a new brand in the low tier and by reducing the supply of a mid-tier brand. As a result, there has been a significant increase in BAT's low-tier market sales (around 68.0 percent) in FY 2019-20 compared to that of FY 2018-19 (around 36.78 percent). This study attempts to estimate the gap in government tax revenue resulting from BAT's introduction of a new brand in the low tier. This study also analyzes the impact of cigarette tax policies on cigarette companies' motivation to expand the low-tier market for more profit and to avoid taxes.

To estimate the tax revenue gap and to analyze the effect of different tax policies, the authors utilize the WHO Tobacco Tax Simulation Model (TaXSiM) and prices and sales volumes of BAT's cigarettes brands for FY 2019-20 from NBR. First, the baseline government tax revenue and industry revenue from BAT's cigarette brands are estimated.

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<sup>6</sup> WHO Report on the Global Tobacco Epidemic, 2019 and 2021

<sup>7</sup> See BAT's market share and revenue contribution from 2006-07 to 2019-20 in Annex table A1.

Then the authors designed multiple scenarios comprising different potential actions from BAT and different tax policies by the government. Using TaXSiM, the tax revenue and industry revenue are estimated under each of the simulated scenarios.

To estimate the government tax revenue gap due to BAT's introduction of a new brand in the low tier, the baseline tax revenues are compared with the tax revenues from Scenario 1, where it is assumed that BAT does not introduce a new brand in the low tier. The authors estimate that the government revenue gap is around 2.73 billion taka to 9.84 billion taka, depending on the scenario assumptions.

In Scenario 2, it is assumed that the government only increases the low-tier cigarettes base price in FY 2019-20 without any change in excise tax from the status quo scenario (policy intervention 1). Comparing the results of the baseline with the results of Scenario 2, a similar pattern appears in the government revenue gap compared to Scenario 1. But BAT is also estimated to have a large increase in industry revenue (ranging from 2.13 billion taka to 7.73 billion taka) under Scenario 2, implying that policy intervention 1 might induce BAT to further expand its low-tier market share, which in turn would result in a higher tax revenue gap for the government. Therefore, to achieve the government's desired result of dissuading brand introduction in the low tier in addition to earning higher tax revenue, a price increase in low-tier cigarettes must be induced by an excise tax rate increase.

This is confirmed by the results of Scenario 3 and Scenario 4, where it is assumed that the government increases the base price of low-tier cigarettes along with imposing a uniform ad valorem excise tax rate for all tiers (policy intervention 2). Comparing the results of Scenario 4 to the baseline results, the estimated revenue gap is 34.90 billion taka to 42.01 billion taka. Also, BAT's revenues under Scenario 3 and Scenario 4 are estimated to be lower compared to the baseline results. This implies that BAT would be demotivated to introduce a new brand in the low tier under policy intervention 2.

The game theoretical analysis also confirms that imposing the uniform ad valorem excise tax along with an increase in the base price of low-tier cigarettes will be a dominant strategy for the government, leading the BAT to refrain from introducing a new brand in the low tier while also ensuring a significant increase in tax revenue.

This study is limited to the prices and sales information for BAT brands. Further analysis can be done using other manufacturers' information. Also, this evidence is only for one year, FY 2019-20. To estimate the cumulative government revenue gap, further research can be undertaken where information for later years is utilized.

On various occasions, the government of Bangladesh has indicated a strong commitment to a tobacco-free Bangladesh. To achieve that goal, researchers and tobacco-free-Bangladesh advocates have raised their voices for years to advocate for simplifying the complex tax structure, increasing the base price of tobacco products, and imposing a

uniform tax for all tiers. This study adds more evidence to support those calls for policy change. Based on the evidence from this study, the authors strongly recommend that the Bangladesh government should impose a uniform tax for all tiers along with a significant increase in the base price of each tier. This will eventually help the government to achieve its target of a tobacco-free Bangladesh and also help to earn more tax revenue, which is particularly important during the pandemic and the post-COVID-19 situation where the government is under increasing pressure to generate revenue.



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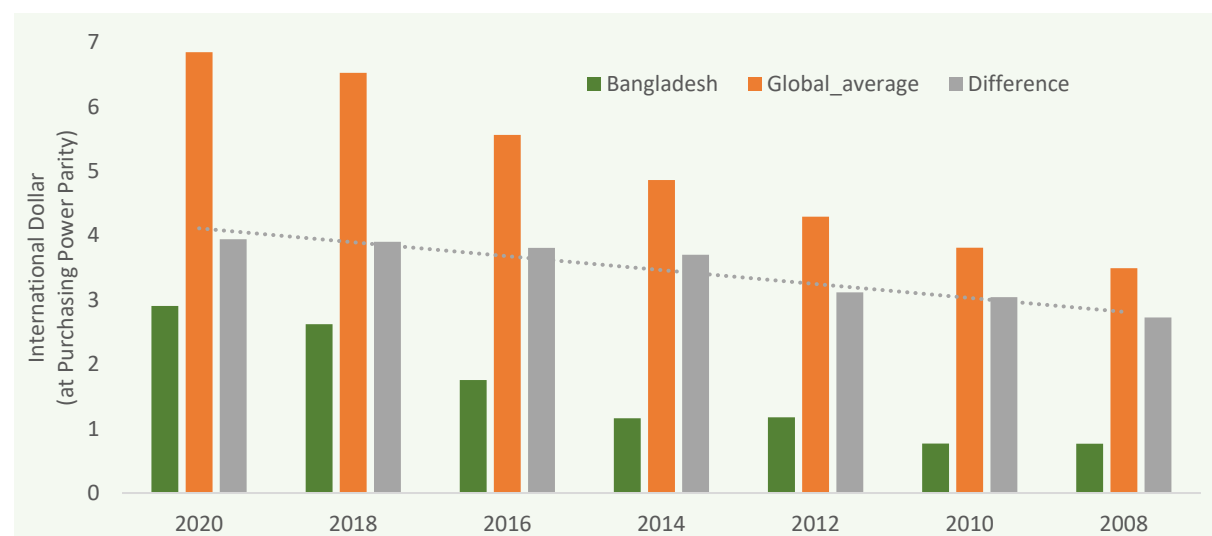
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## Annex

**Figure A1.** Price of the most-sold cigarette brand (in international PPP dollars)



Note: Over time, the price of the most-sold brand increased in Bangladesh and globally. But the difference between the price in Bangladesh and the average global price increased (see the dotted trendline). This implies that the price in Bangladesh did not increase as much as the price increased globally.

Source: Authors' calculations from *WHO Report on Global Tobacco Epidemic 2021*

**Table A1.** Cigarette market share and contribution to tax revenue, by tier, of British American Tobacco Bangladesh

Year	Tier-wise market share				Total market share	BAT's share in total tax revenue
	Premium	High	Medium	Low		
2006-07	100%	92%	54%	0%	49%	69%
2007-08	99%	87%	61%	3%	44%	67%
2008-09	99%	93%	60%	1%	40%	65%
2009-10	99%	97%	61%	7%	41%	68%
2010-11	99%	97%	52%	9%	35%	62%
2011-12	98%	98%	45%	15%	36%	60%
2012-13	98%	99%	58%	26%	47%	68%
2013-14	98%	99%	58%	30%	47%	67%
2014-15	97%	99%	59%	38%	50%	68%
2015-16	97%	98%	64%	48%	55%	68%
2016-17	96%	98%	66%	58%	63%	72%
2017-18	97%	99%	68%	62%	68%	75%
2018-19	98%	100%	59%	59%	66%	72%
2019-20	97%	100%	65%	75%	78%	82%

Source: National Board of Revenue, Ministry of Finance, Government of Bangladesh, 2021

**Table A2.** Cigarette prices and tax rates, by tier, in Bangladesh from 2006-07 to 2021-22

Year	Premium				High				Medium				Pr
	Price	SD	VAT	HDS	Price	SD	VAT	HDS	Price	SD	VAT	HDS	
2006-07	≥ 30.00	57%	15%	N/A	18.00-24.99	55%	15%	N/A	10.50-12.49	52%	15%	N/A	5.25
2007-08	≥ 35.00	57%	15%	N/A	19.00-26.49	55%	15%	N/A	12.50-13.49	52%	15%	N/A	6.00
2008-09	≥ 41.00	57%	15%	N/A	21.00-28.00	55%	15%	N/A	13.25-14.25	52%	15%	N/A	6.50
2009-10	≥ 46.25	57%	15%	N/A	23.25-29.25	55%	15%	N/A	16.25-17.25	52%	15%	N/A	7.25
2010-11	≥ 52.00	58%	15%	N/A	27.00-32.00	56%	15%	N/A	18.40-19.00	53%	15%	N/A	8.40
2011-12	≥ 60.00	60%	15%	N/A	32.36-36.00	58%	15%	N/A	22.50-23.00	55%	15%	N/A	11.00
2012-13	≥ 66.00	61%	15%	N/A	35.20-39.50	59%	15%	N/A	24.75-25.25	56%	15%	N/A	12.10
2013-14	≥ 80.00	61%	15%	N/A	42.00-45.00	59%	15%	N/A	28.00-30.00	56%	15%	N/A	13.69
2014-15	≥ 90.00	61%	15%	1%	50.00-54.00	61%	15%	1%	32.50-35.00	60%	15%	1%	15.00
2015-16	≥ 70.00	64%	15%	1%	≥ 45.00	62%	15%	1%	≥ 45.00	62%	15%	1%	1
2016-17	≥ 70.00	65%	15%	1%	≥ 45.00	63%	15%	1%	≥ 45.00	63%	15%	1%	2
2017-18	≥ 70.00	65%	15%	1%	≥ 45.00	63%	15%	1%	≥ 45.00	63%	15%	1%	2
2018-19	101	65%	15%	1%	75	65%	15%	1%	48	65%	15%	1%	3
2019-20	123	65%	15%	1%	93	65%	15%	1%	63	65%	15%	1%	3
2020-21	128	65%	15%	1%	97	65%	15%	1%	63	65%	15%	1%	3
2021-22	135	65%	15%	1%	102	65%	15%	1%	63	65%	15%	1%	3

Note: Prices are in Bangladeshi taka. SD is Supplementary Duty (Excise Tax), VAT is Value Added Tax, and HDS is Health Development Surcharge

Source: Nargis et al (2019) and National Board of Revenue, Bangladesh