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Tobacco industry pricing undermines tobacco tax policy: A tale from Bangladesh

Nigar Nargis[a,*], A.K.M. Ghulam Hussain[b], Mark Goodchild[c], Anne C.K. Quah[d,f], Geoffrey T. Fong[d,e]

[a] American Cancer Society, Inc., 555 11th Street NW, Washington, DC 20004, USA
[b] Department of Economics, University of Dhaka, Nilkhet, Dhaka 1000, Bangladesh
[c] Health Promotion Department, World Health Organization, Avenue Appia 20, 1211 Geneva 27, Switzerland
[d] Department of Psychology, University of Waterloo, 200 University Avenue W, Waterloo, ON N2L 3G1, Canada
[e] Ontario Institute for Cancer Research, Toronto, 661 University Ave, Suite 510, Toronto, ON M5G 0A3, Canada
[f] School of Public Health & Health Systems, University of Waterloo in addition to the Department of Psychology, University of Waterloo

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ABSTRACT

The effectiveness of tax increase in reducing tobacco use depends on the extent to which the industry passes on the tax to consumers. Evidence suggests that tobacco industry may absorb or raise the price more than the tax increase depending on the price segment of tobacco products. In this paper, we examined the industry's pricing strategy by price segment of the cigarette market in Bangladesh by observing the deviation between the market retail prices (MRP) of cigarettes faced by consumers and government recommended retail prices (RRP) used as tax base in a four-tiered ad valorem tax structure. The RRPs by brands were collected from government sources. The MRPs by brands were collected by the International Tobacco Control Bangladesh Wave 3 Survey 2011–12 and Wave 4 Survey 2014–15. Applying linear regression to the deviation of MRP from RRP by price tiers, we found MRPs were higher than RRPs for higher-price brands allowing extra profit margin from the high end while lowering the relative price of and expanding demand for cheaper brands. Bangladesh cigarette industry adopted a differential pricing strategy that undermined the intended effect of tax policy change in reducing cigarette consumption and improving public health. This pricing strategy was supported by the tiered excise tax structure which should be replaced with a uniform specific excise system. In the face of growing cigarette affordability, it is crucial that the specific tax be increased routinely by an amount that induces cigarette price increases large enough to make cigarettes less affordable over time.

1. Introduction

Raising tobacco taxes is a proven measure for reducing tobacco consumption and tobacco-related diseases and deaths, accruing significant benefits to public health (IARC, 2011; NCI-WHO, 2016). The effectiveness of taxation in curbing tobacco use is crucially dependent on its effect on the retail price, which is considerably determined by the extent that manufacturers and retailers pass the tax increase on to consumers. If the manufacturers want to retain the market of certain brands, for example, they are likely to absorb some of the tax increase which means that the retail price of these brands will not increase by as much, if at all. There is evidence from the United Kingdom, Europe, New Zealand, Taiwan, Spain and 23 European Union countries that manufacturers tend to absorb the tax increase for cheaper brands while raising the price for more expensive brands (Gilmore et al., 2013; Hiscock et al., 2017; European Commission, 2013; Gallus et al., 2014; Marsh et al., 2015; Ajmal and VI, 2015; Lee et al., 2003; López-Nicolás et al., 2013; van Schalkwyk et al., 2019). There is also evidence of tax absorption for brands across all price categories in Indonesia, with the percentage decrease in price being relatively greater among cheaper brands (Barber and Ahsan, 2009). If this is the case, the effectiveness of any given tax increase will be mitigated and the public health benefit diminished, particularly for low-income smokers who consume mostly cheaper brands. In this paper, we examined the pricing strategy of cigarette manufacturers in Bangladesh and its implications for the effectiveness of tax increases in reducing tobacco consumption.

* Corresponding author at: American Cancer Society, Inc., 555 11th Street NW, Washington, DC 20004, USA.
E-mail addresses: nigar.nargis@cancer.org (N. Nargis), goodchildm@who.int (M. Goodchild), ackquah@uwaterloo.ca (A.C.K. Quah), geoffrey.fong@uwaterloo.ca (G.T. Fong).

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Table 1
Excise tax rates and recommended retail prices (RRPs) by price tiers for cigarettes in Bangladesh, 2011–12 to 2015–16.

Fiscal year	Low tier		Medium tier		High tier		Premium tier	
	Price per pack of 10, BDT	Excise tax rate, % of price	Price per pack of 10, BDT	Excise tax rate, % of price	Price per pack of 10, BDT	Excise tax rate, % of price	Price per pack of 10, BDT	Excise tax rate, % of price
2011–2012	11.00–11.30	36	22.50–23.00	55	32.36–36.00	58	≥ 60.00	60
2012–2013	12.10–12.30	39	24.75–25.25	56	35.20–39.50	59	≥ 66.00	61
2013–2014	13.69–13.91	39	28.00–30.00	56	42.00–45.00	59	≥ 80.00	61
2014–2015	15.00–16.50	43	32.00–35.00	60	50.00–54.00	61	≥ 90.00	61
2015–2016[a]	18.00	49	NA	NA	40.00–69.00	62	≥ 70.00	64

BDT: Bangladeshi taka; NA: not applicable.
Source: National Board of Revenue, Ministry of Finance, Government of Bangladesh.
Notes: In addition to excise tax (supplementary duty), the government applies value-added tax at 15% of the recommended retail price. A 1% health development surcharge was included in the excise tax rates from 2014 to 2015.
[a] In 2015–2016 the National Board of revenue ruled that all brands belonging to the medium-price tier in 2014–2015 must move to the high-price tier, while no brands were allowed to move from the low-price to the medium-price tier. The following specific conditions were imposed: (i) all brands of cigarettes with current (2014–2015) retail price between BDT 32.50–35.00 to shift to BDT 40.00–69.00 tier; (ii) all brands of cigarettes with current retail price between BDT 50.00–54.00 to shift to BDT 70.00+ tier; (iii) all brands of cigarettes with current retail price BDT 90.00+ to add minimum BDT 10.00 to current retail price.

2. Methods

2.1. Data

In Bangladesh, the National Board of Revenue (NBR) of the Ministry of Finance sets the recommended retail price (RRP) for each cigarette brand which is printed on cigarette packs. The retailers are required by law to sell cigarettes at the RRPs printed on cigarette packs. The RRPs are estimated by the tax authority based on the data on the cost of production by brands provided by the cigarette manufacturers. The excise tax liability of cigarette manufacturers is dependent on tiered ad valorem supplementary duty based on the RRP at four different rates that successively increase with the four price tiers—low, medium, high, and premium. In addition, there is a 15% value-added tax (VAT) based on the RRP. The details of the RRPs and tax rates for the period under observation in this study are provided in Table 1.

As NBR determines both the tax rates and the RRPs for cigarette brands, in contrast to the usual process whereby the tax authority determines the tax rates and then allows the market to determine the price, the pass-through of tax increases onto prices by the tobacco industry in Bangladesh cannot be easily separated from the price increases controlled by the tax authority. However, as we will show, the industry exercises some power over the market retail price (MRP) that the consumers ultimately pay, with this price often deviating from the NBR-administered RRPs in the absence of strict enforcement of RRPs at the retail level. Since these prices can be different, it was necessary for us to collect brand-specific MRPs and compare with corresponding RRPs announced by NBR. The data on brand-specific RRPs for 2011–12 and 2015–16 were sourced from the NBR. Due to significant presence of both pack and stick purchases, the NBR provides RRPs for both types of transactions.

The data on the MRPs of different brands of cigarettes were collected in two phases. The first phase was conducted under ITC Bangladesh Wave 3 Survey from November 2011 to April 2012 to collect data on brand-specific MRPs corresponding to the RRPs announced by NBR for the fiscal year 2011–12. The second phase was conducted by the ITC Bangladesh Project team in collaboration with WHO under ITC Bangladesh Wave 4 Survey in October 2015. The data on brand-specific MRPs collected in this phase were used to correspond to the RRPs announced by NBR for the fiscal year 2015–16.

The ITC Bangladesh Survey is nationally representative, with multistage sampling design, conducted by the Bureau of Economic Research at the University of Dhaka, Bangladesh, in collaboration with the University of Waterloo, Canada (Nargis et al., 2015). The sampling units, selected at successive stages with probability proportional to population size, included 20 of 64 districts from six divisions, 37 upazilas from 20 districts and 78 clusters (villages in rural areas and wards in urban areas) from 37 upazilas. Interviewers used survey forms to report the prices of the top five most popular brands sold in both packs and sticks by each retailer. It should be noted that retailers are the main distribution channel in Bangladesh (ITC Project, 2014). The participants provided informed consent.

The MRP data for 2011–12 was collected by interviewing retailers in 350 stores in 78 sample clusters. In 2011–12, the survey covered 19 brands in low, 4 brands in medium, 4 brands in high, and 2 brands in premium price tiers out of 45, 4, 4, and 2 brands listed with NBR for the respective price tiers, totalling 1970 observations on market price by brands.

The MRP data for 2015–16 was collected from retailers in 253 stores in 76 villages. The price data covered 15 brands in low, 7 brands in high, and 1 brand in premium price tiers out of 23, 10 and 2 brands listed with NBR for the respective price tiers, totalling 1560 observations on market price by brands. In 2015–16, no medium-price brands were found in the retail stores due to the rule introduced by the NBR in 2015–16 that all brands belonging to the medium tier in 2014–15 must move to the high tier.

2.2. Analysis

Cigarette packs can be marketed in 10- and 20-stick pack sizes. The price of 10-stick packs is generally half of the price of 20-stick packs. For analytical convenience and to ensure the comparability of brand prices over time, all 20-stick pack prices were divided into half and converted to 10-stick pack prices. The prices per stick reported for stick purchases were converted to equivalent prices per pack of 10 sticks by multiplying by 10. The MRP was compared between pack and stick sale on the same standardised basis of Bangladesh Taka (BDT) per 10 sticks to measure the premium that the retailers derive from one type of sale over the other.

The average MRP for each brand was calculated from the MRP data reported from the stores. This average MRP was compared with the RRP for each brand by type of sale in packs and sticks. The comparison was also classified by the four price tiers to analyse how the MRP was at variance with the RRP by the price and tax tier. We analysed the deviation of MRP from RRP by brands by applying the following linear regression:

$$MRP_i - RRP_i = b_0 + b_1 MEDIUM_i + b_2 HIGH_i + b_3 PREMIUM_i + b_4 STICK_i + b_5 YEAR_i + \sum_j b_{6j} CLUSTER_j + u_i \quad (1)$$

where i stands for individual brands; MEDIUM = 1 if a brand belongs to medium-price tier and 0 otherwise; HIGH = 1 if a brand belongs to high-price tier and 0 otherwise; PREMIUM = 1 if a brand belongs to premium tier and 0 otherwise; STICK = 1 if price is reported for stick purchase and 0 for pack purchase; YEAR = 1 if year of observation is 2015–16 and 0 for 2011–12; and CLUSTER represents regional fixed effects for sample clusters j. The constant term b_0 represents the average difference between MRP and RRP per pack for the reference category which includes low-price brands sold in packs in 2011–12.

Ordinary least squares (OLS) estimation of Eq. (1) is likely to yield biased estimates because the assumption of homogeneity of variance may not hold when all the independent variables are categorical, and the dependent variable is continuous (Grizzle et al., 1969). Provided that the variance of the dependent variable within each subgroup can be estimated independently, the linear regression Eq. (1) can be estimated using the variance-weighted least squares (VWLS) method to account for heterogeneity of outcome across subgroups. Thus, a second set of estimates is obtained using VWLS regression. The Chi-square statistic of the Cook-Weisberg test was used to confirm the presence of heteroscedasticity.

The final step involved measuring the variation in revenue collection attributable to the deviation of MRP from RRP. If MRP exceeds RRP, it discourages cigarette smoking more than intended by the RRP, and thus is 'better' for public health. However, it implies that the government could generate more revenue had tax been based on MRP. It also implies that manufacturers and retailers are making larger profit by charging higher prices in the market, while paying tax based on the RRP which is lower than the MRP. On the other hand, if MRP is less than RRP, it is likely to encourage smoking to the detriment of public health. The extra industry revenue is calculated as the following sum over the price segments *i*:

$$\sum_i (\mathrm{MRP}_i - \mathrm{RRP}_i) \text{ X Sales volume in packs}_i$$

The potential tax revenue gain is measured by the following sum over the price segments *i* in different tax tiers *t*:

$$\sum_{it} (\mathrm{MRP}_{it} - \mathrm{RRP}_{it}) \text{ X Sales volume in packs}_{it} \text{ X}$$

$$(\text{Excise tax rate}_t + \text{Value Added Tax rate})$$

3. Results

3.1. Divergence in MRP between pack and stick sales

According to the ITC Bangladesh Wave 3 Survey data, 57% of cigarette consumption takes place in pack form, while 43% is in stick form. The large market share of single stick sales in Bangladesh suggests that there must be incentives from both the demand and the supply sides that underpin this form of transaction. On the demand side, smokers who have relatively lower smoking intensity tend to purchase in the stick form. In ITC Bangladesh Wave 3 Survey, we observed that the average per capita daily consumption of cigarettes by smokers who purchased in packs was 11.58, while that for smokers purchasing sticks was 7.02. Besides, for those who have little money to spare, buying in smaller quantities in stick form allows them to satisfy their immediate nicotine craving.

From the perspective of sellers, it enables greater differentiation along the demand curve. The supply-side incentive also lies in the price differential between pack and stick sales.

As shown in Fig. 1a, for the year 2011–12, the price per 10 sticks does not differ significantly between pack and stick purchases for most of the low-price brands. For a few low-price brands that are popular such as Bristol, Real, Pilot, and Sheikh, the prices in stick purchase are greater than in pack purchase. Smokers are likely paying a premium in stick purchases of these popular brands for their brand loyalty. In contrast, for all the medium-price, high-price, and premium brands except for Castle in the high-price category, the prices in stick purchases are greater than in pack purchases. Fig. 1b shows a clear price differential that exists for stick over pack sales across all brands in the market for 2015–16, the differential being more pronounced for high-price and premium brands compared to low-price brands. Since most of the market is concentrated in the low-price segment where it is also likely more price sensitive, the retailers do not extract much premium from stick sale at this level. However, they can extract high retail margin for the higher-price brands in stick purchase where smokers are less price sensitive.

3.2. Divergence between MRP and RRP

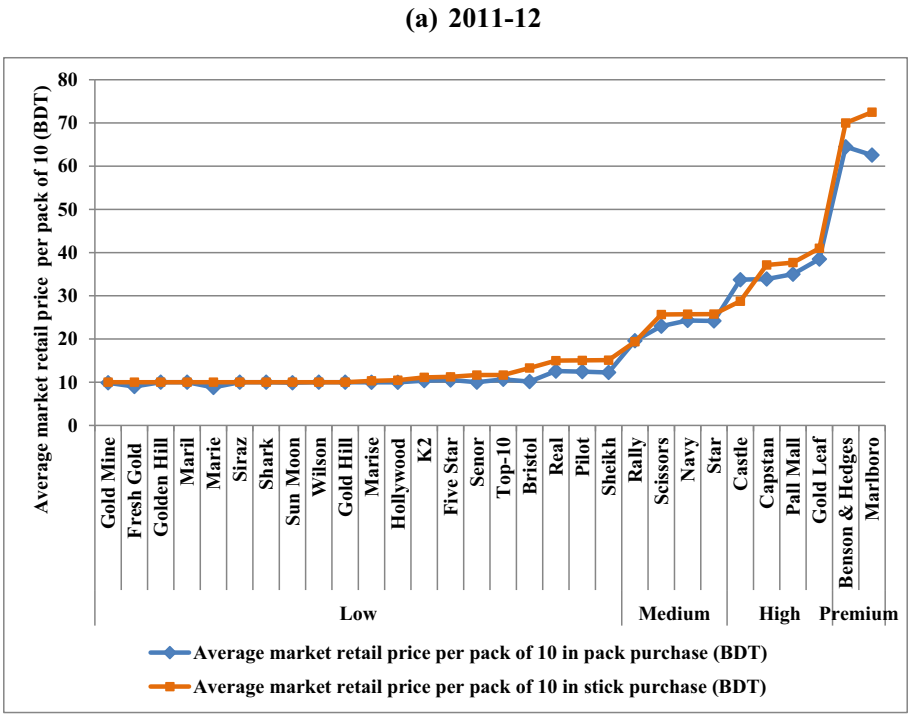
In Fig. 2a and b, we compared the RRP with the MRP for both pack and stick sales for 2011–12 and 2015–16 respectively. In 2011–12, cigarette brands marketed in the medium-priced, high-priced, and premium tiers tended to record higher MRPs in both pack and stick purchases, except for two brands (e.g. Rally and Castle) (Fig. 2a). A significant number of low-priced brands, on the other hand, were sold at the MRP below RRP as indicated by the negative differentials, suggesting the existence of manufacturers' discounting their brands at this low end of the market.

The MRP-RPP differential for both pack and sticks purchases remained large for high-price and premium brands in 2015–16 (Fig. 2b). However, a small price differential emerged for brands in the low-priced segment as well. This suggests that the manufacturers may have switched their pricing strategy in a contemporaneous or even collusive manner by no longer discounting low-price brands, although the differential of MRP over RRP for low-price brands were still lower than those for high-price and premium brands.

The mean of differences between MRP and RRP by brands and type of purchase (pack and stick) converted to 2015 prices are presented in Table 2. In 2011–12, retailers on average charged BDT 0.61, 2.11, 4.35, and 6.87 more than RRP per pack for low-price, medium-price, high-price, and premium brands. The difference was larger in stick than in pack purchases for all price tiers, with evidence of discounting in pack purchases in the low-price tier. The price differential grew noticeably bigger in 2015–16 compared to 2011–12 indicating that the profit motive of raising MRP above RRP got stronger over time. The discounting in pack purchases in the low-price tier was also replaced with a mark-up of BDT 2.31 per pack in 2015–16.

The results of OLS and VWLS regression of the differential between MRP and RRP are presented in Table 3. The Chi-square statistic of the Cook-Weisberg test confirms the presence of heteroscedasticity. Hence, we use VWLS estimates to correct for the bias in OLS estimates. The results of VWLS (pooled) regression indicate that for low-price brands, MRPs were lower than RRPs by BDT 1.47 on average, suggesting the presence of discounting in the low tier. In contrast, the MRPs were higher than RRPs for all the three upper tiers. The statistically significant and larger estimates for higher price tiers (BDT 4.02 for medium-price, BDT 4.05 for high-price and BDT 5.25 for premium brands) suggest that the mark-up of market price over recommended price was higher for more expensive brands, which is indicative of cross-subsidization of low-price brands through charging a higher premium on higher-priced brands. The differential became larger by BDT 3.39 in 2015–16 compared to 2011–12, which suggests that the profit motive of charging market prices over the recommended prices intensified over time.

Separate VWLS regression for 2011–12 and 2015–16, however, indicate that the discounting offered to low-price brands in 2011–12 (BDT 1.39) reversed to an average premium of BDT 1.89 in 2015–16 and the mark-up for high-price and premium brands attenuated in 2015–16 compared to 2011–12. Nevertheless, the mark-up was significantly higher for high-price and premium brands than for low-price brands in both years.



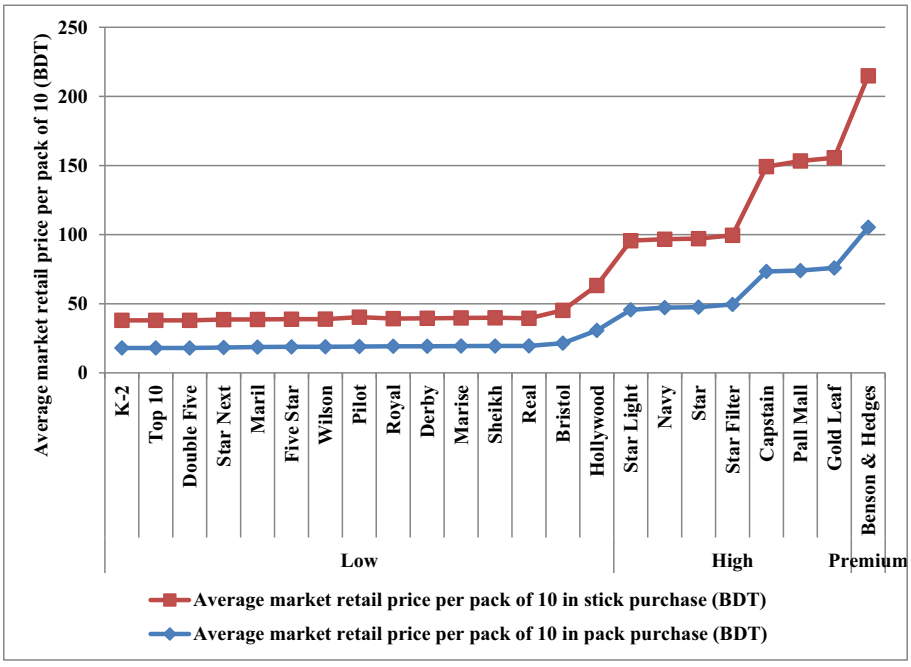


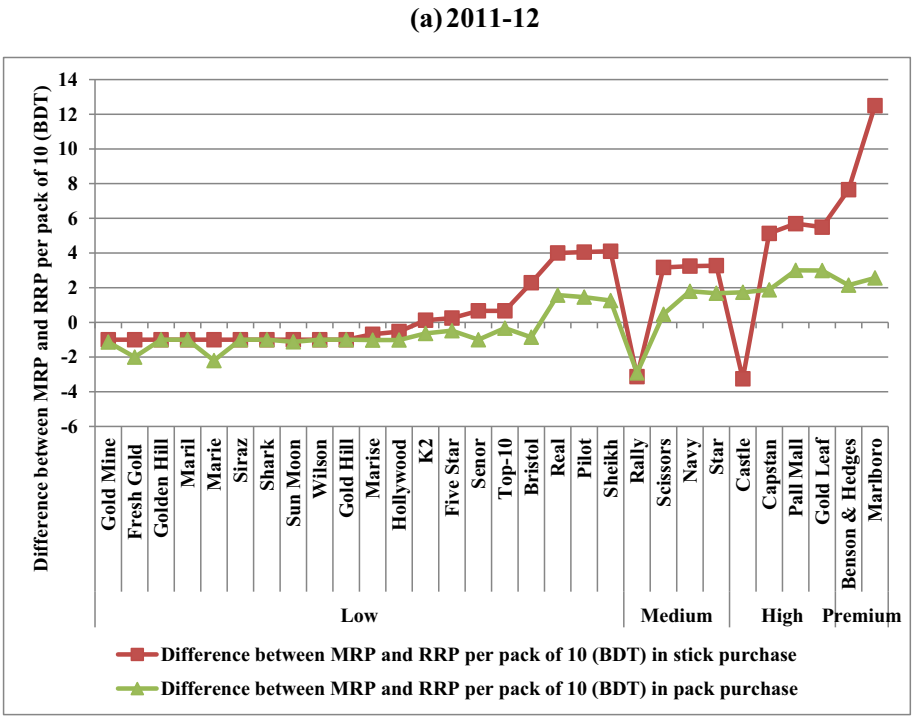
Fig. 1. Comparison of cigarette market retail price (MRP) per pack of 10 (BDT) between pack and stick purchases by brand in Bangladesh
(a) 2011–12
Source: Authors' calculations based on market retail price data collected by the ITC Bangladesh Wave 3 Survey 2011–12.
(b) 2015–16
Source: Authors' calculations based on market retail price data collected by the ITC Bangladesh Wave 4 Survey 2014–15.
Note: The medium-priced segment did not exist in 2015–16 due to the rule introduced by the National Board of Revenue in 2015–16 that all brands belonging to the medium-price segment in 2014–15 must move to the high-price segment, while no brands could move from the low-price to the medium-price category.

3.3. Implications for tax revenue and industry profit

When MRP exceeds RRP, the retail margin over and above RRP goes untaxed, with the implication that total tax revenues are lower than otherwise would be the case. In the fiscal year 2011–12, NBR collected BDT 94.78 billion (USD 1.16 billion) in excise and VAT revenue from the cigarette manufacturers. This was 10.26% of total revenue collection by the NBR in that year. Our calculation shows that if the NBR were authorized to collect tax on the MRP, it could have collected an additional BDT 7.5 billion (USD 91.2 million). The amount of excise and VAT revenue collected was thus 7% lower than the revenue potential. On the other hand, the tobacco industry made an estimated BDT 11 billion (equivalent to USD 134.7 million) in extra profit margin over and above the profit embedded in the RRP. The loss of cigarette tax revenue was even larger in 2015–16 at BDT 23.9 billion (USD 307 million), while the extra profit margin for the industry was an estimated BDT 35.3 billion (USD 452.5 million), more than doubling after adjustment for inflation since 2011–12.

3.4. Price gap between the cheapest and the most expensive cigarette brands

Due to the divergence between MRP and RRP, the price gap



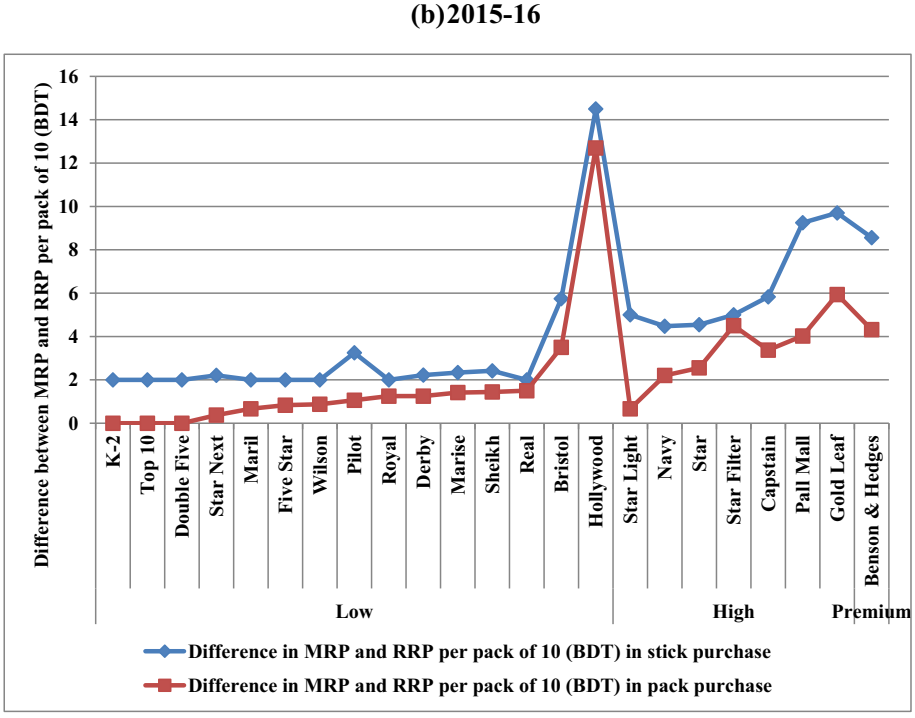


Fig. 2. The MRP-RRP differential per pack of 10 (BDT) in stick and pack purchases by cigarette brands in Bangladesh
(a) 2011–12
Source: Authors' calculations based on the market retail price data collected by the ITC Bangladesh Wave 3 Survey 2011–12 and the recommended retail price data collected from the National Board of Revenue.
(b) 2015–16
Source: Authors' calculations based on the market retail price data collected by the ITC Bangladesh Wave 4 Survey 2014–15 and the recommended retail price data collected from the National Board of Revenue.
Note: The medium-price segment did not exist in 2015–16 due to the rule introduced by the National Board of Revenue in 2015–16 that all brands belonging to the medium-price segment in 2014–15 must move to the high-price segment, while no brands could move from the low-price to the medium-price category.

between the premium and low-priced brands also widened. As shown in Table 4, in 2011–12, the RRP of the most expensive brand, Benson & Hedges, was 5.67 times the RRP of the cheapest brand, Marie, in pack purchase. In terms of MRP, this ratio increased to 7.33. Similarly, in stick purchase, the ratio of RRP of the most expensive brand to the cheapest brand was 5.45, which increased to 7.25 in case of MRP. In 2015–16, both the MRP and the RRP were higher for pack and stick purchases. The price gap between the most expensive brand and the cheapest brand continued to be high in 2015–16 although it decreased somewhat for MRP compared to 2011–12.

4. Discussion

4.1. Cigarette manufacturers' differential pricing strategy

This study demonstrates that cigarette manufacturers in Bangladesh followed pricing strategies that allowed them to extract extra profit margin while avoiding payment of tax on the additional profit. By raising MRP above RRP, the manufacturer can potentially extract higher profit margin from the high-end of the tiered system where smokers are expected to be more affluent and less price sensitive

Table 2
Mean differential per pack (in 2015 BDT) between Market Retail Price (MRP) and Recommended Retail Price (RRP) by price segment in 2011–12 and 2015–16.

Price segment	Number of stores	Pack purchase		Stick purchase		All purchases	
		Mean (2015 BDT)	95% CI	Mean (2015 BDT)	95% CI	Mean (2015 BDT)	95% CI
2011–12							
Low	933	−0.19	(−0.33, −0.05)	1.22	(0.98, 1.46)	0.61	(0.46, 0.76)
Medium	561	1.47	(1.27, 1.67)	2.58	(2.24, 2.93)	2.11	(1.89, 2.31)
High	321	3.27	(2.97, 3.58)	5.16	(4.38, 5.94)	4.35	(3.90, 4.79)
Premium	155	2.65	(1.94, 3.35)	10.06	(9.78, 10.33)	6.87	(6.33, 7.41)
All brands	1970	1.07	(0.94, 1.20)	2.94	(2.72, 3.17)	2.14	(2.00, 2.28)
2015–16							
Low	705	2.31	(1.90, 2.71)	3.77	(3.31, 4.26)	3.20	(2.88, 3.51)
Medium	0	n/a	n/a	n/a	n/a	n/a	n/a
High	736	4.43	(3.91, 4.95)	7.91	(7.46, 8.36)	6.52	(6.17, 6.87)
Premium	119	5.26	(4.00, 6.51)	10.48	(8.74, 12.22)	8.39	(7.25, 9.54)
All brands	1560	3.53	(3.21, 3.86)	6.24	(5.89, 6.59)	5.16	(4.92, 5.40)

Source: Authors' calculations based on the market retail price data collected by the ITC Bangladesh Wave 3 Survey 2011–12 and Wave 4 Survey 2014–15, and the recommended retail price data collected from the National Board of Revenue.
Note: The medium-price segment did not exist in 2015–16 due to the rule introduced by the National Board of Revenue in 2015–16 that all brands belonging to the medium-price segment in 2014–15 must move to the high-price segment, while no brands were allowed to move from low-price to the medium-price category.

(Nargis et al., 2014). In addition, it allows the manufacturer to cross-subsidize brands at the lower tiers with excess profit earned at the upper tier. By lowering the relative price of brands in the low tier, the manufacturer can attract more price sensitive smokers to buy cheaper brands and expand overall demand. As a matter of fact, total cigarette sales in Bangladesh registered a 12% increase from 79 to 89 billion sticks between 2012 and 2016 (Euromonitor International, 2017), while the market share of low-price brands expanded from 61.7% to 79.5%. The market share of low-priced brands in the total cigarette production of British American Tobacco Bangladesh (BATB) itself increased from 67% to 74% in one year between 2014 and 2015 (BATB, 2015). Thus, the tobacco industry maximized profit both from increasing the profit per unit at the high end and expanding the market size at the low end of the price distribution.

It is evident from this study that the manufacturers switched their pricing strategy for low-price brands from discounting in 2011–12 to charging a premium over recommended prices in 2015–16. It suggests that the price discounts offered to recruit new smokers in the earlier period was no longer necessary. With the expansion and maturing of the market, manufacturers felt confident enough to extract extra profit margin over recommended prices even from the low-price cigarettes. Moreover, cigarette tax and price increases have failed to keep pace with inflation and income growth in the recent decade resulting in increasing affordability and consumption of cigarettes (Nargis et al., 2019a; Nargis et al., 2019b). Growing affordability of cigarettes contributed to the larger pass through in 2015–16 compared to 2011–12.

The differential pricing strategy of tobacco companies counteracts the intended public health impact of tax and price increases. On the one hand, it encourages initiation of tobacco use among poorer and younger people. On the other, it widens the price dispersion between cheap and expensive cigarettes offering smokers the option to switch-down rather than to reduce or quit smoking when tax and price increase. Thus, it can

Table 3
Coefficients estimated from ordinary least squares (OLS) and variance-weighted least squares (VWLS) regression of price differential per pack (in 2015 BDT) between market and recommended prices by price tiers in 2011–12 and 2015–16.

Dependent variable	OLS			VWLS (pooled)			VWLS (2011 − 12)			VWLS (2015–16)		
Difference of market and recommended prices	Coeff.	SE	P-value	Coeff.	SE	P-value	Coeff.	SE	P-value	Coeff.	SE	P-value
Control variables												
Constant	−0.35	0.56	0.54	−1.47	0.00	0.00	−1.39	0.00	0.00	1.89	0.00	0.00
Price tiers (reference: LOW)												
Medium	1.38	0.17	0.00	4.02	0.00	0.00	4.45	0.00	0.00	–	–	–
High	3.01	0.13	0.00	4.05	0.05	0.00	3.72	0.08	0.00	3.28	0.09	0.00
Premium	4.77	0.21	0.00	5.25	0.00	0.00	5.67	0.00	0.00	3.08	0.00	0.00
Type of purchase (reference: Pack)												
Stick	2.03	0.11	0.00	0.09	0.00	0.00	0.18	0.00	0.00	0.10	0.00	0.00
Year (reference: 2011–12)												
2015–16	1.73	0.13	0.00	3.39	0.00	0.00						
Number of observations	7060			6003			3270			2733		
Adjusted R-squared	0.20											
Cook-Weisberg test for heteroskedasticity												
Chi-square (1)	699.28											
Prob > chi-square	0.0000											

Source: Authors' calculations based on the market retail price data collected by the ITC Bangladesh Wave 3 Survey 2011–12 and Wave 4 Survey 2014–15, and the recommended retail price data collected from the National Board of Revenue.
Notes

1. The regression controls for regional fixed effects using the sample clusters.
2. The medium segment did not exist in 2015–16 due to the rule introduced by the NBR in 2015–16 that all brands belonging to the medium segment in 2014–15 must move to the high segment, while no brands could move from low to the medium category.

Table 4
Market retail price (MRP), recommended retail price (RRP) and the price ratio of the most expensive and the cheapest cigarette brands in Bangladesh, 2011–12 and 2015–16.

	Price per pack of most expensive brand		Price per pack of cheapest brand		Price ratio: cheapest and most expensive brands	
	In pack purchase (BDT/pack of 10)	In stick purchase (BDT/stick)	In pack purchase (BDT/pack of 10)	In stick purchase (BDT/stick)	In pack purchase	In stick purchase
2011–12						
Market retail price (MRP)	64.50	7.25	8.80	1.00	7.33	7.25
Recommended retail price (RRP)	62.35	6.00	11.00	1.10	5.67	5.45
2015–16						
Market retail price (MRP)	105.32	10.96	18.00	2.00	5.85	5.48
Recommended retail price (RRP)	101.00	10.10	18.00	1.80	5.61	5.61

Source: Authors' calculations based on the market retail price data collected by the ITC Bangladesh Wave 3 Survey 2011–12 and Wave 4 Survey 2014–15, and the recommended retail price data collected from the National Board of Revenue.

undermine the effectiveness of tax and price increases in inducing smoking cessation or mitigating smoking initiation (Ross et al., 2011a; Ross et al., 2011b; Licht et al., 2011). Bangladesh has the second highest tax share in retail price of the most sold brand of cigarettes (71%) next to Thailand (78.6%) among South-East Asian countries (WHO, 2019). However, the retail price of the most sold brand of cigarettes is one of the lowest in the region, which coupled with tobacco industry pricing undermining tobacco tax policy can further impede the intended public health goals of tobacco taxation. Furthermore, affordability of cigarettes in Bangladesh has increased significantly despite the increase in tax rates and despite the now higher tax share in retail price (Nargis et al., 2019a; Nargis et al., 2019b). In Bangladesh, and in other key low- and middle-income countries (notably China), affordability, not tax share, is the key construct governing demand.

Although the availability of single sticks is convenient for smokers with low daily purchasing power, they do end up spending more per unit with the extra profit enjoyed by retailers. Single stick sales also pose a public health problem because it gives more room for smokers to continue smoking even though at a lower intensity, and this in turn becomes an impediment to quitting. Evidence suggests that smoking with lower intensity does not reduce the risk of smoking related diseases in a linear fashion (Schane et al., 2010). In addition, the availability of single sticks can encourage experimentation among youth who are at risk of addiction.

4.2. Policy implications for Bangladesh

Despite the administration of cigarette price by the tax authority in Bangladesh, the cigarette manufacturers have been able to manipulate the retail price by setting the MRP below or close to the RRP at the low-priced tier while raising the MRP above the RRP at a much higher rate at the medium, high, and premium tiers. This industry pricing strategy has resulted in majority of cigarette consumption being concentrated in the low-price tier encouraging consumption among low-income smokers, while creating larger profit margin from the higher price tiers for the tobacco industry and revenue loss to the government.

The industry's differential pricing strategy has been supported by the tiered excise tax structure that has been in force in Bangladesh for the past two decades. The significantly lower rate of excise tax for the low-price tier was meant to protect domestic manufacturers producing mostly low-price cigarettes from competition with multinational tobacco companies. The first cigarette manufacturer in Bangladesh (known as East Pakistan prior to 1971) was established in 1949 as the Pakistan Tobacco Company, which was renamed Bangladesh Tobacco Company (BTC) in 1972 immediately after the independence of Bangladesh. BTC was originally a subsidiary of the multinational company British American Tobacco (BAT), but then was taken over by BAT in 1998, which renamed BTC as British American Tobacco Bangladesh (BATB) (Efroymson and Ahmed, 2003). For many years, BTC and later BATB operated as a monopoly, and then was joined by the domestic companies Dhaka Tobacco Industries (DTI) and Abul Khair Tobacco Limited (AKTL). Currently, these three companies account for 98% of the total cigarette production in Bangladesh, with a few small domestic manufacturers producing the remaining 2%. Up to 2006–2007, BATB produced brands in the top three tiers while DTI and AKTL produced in the bottom three tiers. BATB started to produce brands in the lowest tier in 2007–2008 with 3.2% of the market share of low-price brands and expanding it to 62.2% by 2017–2018 (National Board of Revenue, Ministry of Finance, Government of Bangladesh, n.d.). BATB currently operates as a market leader with brands in all four price tiers of the market. Under these circumstances, preferential tax rates for lower priced brands have been essential for the survival of the domestic companies. The continuation of the tiered cigarette tax structure, despite the huge administrative burden entailed by such a complex tax system, indicates that cigarette tax policy in Bangladesh has been influenced by the domestic cigarette manufacturers to a great

extent.

Under increasing competition from BATB, DTI marketed Marlboro which is a Philip Morris International (PMI) brand under an agreement with PMI since 2007. Subsequently in August 2018, DTI was acquired by another large multinational tobacco company Japan Tobacco International (JTI). Despite the continuation of the tiered tax structure, the remaining domestic companies including AKTL appear to be at risk of being outcompeted or acquired by multinational companies with the changing dynamics of two international competitors operating on the supply side of cigarette market (Ahmed et al., 2019). Therefore, the resistance of domestic manufacturers to the simplification of excise tax structure into a uniform specific system on the ground that it would jeopardize their survival and the livelihood of cigarette manufacturing workers and tobacco farmers seems to be overrated. A recent report released by the NBR provided supporting evidence for the workers employed in biri (a hand-rolled smoked tobacco product in Bangladesh besides machine-made cigarettes) industry (NBR, 2019). An evaluation of the alternative livelihood options of cigarette manufacturing workers and tobacco farmers is beyond the scope of the present study and remains to be addressed in future research.

The findings of this study have several implications for the tobacco tax policy in Bangladesh. First, the government should consider replacing the tiered tax structure with a uniform system. Second, a specific tax (fixed amount per pack) should be in place instead of an ad valorem tax (percentage of retail price). A specific tax would help reduce the price gap between low-price and higher-price brands and ensure a steady and predictable revenue flow. A specific tax, however, would need to be adjusted upward for inflation and income growth routinely in order to increase prices and keep the affordability of tobacco products from increasing.

Under ad valorem taxation, administration generally relies on the manufacturers' declaration of price at manufacturing or retail level which serves as the tax base for applying the ad valorem rate as a percentage of the tax base. In this system, producers have an incentive to undervalue their products to reduce their tax liability. In Bangladesh, the practice is different from this standard procedure. The NBR sets both the ad valorem tax rate and the retail price. It means that for each price tier, the tax per unit (e.g., a pack of 10 cigarettes) is fixed by the NBR. Because of this, the excise tax on cigarettes in Bangladesh effectively follows a tiered specific tax structure. The cigarette manufacturers in Bangladesh are thus not allowed to set the market price of cigarettes independently. They are required to sell cigarettes at the retail prices recommended by the NBR for each individual brand. Their tax liability for each brand is thus fixed per pack or stick. In these circumstances, the cigarette manufacturers cannot take advantage of undervaluation to reduce their tax liability as they can usually do under an ad valorem system. In this paper, we showed that cigarettes were not necessarily sold at the retail prices recommended by the NBR although the cigarette companies were paying taxes based on those recommended prices. This strategy allowed the companies to shift the tax increases at a lower rate for cheaper brands, which helped the cigarette companies expand cigarette sales in the low tier considerable extent despite periodic tax and price increases by the NBR in the period under observation.

The administration of a uniform specific excise system is significantly easier for the government. It would also allow the government to withdraw control from administering the RRPs for cigarettes, which creates extra burden on the tax authority. The tax authority does not have the capacity to monitor and enforce the RRPs across thousands of retailers throughout the country. The tobacco industry is taking advantage of this administrative weakness to maximize their profit. Therefore, it is recommended that the government let the market determine the relevant price and collect the revenue based on a sufficiently high specific tax that is independent of the value of the product and depends only on the volume of sale.

Finally, strong legislative measures should be taken to eliminate the sale of single sticks. Although such legislation requires enforcement, it would support other tobacco control efforts by increasing the likelihood that smokers will quit and by closing an important gateway for smoking initiation among youth.

5. Conclusion

Bangladesh cigarette industry adopted a differential pricing strategy that lowered the relative price of cheaper brands with cross-subsidization from the higher profit margin from expensive brands and expanded cigarette demand, with negative public health impact and foregone tax revenue. This pricing strategy was supported – even amplified – by the tiered excise tax structure that has been in place in Bangladesh for the past two decades. The idiosyncratic excise structure was meant to protect local cigarette manufacturers but had failed to do so while allowing the growth of deadly tobacco smoking. The government should replace the tiered tax structure with a uniform specific excise system. In the face of growing cigarette affordability, it is crucial that the specific tax be increased routinely by an amount that induces cigarette price increases large enough to make cigarettes less affordable over time. The government also needs to withdraw its control over setting cigarette prices by allowing the market to determine them.

Author contribution section

Nigar Nargis conceived the paper, conducted the analysis, drafted and revised the paper. AKM Ghulam Hussain designed the survey, administered data collection, and contributed to the analysis and drafting of the manuscript. Mark Goodchild, Anne CK Quah and Geoffrey T Fong contributed to the drafting and revisions of the manuscript.

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Disclaimer

The authors alone are responsible for the views expressed in this article, and they do not necessarily represent the views, decisions or policies of the institutions with which they are affiliated.

Declaration of Competing Interest

Geoffrey T Fong has served as an expert witness on behalf of governments in litigation involving the tobacco industry.

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Data statement

The data can be accessed by submitting the data request forms available at http://www.itcproject.org/forms.

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