Original Article

Impact on Thai Health Expenditures from not Adjusting Tobacco Tax Rates under the Ministerial Regulation under Excise Act B.E. 2560 (2017)

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Objective: To assess the effect of not adjusting the tobacco tax rate of the Ministerial Regulation under Excise act B.E. 2560 (2017) on Thai health expenditure.

Materials and Methods: The one-year economic effect of implementing versus postponing the tobacco tax rate according to the excise act was estimated. Epidemiology and economics parameters were retrieved from the Thai population-based epidemiological surveys and the related local studies. The analysis was performed for each of four cigarette types, then aggregated and the differences were calculated as number of smokers × number of cigarettes × percent margin. Finally, the effect on health expenditures was estimated.

Results: From the simulation of the four product types, total cigarette sales for all four groups would drop if the tobacco tax rate was not postponed. In consequence, government's health expenditures would be reduced from less burden of smoking-related diseases for 1,745 million THB per year. The company profit would be decreased by –2,175 million THB only for the local products low price, while others had more profit at 9,542, 1,791, and 9,601 million THB. From the government perspective, more tax would be collected from both excise and other tax in total of 3,769 and 1,001 million THB per year.

Conclusion: Implementing suitable tobacco tax reform will reduce the number of smokers and the burden of its related diseases. The industry would still get larger increase in profit compared to the additional tax collected by the government.

Keywords: Health expenditures; Economic effect; Tobacco tax; Excise act; FCTC

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Tobacco use creates an enormous illness burden in the overall society, as it causes both higher direct health care costs associated with tobacco-related disease and indirect costs associated with premature death, productivities losses, or disability due to tobacco-related illnesses. In Thailand, it was found that the prevalence of tobacco use in 2018 was 19.9%[1]. A study showed that the societal cost of tobacco-related diseases in the mentioned country was about 74.88 billion THB in 2009[2].

Substantial tobacco taxation is a significant tobacco control policy worldwide. It especially conforms with the World Health Organization (WHO) Framework Convention on Tobacco Control (FCTC), which states that taxation is used to reduce demand for smoking, increase government revenues, and also affect the labor force of the tobacco industry such as agriculture and manufacturing. The consequence of reduced smoking is that the smoking-related diseases will be decreased, and the health expenditure will be reduced. Tobacco taxes in Thailand have been established since the early 1900s to control the use of tobacco and opium. The first excise tax rate was introduced and continuously added through other taxes such as earmarked tax, value-added tax (VAT), local, and the interior tax in 1990[3,4].

FCTC and other countries' experiences

In reference to the guidelines for the implementation of article 6 of the WHO FCTC[5],

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there are two types of excise taxes, specific and ad valorem. A specific excise tax rate is calculated based on quantity, that is, a fixed amount per cigarette. Whilst, the ad valorem excise tax rate is based on value, a percentage of the price (WHO). Therefore, raising tobacco taxes are aimed to reduce tobacco use. Between 1999 and 2014, 103 countries have ratified FCTC article 6[6]. Over these 15 years, 69 countries increased the tobacco tax rate, 33 decreased it, and one had the same tax rate.

Tobacco tax policy in Thailand

Nowadays, the Thai government uses the excise tax as the primary tax on cigarettes. It has increased on ten occasions, from 55% in 1990 to 90% in 2016 for the ex-factory price for locally produced cigarettes and CIF plus import duty for imported cigarettes. During these periods, an earmarked health tax has been collected since 2001[7] at 7.5% of excise tax. The collection was shared for the Thai Health Promotion Foundation activities, the government sports fund, and the elderly fund at 2% each, and for the Thai Public Broadcast Service at 1.5%. Additionally, the VAT is added at 7% of the retail price including the local and the interior tax. They are collected at 1.86 THB and 10%, respectively, by the Excise Department on behalf of local administrative organizations and the Ministry of Interior, as shown in Table 1.

In 2017, the Excise Department and the Ministry of Finance updated and consolidated seven excise tax policies, included tobacco tax, to be one and launched it on September 16, 2017[8]. This single policy results in the tobacco taxation under Ministerial Regulation to have a hybrid or mixed excise rate. This mixed rate includes a specific rate of 1.20 THB per cigarette plus an ad valorem rate of 20% for cigarettes with a price less than or equal to 60 THB per pack of 20 cigarettes and 40% for cigarettes priced more than 60 THB. The mentioned rate was applied for two years only, then increased to 40% for all cigarettes from October 2019, as shown on Table 1. However, in 2019, the government decided to extend the tax enforcement period for one more year from October 2019 to October 2020 to relieve the agricultural and manufacturing sectors[9]. In consequence, there was an effect on tax revenue, the amount of tobacco used, the burden of smoking-related disease, the heath expenditures, and the tobacco industry revenues. The present study aimed to assess these effects by converting all results into monetary values and measure its impact to the government and tobacco industry for decision-making considerations in the future.

Table 1. The structure of the Ministerial Regulation under Excise act B.E. 2560 (2017)

	Before October 2019	After October 2019 (postponed to October 2020)
Excise tax (specific tax rate)	1.20 THB per cigarette	
Excise tax (ad valorem tax rate)	20% of selling price less or equal 60 THB per pack and 40% for the rest	40% of the selling price
Earmarked tax	7.5% of excise tax	
Value-added tax (VAT)	7% of the retail price	
Local tax	10% of excise tax	
The interior tax	1.86 THB per pack (20 cigarettes)	

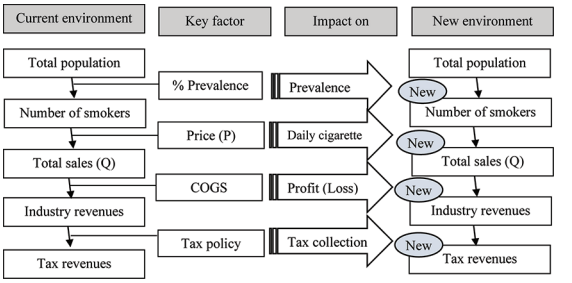

Figure 1. Analytic model.

Material and Methods

The authors estimated the one-year effect of implementing versus postponing the tobacco tax rate according to the structure of the Ministerial Regulation under Excise act B.E. 2560 (2017) from the perspective of the government and tobacco industry. The method used for the present analysis considered the increase of excise tax, which would consequently decrease demand and produce less tobacco consumption based on price elasticity. Tobacco margins and their effect on selling price and quantity were also assessed to explain the effect on tax and industry revenues. Figure 1 presented the analytic model adopted from the budget impact analysis concept for economic evaluation. The epidemiological such as the prevalence of smoking, average number of daily cigarettes, and percent locally produced products, and economic such as price elasticity of demand for tobacco, parameters were identified from a search of the literature in Thailand, as shown on Table 2.

The number of smokers by age group, which were 15 to 19, 20 to 24, 25 to 44, 45 to 59, 60 years old and above, and living area such as Bangkok or

Table 2. Epidemiology and economics parameters

Parameter	Bangkok	Non-Bangkok	Sources
Prevalence of smoking (%)			(1)
15 to 19 years	9.97	9.72	
20 to 24 years	18.81	20.91	
25 to 44 years	17.75	22.85	
45 to 59 years	16.35	21.81	
60 years and above	6.26	15.26	
Average number of daily cigarettes (%)			(1)
15 to 19 years	7.16	2.27	
20 to 24 years	7.16	2.27	
25 to 44 years	9.47	3.00	
45 to 59 years	9.08	2.87	
60 years and above	6.87	2.18	
Locally produced products (%)	60.00		(1)
Price elasticity of demand for tobacco (%)			(11-13)
15 to 19 years	−0.31	−0.08	
20 to 24 years	−0.39	−0.10	
25 to 44 years	−0.46	−0.12	
45 to 59 years	−0.29	−0.07	
60 years and above	0.00	0.00	

non-Bangkok, were estimated as the population at different ages[10] in 2018 × % prevalence of smoking. The total cigarette use in one year was then calculated by the number of smokers x average number of daily cigarettes × 365 days, then the estimated cigarette use was classified into four groups by the ratios - low versus high price locally produced, and low versus high price imported cigarettes. Low price referred to a selling price less than or equal to 60 THB, while high as a price more than 60 THB per pack, with one pack that contains 20 cigarettes.

The ratio of low versus high price tobacco at 40:60, current selling prices at 60 THB for the low price for both locally produced and imported, while high prices were designated at 95 and 99 THB for locally produced and imported, respectively. Price elasticity, by definition, was the percentage change in quantity demand of a good divided by the percentage change in price. A value of less than one meant price inelastic and was applied to adjust the average number of daily cigarettes where the prices changed after the Excise act B.E. 2560 (2017) implementation[11-13].

At each age group, based on the structure of the Ministerial Regulation under Excise act B.E. 2560 (2017), as shown on Table 1, the tax revenue and company profit were measured by adjusting the selling price per pack.

The estimated revenues were calculated from P × Q, where P was the expected selling price before and after the new tax structure was applied, and Q was the expected demand for tobacco consumption based on price elasticity. The excise and other taxes were then estimated from total sales (Q) for each product type and company profit from the two different profits scenarios, implementing and postponing the tobacco excise act 2017. One-way sensitivity analysis was performed to demonstrate the product's %margin at different selling prices and the cost of goods sold (COGS). The effect on health expenditures was calculated from percent reduction of tobacco consumed of current smoking health expenditures per year[14].

Results

Table 3 illustrates the results of the simulation for the four product types, locally produced low price, locally produced high price, imported low

Table 3. Estimate selling price, total tax, cost of goods sold and profit (THB) of postponed vs. implemented the tobacco tax rate according to the structure of the Ministerial Regulation under Excise act B.E. 2560 (2017)

	Local produced low price		Local produced high price		Imported low price		Imported high price	
	Postpone	Implement	Postpone	Implement	Postpone	Implement	Postpone	Implement
Selling price	60.00	85.00	95.00	99.00	60.00	90.00	99.00	105.00
Excise tax (specific tax rate)	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00
Excise tax (ad valorem tax rate)	11.21	31.78	35.51	37.01	11.21	33.64	37.01	39.25
Earmarked tax	2.64	4.18	4.46	4.58	2.64	4.32	4.58	4.74
Value-added tax (VAT)	3.93	5.56	6.21	6.48	3.93	5.89	6.48	6.87
Local tax	3.52	5.58	5.95	6.10	3.52	5.76	6.10	6.33
The interior tax	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86
Total tax	47.16	72.96	78.00	80.02	47.16	75.48	80.02	83.05
Cost of goods sold	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
Company profit	4.84	4.04	9.00	10.98	4.84	6.52	10.98	13.95
%Margin	8.06	4.76	9.47	11.09	8.06	7.24	11.09	13.29

Table 4. Total sales and consequences of not adjusting the tobacco tax rate according to the structure of the Ministerial Regulation under Excise act B.E. 2560 (2017)

Per one year	Local produced low price	Local produced high price	Imported low price	Imported high price
Total sales (cigarettes)				
Before	2,130,867,947	4,972,025,209	1,439,621,240	3,359,116,227
After	2,011,444,319	2,943,866,374	1,342,801,655	3,331,732,910
Change	119,426,628	28,158,834	96,819,585	27,383,317)
Excise tax (THB)	1,857,565,080	285,842,599	1,335,470,924	290,120,376
Other tax# (THB)	455,016,478	103,339,493	337,471,472	104,745,980
Company profit (THB)	2,175,551,855	9,542,005,052	1,790,583,339	9,601,188,495
Health expenditures (THB)		1,744,980,000		

Other tax consists of earmarked tax, value-added tax (VAT), local, and the interior tax

price, and imported high price. By tobacco selling price increased from 60 to 85 THB, 95 to 99 THB, 60 to 90 THB, and 99 to 105 THB, respectively, the government would have more tax revenues from a range of 47.16 to 80.02 to 72.96 to 83.05 THB per tobacco pack. With the fix of the COGS at 8 THB, changes in %margin were negative, from 8.06 to 4.76, and 7.24 for locally produced and imported low price products accordingly.

Due to the higher selling price per pack, the reduction in tobacco consumption that followed the price elasticity of demand was estimated. The total sales of all product types decreased, ranging from –27.38 to –119.43 million cigarettes per year, as shown on Table 4. However, their company profit still increases because of the higher selling price per pack. In total, local produced tobacco companies earn 7,366 million THB (9,542 minus 2,175), whilst imported tobacco companies earn 11,392 million THB (1,791 plus 9,601). Also, the government would have 4,769 million THB more for tax revenues per year, that was, 3,769 million THB from the excise tax and 1,001 million THB from other taxes. From the reduction of tobacco consumption before and after the increased tax rate at 2.28%, the total health expenditures related for this was at 1.745 million THB per year (2.28% × 87,249 mil.)

The results of the sensitivity analysis are demonstrated in Figure 2. Two parameters, selling price and COGS, were changed to lower and higher values at each time and re-calculated for %margin. Axis X is %margin, and axis Y were parameters, and the top one was an effect of +5% and –5% of the selling price, while the lower one was for COGS at 7 and 9 THB. The red line was the current margin, and the green line was the %margin when the law's act was not postponed. The result showed that the %margin would drop for locally-produced low priced products (A) if implementing the tax law, while it would not be lower than the current %margin for imported high priced product (D). Nonetheless, for the other two groups (B) and (C), it depended on the selling price or COGS. A break-even point for the company to have the same %margin for (C) was at 86.50 THB.

Discussion

Thailand is considered as one of South-East Asia countries that adopted the WHO FCTC Article 6 since the announcement. From FCTC version 2016 indicators, countries that implemented a type of excise tax increased from 87% (134/154 countries) in 2008 to 92% (160/174) in 2016[15]. Thailand has changed its excised tax to hybrid or mixed rate since 2017 with specific rate at 1.20 THB per cigarette plus ad valorem rate at 20% of selling price of less or equal 60 THB per pack and 40% for the rest. It also planned to increase these taxes. The present study found that by not adjusting the tobacco tax rate for one year of according to the structure of the excise tax act B.E. 2560 (2017) in October 2019, the Thai government would generate a loss of 4,769 million THB per year from tax revenues, including 3,769 million THB from the excise tax, and miss the reduction of 271 million cigarettes aggregated from all four product types in one year.

Compared to a systematic review study of cost-effectiveness of tobacco control policies and programs targeting adolescents in 2017[16], evidence of cost-effectiveness was scarce and rarely focused on the evaluation of legal bans and no comparisons among interventions had been made. Regardless, all 16 inclusion studies from systematic review concluded that smoking prevention policies were worth their costs, not only for the tax policy.

In Thailand, from the Global Adult Tobacco Surveys between 2009 and 2011. Husain et al,

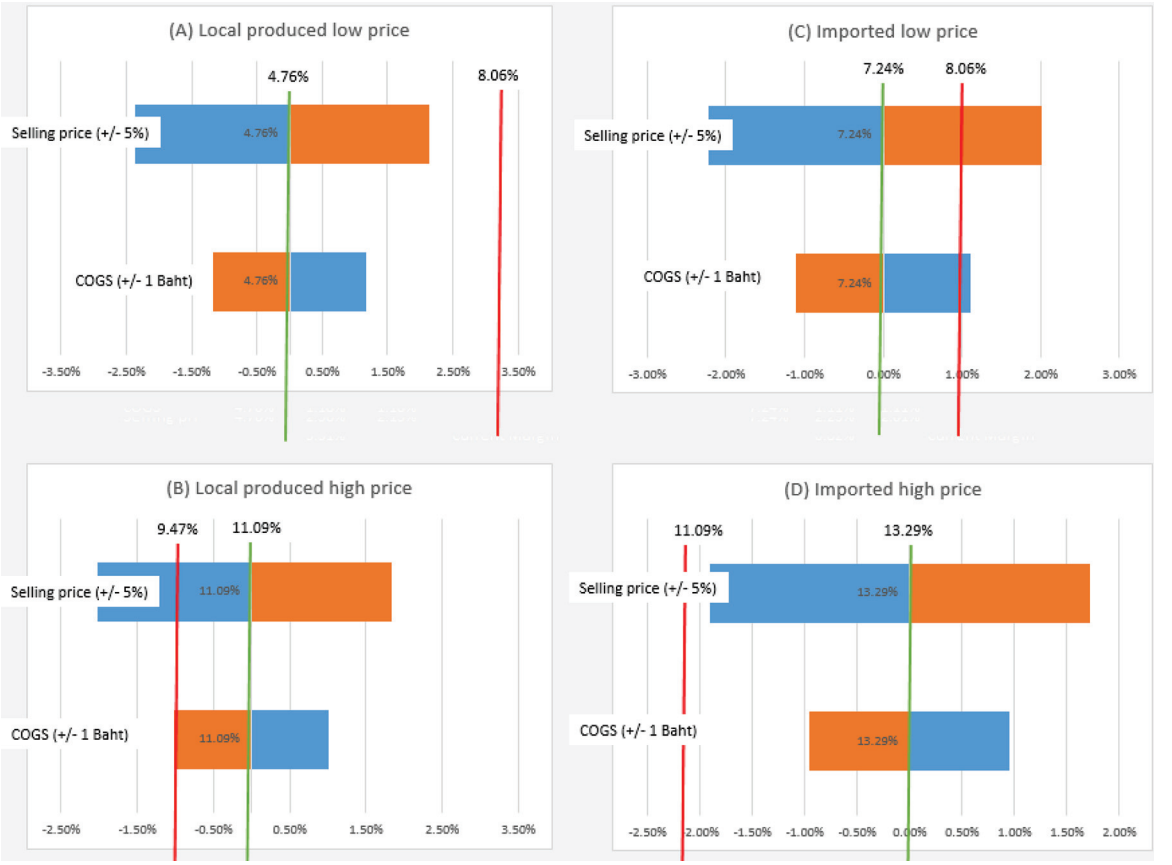

Figure 2. Sensitivity analysis of %margin for each product type.

estimated consumer's behavioral changes in cigarette prices paid, affordability, and consumption in three price categories, upper-, middle-, and lower-priced tiers[17]. When cigarette prices increased, overall, the affordability of cigarettes remained unchanged, however, there was a shift from more to less expensive cigarette brands.

A tobacco excise tax collection system using tax rates based on two price levels for manufactured cigarettes may cause problems in three ways. Firstly, in the case of the domestic tobacco industry and the two price level regulations that come into force, the regulation does not stipulate that the price reduction of existing brands sold in the market may benefit the foreign tobacco industry. Furthermore, foreign cigarette producers reduce the prices of existing cigarette brands to gain domestic consumers[18,19].

Secondly, there may be negative consequences for tobacco farmers in the domestic tobacco industry since the price competition with imported cigarettes involves a product that does not use locally grown raw materials. Finally, the domestic tobacco control policy is frustrated since the tobacco growers, who supply the tobacco to the domestic tobacco industry will oppose adjusting the tax rate to a single level. They feel that a single level makes domestic cigarettes more expensive than imported cigarettes in the market.

Therefore, solving these government problems must focus on creating new careers for tobacco farmers[5]. Agricultural production must be transitioned from tobacco farming to other jobs that are stable and sustainable since tobacco products have negative health effects.

It is not appropriate to foster competition among tobacco companies in the market because it will result in increased consumption. This market competition also leads to health problems that will occur in the future. Transitioning to other crops is consistent with the price and tax measures in the provisions of the FCTC of the WHO, aiming to reduce the demand for tobacco products.

Implementing the tobacco tax rate according to the structure of the Ministerial Regulation under the Excise Act B.E. 2560 (2017) will reduce the total

sales in all four types of tobacco products, which consequently will decrease the burden of disease-related to smoking, reduce health expenditure, and improve quality of Thai people life.

What is already known on this topic?

This study was an academic exercise study. If more information was available, it may be developed into further policy-improvement studies.

What this study adds?

This study assesses the effect of not adjusting the tobacco tax rate of the Ministerial Regulation under Excise act B.E. 2560 (2017) on Thai health expenditure. Implementing suitable tobacco tax reform will reduce the number of smokers and the burden of its related diseases, while the industry still gets larger increase in profit compared to the additional tax collected by the government.

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Conflicts of interest

The authors declare no conflict of interest.

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