

DOES CIGARETTE TAX AFFECT SMOKERS?: THE THAILAND CONTROVERSY

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ABSTRACT: Price policies involving taxation have been used to control smoking not only in Thailand but also in other countries around the world. The objectives were to determine associations between cigarette tax rates and cigarette sale volumes, cigarette tax revenues, cigarette price, number of smokers, and market shares of locally produced and imported cigarette. This study reviewed the retrospective data, trends and predicted value of excise cigarette tax on cigarette sale volumes, number of smokers, cigarette prices and tax revenues from the Thailand Health Profile 2008-2010 supported by Ministry of Public Health. The result of correlations were classified into 1) significant positive correlation between cigarette tax rates and cigarette price, sale volumes of imported cigarettes, cigarette tax revenues, predicted number of smokers, predicted cigarette price, predicted sale volumes of imported cigarettes, and predicted cigarette tax revenues ($p < 0.001$). 2) significant negative correlation between cigarette tax rates and total sale volumes of cigarettes ($p < 0.009$), predicted total sale volumes of cigarettes, and predicted sale volumes of cigarettes produced by Thailand Tobacco Monopoly ($p < 0.001$). The study revealed the rising of the cigarette tax associated with decrement of total sale volumes of cigarettes, and increment of cigarette prices, and cigarette tax revenues. The contrasts of the study were the more cigarette tax rising, the sale volumes of imported cigarettes were increased and the number of smokers were not significantly changed. The study recommended that implementing tax policies, price policies on tobacco products to contribute to the health objectives related to reducing tobacco consumption, excise tax rising might not be the best way to make them an effective tool for tobacco control in Thailand, tax policies should be designed carefully and implemented efficiently with other health promotion and prevention strategies.

Keywords: Cigarette tax, Cigarette sale volumes, Smokers, Thailand

INTRODUCTION

Numerous studies which studied effects of smoking on health, health care spending, and longevity concluded that reducing the number of smokers would improve health and increase longevity. Smoking has been shown to cause or worsen an array of medical problems including cardiovascular diseases, various types of cancer, bronchitis, and reproductive health problems and to contribute to early death. People who quit smoking see some improvements in their health fairly quickly, but many of the ill effects of smoking can take years to go away, some may never entirely disappear [1]. Cigarette smoking is the number one

risk factor for lung cancer [2, 3]. In the United States, cigarette smoking causes about 90% of lung cancers [3]. Tobacco smoke is a toxic mix of more than 7,000 chemicals [2, 3]. At least 70 are known to cause cancer in people or animals. People who smoke are 15 to 30 times more likely to get lung cancer or die from lung cancer than people who do not smoke. Even smoking a few cigarettes a day or smoking occasionally increases the risk of lung cancer. The more years a person smokes and the more cigarettes smoked each day, the greater the risk [2, 4, 5]. People who quit smoking have a lower risk of lung cancer than if they had continued to smoke, but their risk is higher than the risk for people who never smoked. Quitting smoking at any age can lower the risk of lung cancer [3, 6, 7]. Lung cancer is the second common cancer in

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Table 1 Excise tax rate, cigarette sales, taxes collected and number of smokers, 1989-2009 [9]

Year	Tax rate (%)	Sale volume (Million packets)	Cigarette tax collected (Million Baht)	No. of smokers (Million)	Cigarette price, Baht per packet
1989	35-55	1,843	14,664	-	-
1990	55	1,941	15,461	-	15
1991	55	1,942	15,898	11.3	-
1992	55	2,035	15,438	-	-
1993	55	2,135	15,345	10.4	15
1994	60	2,328	20,002	-	18
1995	62	2,171	20,736	-	21
1996	68	2,463	24,092	11.2	24
1997	68	2,415	29,755	10.2	28
1998	70	1,951	28,691	-	-
1999	70	1,810	26,708	10.2	28
2000	71.5	1,826	28,110	-	32
2001	75	1,727	29,627	10.5	36
2002	75	1,716	31,247	-	-
2003	75	1,904	33,582	7.7	38
2004	75	2,110	36,326	11.3	-
2005	75	2,187	39,690	-	38
2006	79	1,793	35,646	11.0	42
2007	80	1,958	41,528	10.8	45
2008	80	1,837	40,489	-	45
2009	85	1,790	44,167	10.9	58

Thailand 20.6 per 100 000 for men and 9.3 per 100 000 in women, also lung cancer is the most important site in men and the second place in women in Chiang Mai province [8].

Thailand trends for excise tax rate, cigarette sales, taxes collected are gradually increased, whilst the number of smokers remains unchanged as shown in Table 1. Increases in taxes on and prices of tobacco products are by far the best buys in tobacco control because they can significantly reduce tobacco use through lower initiation and increased cessation, especially among young people and the poor [10], increases in tobacco excise taxes increase prices and reduce the prevalence of adult tobacco use [11].

Chonpaisal [12] studied cigarette tax burden of Thai smoker, revealed lower income smokers are much more price elastic and therefore benefit more from the commitment device provided by higher taxes. Bishop and Yoo [13] investigated the determinants of cigarette consumption in 1985, including taxes, the 1950's health scare, and the advertising ban. They found that the taxes were more effective in reducing the consumption than the health scare or the advertising ban. In fact, the latter two had little effect on reducing smoking. Therefore, it has been shown that levying taxes on cigarettes would be an effective means of reducing the consumption of cigarettes [14]. In Thailand, consumption of tobacco products was found to have decreased relatively continuously in relation

to that of other goods. In 1970, tobacco expenditure at the then current prices (3.41 billion baht) represented around 3.69% share of total consumption expenditure (92.43 billion baht). In 1980, although tobacco expenditure jumped to 12.07 billion baht, its share of total consumption expenditure of 433.58 million baht went down to 2.78%. The decreasing trend continued into the 1990s and the 2000s. The average annual growth rate of tobacco expenditure over these periods was well behind that of expenditure on other goods. Consequently, in 1990, tobacco consumption went down to 26.94 billion baht and its share of total consumption expenditure went down to 2.18% of the total consumption expenditure that was around 1234.98 billion baht. In 2000, 2005, 2006, 2007 and 2008, the share went down further to 1.69%, 1.44%, 1.29%, 1.26%, and 1.23%, respectively [15].

The price of cigarettes in Thailand is relatively high in comparison with that in other countries in South East Asia. One factor affecting the higher price of cigarettes was that excise tax on cigarettes was increased for 9 times: from 55% in 1992 to 80% in 2006 and 85% in 2009, equivalent to about 67-70% of retail price to consumers. Though the main purpose of excise tax increase was for the benefit of government income, it had also affected the cigarette retail price and cigarette consumption [16]. Southeast Asia Initiative on Tobacco Tax (SITT) [17] reported the 2011 tobacco tax burden

Table 2 Market shares of locally produced and imported cigarettes, 1991-2009 [18]

Fiscal year	Market share (%)	
	For cigarettes produced by the Thailand Tobacco Monopoly (TTM)	For imported cigarettes
1991	99.4	0.6
1992	97.4	2.5
1993	97.2	2.8
1994	97.0	3.0
1995	96.7	3.2
1996	96.8	3.1
1997	95.9	4.1
1998	91.5	8.4
1999	86.4	13.5
2000	86.7	13.3
2001	85.0	15.0
2002	84.7	15.3
2003	85.9	14.1
2004	80.1	19.9
2005	77.7	22.3
2006	73.2	26.8
2007	77.4	22.6
2008	76.0	24.0
2009	76.0	24.0

as a percentage of retail prices in ASEAN, Brunei 72%, Thailand 70%, Singapore 69%, Indonesia 62%, Myanmar 50%, Malaysia 48%, Vietnam 45%, Philippines 41%, Cambodia 25%, and Lao 19.7%. In Thailand, trends of market shares of locally produced cigarettes were decreased, opposite to the trends of market shares of imported cigarettes, which were increased as shown on the Table 2.

It should be noted that the major tobacco products that are consumed in Thailand are cigarettes and hand-rolled tobacco products. The rate of excise tax has increased continuously over the past two decades. In 1992, the rate of excise tax for cigarettes was set at 55%. The same rate was applied to both locally produced and imported cigarettes. Following Thailand's antismoking policies, it was increased continuously. On 29 August 2007, it was further raised to 80% — that is the ceiling rate, i.e. the highest rate allowed by the present law. Based on this rate, all taxes share only around 63% of cigarette retail prices. Since 14 May 2009, the ceiling rate of excise tax has been raised to 90% and the applied rate to 85% (Table 1). This is expected to tighten cigarette consumption in Thailand. However, other tobacco products also have a significant share in Thailand's tobacco market; the excise rates on these products are very low [15].

Thailand has paucity of evidence regarding the association between tobacco taxes and adult cigarette consumption support for taxes as a way to reduce smoking. Thai Health Promotion Foundation

offers services through the government's two-percent surcharge tax on tobacco products [19]. Support for tobacco taxes is the government preferences for raising revenue outside the traditional methods of sales, income and property taxes, the primary political justification for higher tobacco taxes is the public health argument that assumes that higher taxes will reduce smoking [20, 21].

Current population survey tobacco use supplements to study the effect of recent, large changes in tobacco taxes on both the propensity to smoke and the number of cigarettes smoked (i.e. smoking intensity). We follow previous researchers and obtain estimates of the association between state tobacco taxes and smoking. This paper analyzed Thailand data of smoking, tax, factors to determine associations between cigarette tax rates, cigarette sale volumes, cigarette tax revenues, cigarette price, and number of smokers.

METHODOLOGY

This paper reviewed the retrospective data from the Thailand health profile 2008-2010 supported by Ministry of Public Health, Thai Health Promotion Foundation and contributed with other papers on smoking tax and health economics. All statistical analyses were performed using the statistical package for the social sciences (SPSS, version 17). Predicted values of cigarette tax revenues, cigarette prices, number of smokers, and market shares of locally produced and imported

Table 3 Correlation of cigarette tax rates, number of smokers, prices, sale volumes, and tax revenues

Fiscal year 1998 to 2009	Cigarette tax rate (%)	Number of smokers (Million)	Cigarette price (Baht per packet)	Total sale volumes of cigarettes (Million packets)	Sale volumes of cigarettes produced by TTM (Million packets)	Sale volumes of imported cigarettes (Million packets)	Cigarette tax revenues (Million Baht)
Mean	68.1136	10.4222	34.8462	2114.6332	1928.5333	135.2500	21682.8000
SD	9.94501	1.09519	11.21640	233.66765	260.37716	94.60840	7528.75269
Pearson correlation of tax rate percentage		.123	.978**	-.629**	-.259	.880**	.971**
Sig. (2-tailed)		.752	.000	.009	.351	.000	.000

Table 4 Correlation of cigarette tax rates, predicted values of number of smokers, prices, sale volumes, and tax revenues

Fiscal year	Cigarette tax rate (%)	Predicted number of smokers (Million)	Predicted cigarette price (Baht per packet)	Predicted total sale volumes of cigarettes (Million packets)	Predicted sale volumes of cigarettes produced by TTM (Million packets)	Predicted sale volumes of imported cigarettes (Million packets)	Predicted cigarette tax revenues (Million Baht)
1988	55	9.93	7.89	2422.75	1998.31	22.28	14119.46
1989	55	9.93	7.89	2422.75	1998.31	22.28	14119.46
1990	55	9.93	7.89	2422.75	1998.31	22.28	14119.46
1991	55	9.93	7.89	2422.75	1998.31	22.28	14119.46
1992	55	9.93	7.89	2422.75	1998.31	22.28	14119.46
1993	55	9.93	7.89	2422.75	1998.31	22.28	14119.46
1994	60	10.04	15.40	2305.27	1956.28	76.74	18675.70
1995	62	10.09	18.40	2258.28	1939.47	98.52	20498.20
1996	68	10.23	27.41	2117.31	1889.02	163.87	25965.69
1997	68	10.23	27.41	2117.31	1889.02	163.87	25965.69
1998	70	10.27	30.41	2070.31	1872.21	185.65	27788.19
1999	70	10.27	30.41	2070.31	1872.21	185.65	27788.19
2000	71	10.31	32.66	2035.07	1859.60	201.99	29155.06
2001	75	10.39	37.91	1952.83	1830.17	240.10	32344.44
2002	75	10.39	37.91	1952.83	1830.17	240.10	32344.44
2003	75	10.39	37.91	1952.83	1830.17	240.10	32344.44
2004	75	10.39	37.91	1952.83	1830.17	240.10	32344.44
2005	75	10.39	37.91	1952.83	1830.17	240.10	32344.44
2006	79	10.48	43.92	1858.85	1796.55	283.67	35989.43
2007	80	10.51	45.42	1835.35	1788.14	294.56	36900.68
2008	80	10.51	45.42	1835.35	1788.14	294.56	36900.68
2009	85	10.62	52.92	1717.87	1746.10	349.01	41456.93
Mean	68.1136	10.2314	27.5759	2114.6332	1888.0659	165.1032	26069.2455
SD	9.94501	0.22935	14.92819	233.66765	83.60696	108.31188	9062.37569
Pearson correlation of tax rate percentage		1.000**	1.000**	-1.000**	-1.000**	1.000**	1.000**
Sig. (2-tailed)		.000	.000	.000	.000	.000	.000

**Correlation is significant at the 0.01 level (2-tailed)

*Correlation is significant at the 0.05 level (2-tailed)

cigarette were forecasted with regression analyses. Cigarette tax rates, exacted and predicted data of other variables were analyzed with bivariate Pearson's correlation at the level of significance, p -value < 0.001.

RESULTS

According to the Table 1 data of tax rate, cigarette sales, taxes revenues and number of smokers, and prices linear regression equations were calculate to contribute equation and

forecasted the predicted values of each variables, and bivariate Pearson correlations are as following;

$$\begin{aligned} \text{Total cigarette sale volumes} &= 3715.033 - [23.496 \text{ Tax rate(\%)}] \\ \text{Sale volumes of cigarettes produced by TTM} &= 2460.699 - [8.407 \text{ Tax rate(\%)}] \\ \text{Sale volumes of imported cigarettes} &= 10.891 \text{ Tax rate(\%)} - 576.721 \\ \text{Cigarette tax revenues} &= 911.249 \text{ Tax rate(\%)} - 35999.239 \\ \text{Number of smokers} &= 0.023 \text{ Tax rate(\%)} + 8.611 \\ \text{Cigarette Prices} &= 1.501 \text{ Tax rate(\%)} - 74.612 \end{aligned}$$

According to the study results, correlation of cigarette tax rates, number of smokers, prices, sale volumes, tax revenues, and their predicted values were shown in Table 3 and Table 4.

Results of the study revealed statistic significances of positive correlation between cigarette tax rates and cigarette price, sale volumes of imported cigarettes, cigarette tax revenues, predicted number of smokers, predicted cigarette price, predicted sale volumes of imported cigarettes, and predicted cigarette tax revenues with ($p < 0.001$). Negative correlation also revealed statistic significances between cigarette tax rates and total sale volumes of cigarettes ($p < 0.009$), predicted total sale volumes of cigarettes ($p < 0.001$), and predicted sale volumes of cigarettes produced by Thailand Tobacco Monopoly [TTM] ($p < 0.001$), neither significant correlation between cigarette tax rates and number of smokers, nor sale volumes of cigarettes produced by TTM.

DISCUSSION

There is a general consensus among policymakers that raising tobacco taxes reduces cigarette consumption [22]. Economic studies have documented that cigarette tax or price increases reduce both adult and underage smoking. The general consensus is that every 10 percent increase in the real price of cigarettes reduces overall cigarette consumption by approximately three to five percent, reduces the number of young-adult smokers by 3.5 percent, and reduces the number of kids who smoke by six or seven percent [23]. Cigarettes tax rates have continually increased, the tax rates on cigarettes went up from 55% of the ex-factory price in 1992 to 85% in 2009 making the total tax burden to about 66% of the retail price [12]. According to the study, total sale volumes of cigarette cigarette tax rate also decrease when the cigarette tax rate rising. Statistical analyses of cigarette related data from Thailand health profile 2008-2010 in this study

revealed the more excise cigarette tax increment, the more cigarette price and cigarette tax revenues increase ($p < 0.001$), total sale volumes of cigarettes are decrease ($p < 0.009$) following the demand and supply theory. Even though the overview of increased cigarette tax rate seems to be decrease the sale volumes and numbers of smoker numbers. Surprisingly, while the cigarette tax rising, sale volumes of imported cigarettes are rising ($p < 0.001$) while number of smokers and sale volumes of cigarettes produced by TTM are non-significant correlation with cigarette tax rates, contrast to many studies, such as Chaloupka [24] has been noticed that tax increase measures are the most effective intervention to decrease the demand for tobacco, particularly among under-privileged and youths who are price-sensitive, to increase the need to stop smoking, to reduce smoking relapsed behavior, to reduce tobacco consumption and to prevent the new smokers. Mondha' study [25] revealed cigarette tax increase is beneficial for government revenue and it also affects smoking behavior change of daily smokers. Moreover, this study of cigarette tax on predicted values by linear regression equation also shown the contrary results, rising in excise cigarette tax, predicted number of smokers and predicted sale volumes of imported cigarettes were increased ($p < 0.001$) and predicted sale volumes of cigarettes produced by TTM were decreased ($p < 0.001$). These contrary-to-facts or our knowledge might be imply the excise cigarette tax and smoking are multi-factorial variables, benefits of tax policy on smoking should be reconsidering. Some of the weaknesses and inadequacies of the existing tobacco taxation policies in Thailand limit its efficacy as a potent tobacco control tool. These include, among other things, the absence of mechanisms for inflation adjustment in pricing and taxation, assent to the tobacco companies' strategies for constant pricing and their underreporting of the production cost, low tax rates on popular alternative smoking items. It is being argued that since the share of all taxes in retail prices of cigarettes is too low, the government should increase it so that smoking control can be more effective. This suggestion has been prompted by a pragmatic approach and of the World Bank report. According to the report, an optimal rate of cigarette tax is said to be difficult to determine, while the tax component is suggested to be between two thirds and four fifths of cigarette retail prices. However, there is no empirical support for Thailand to follow the suggestion. Moreover, there has been no serious investigation into other components of the cigarette prices, especially factory prices which are the base of cigarette taxation in Thailand [12].

CONCLUSION

Excise tax on cigarettes has been used as a major instrument for tobacco control in Thailand and its rates have continually increased over the past two decades following the implementation of Thailand's anti-smoking policies [12]. The study revealed the rising of the cigarette tax associated with total sale volumes of cigarettes decrement, the cigarette prices, and cigarette tax revenues were increased as seen in many previous study, however the study revealed other contrasts, the more cigarette tax rising, the sale volumes of imported cigarettes were increased and the number of smokers were not significantly changed. The study recommended that implementing tax policies, price policies on tobacco products to contribute to the health objectives related to reducing tobacco consumption. The other confounders or methods will be applied for further study. Excise tax rising might not be the best way to make them an effective tool for tobacco control in Thailand, tax policies should be designed carefully and implemented efficiently with other health promotion and prevention strategies, this requires a dynamic tax regime, robust tax administration and intense monitoring and implementation.

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