

Empirical Analysis of Cigarette Tax Avoidance in Thailand

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Table of Contents

	Page
Acknowledgment	2
Table of Contents	3
List of figures	8
Executive Summary	9
Background	9
Methods	9
Data	9
Cigarette production and sales	10
Cigarette consumption	10
Estimation of cigarette tax avoidance	11
Method 1: Estimate cigarette tax avoidance from consumption and tax paid sales data	11
Method 2: Investigating the discrepancies between recorded exports and recorded imports of cigarettes to detect any trends in smuggling	12
Revenue from tobacco taxation	13
Conclusion and policy implication	13
Chapter 1: Introduction	15
Research objectives	17
Chapter 2: Methodology	18
Definition of Cigarette tax avoidance	18
Illegal Tax Evasion:	18
Legal Tax Avoidance:	18
Sources of data	19

National Statistics Office (NSO) survey questions related to smoking behavior ...	20
Methods of analysis:	21
Method 1:	22
Method 2:	24
Chapter 3: Cigarette Production and Trade in Thailand	26
History and structure of cigarette taxes in Thailand.....	26
Cigarette Tax Structure	27
Cigarette production and sales	30
Imported cigarettes sales.....	32
Chapter 4: Cigarette Consumption in Thailand	35
Smoking prevalence by gender	37
Smoking intensity.....	37
Annual cigarette consumption estimated from the surveys.....	38
The estimation of manufactured cigarettes and roll-your-own consumption.....	39
Chapter 5: Results of the analysis of cigarette tax avoidance.....	42
Method 1: Estimate cigarette tax avoidance from consumption and tax paid sales data.....	42
Explanation of the anomalous results	44
Without underreporting.....	45
With underreporting	45
Sensitivity analysis	46
Method 2: Investigating the discrepancies between recorded exports and recorded imports of cigarettes to detect any trends in smuggling.....	48

Estimation of smuggling using method 2.....	52
Excise Tax Rates and Consumption.....	53
Government Tax Revenue.....	54
Chapter 6: Conclusion and policy implication	56
References.....	58

List of Tables

	Page
Table 1: Survey questions for smoking behavior (National Statistical Office).....	21
Table 2: Thailand's taxation of tobacco products (2009).....	27
Table 3: Cigarette tax structure (1992-2009).....	28
Table 4: The domestic cigarette retail price during fiscal years 1990-2009.....	29
Table 5: The production and sales of cigarette in Thailand (20sticks in a pack)	31
Table 6: The relationship between cigarette market share and tax rate.....	33
Table 7: Domestic and imported cigarette market share	34
Table 8: Number of current smokers aged 15 and over categorized as daily smoking and occasionally smoking over the years 1991-2006.....	35
Table 9: The number of current smokers aged 15 and over categorized as daily smoking and occasionally smoking by gender during the years 1991-2006.....	36
Table 10: The number of young smokers aged 14 and under by cigarette smoking habit during 1991-2006.....	36
Table 11: Annual tobacco consumption (all types) by current smokers by gender over the year 1991-2006 (Million sticks).....	39
Table 12: The proportion of different tobacco products used by gender, 1991-2006	40
Table 13: The estimation of total annual consumption of manufactured cigarettes and percentage of change over the year 1991-2006	41
Table 14: The differences between legal sales and survey consumption as percentage of legal sales and percentage of change during 1991-2006	43
Table 15: Sensitivity analysis showing differences between consumption and tax paid sales assuming different rates of underreporting in the surveys, 1991-2006.....	47
Table 16: Discrepancies between exports to Thailand and Imports into Thailand, 1991-2006	49
Table 17: Top ten leading partners of cigarette trade with Thailand, 1991-2006	51
Table 18: Smuggling and total consumption of manufactured cigarettes from Export and Import discrepancy (method 2) during 1991-2006	52

Table 19: Excise tax rate, consumption and smuggling over the year 1991-2006 53

Table 20: Cigarette sales and excise tax revenue over the years 1991-2006..... 55

List of figures

	Page
Figure 1: Cigarette retail price and excise tax rate during the years 1990-2009	29
Figure 2: Cigarette production in Thailand over 1991-2006	30
Figure 3: Thailand Tobacco Monopoly Cigarette Production, Domestic sales and Export during 1991-2006.....	32
Figure 4: Smoking prevalence of population age 15 and over by gender during 1991-2006	37
Figure 5: Average number of daily cigarette smoked per current smoker by gender over the year 1991-2006	38
Figure 6: The differences between estimated survey consumption and tax paid sales during 1991-2006.....	43
Figure 7: Exports, Imports and discrepancies in cigarettes trade during 1991-2006 (Million Packs)	50
Figure 8: Imported cigarettes missing as percentage of exports, 1991-2006	51
Figure 9: The relationship between taxation, consumption and smuggling over the years 1991-2006.....	54

Executive Summary

Background

One of the most effective policy interventions to reduce tobacco use is taxation. Illicit trade in tobacco involves tax avoidance and so will decrease the public health benefits, if smokers purchase lower-priced cigarettes from the black market. Cigarette tax avoidance reduces the average sale price, thus increasing consumption. Thailand has one of the highest tobacco tax rates in Southeast Asia - ad valorem rate was 80% of the factory price in 2008 (Excise Department). Between 1994 and 2006, tobacco taxes were increased six times during which time the number of legal cigarette sold went down from 2302 million packs to 1819 million packs. In May 2009, the Abhisit's administration increased the ceiling of tax on manufactured cigarettes from 80% to 90%, and manufactured cigarette tax now represents 85% of the factory price. Tax on shredded tobacco, used for roll your own, is negligible at 0.1% or 0.1 Baht per 10 grams (Excise Department, 2009).

Methods

This report aims to provide empirical evidence of cigarette tax avoidance in Thailand, how it may have changed over time and how much government revenue has been lost as a result of tax avoidance. Two different approaches are used and different sets of data analyzed. The first approach, called Method 1, is a basic method of comparison of consumption estimated from survey data, with the legal consumption from tax paid government sales data. The second approach, called Method 2, assesses the magnitude of illicit trade by estimating discrepancies between recorded export data from countries exporting to Thailand, and Thai official data of imports.

Data

Multiple data sources were employed for the analysis by these two approaches. For Method 1, cigarette consumption was estimated based on the National Health and Welfare Surveys (1991, 1996, 1999, 2006) conducted by the National Statistical Office (NSO), and the Cigarette Smoking and Alcoholic Drinking Behavior Surveys (2001, 2004). Cigarette production and sales data were obtained from the Excise Department and the Thailand Tobacco Monopoly. For Method 2, 16 years of data of recorded exports from all other countries in the world to Thailand were obtained from the United

Nations Commodities Trade Statistical Data (UN-Comtrade); recorded imports to Thailand were retrieved from the Thailand Customs Department, Ministry of Finance.

The main results of the study are described below.

Cigarette production and sales

The official data reported by the Thailand Tobacco Monopoly (TTM) from 1991 to 2006, show that in 1991 the production of cigarettes was about 1986 million packs, 0.5 million packs of which were exported. Production dropped dramatically during the economic crisis in 1998, to about 1728 million packs due partly to decreasing demand caused by the income effect, competition with foreign brands, and smokers switching to RYO in order to avoid taxes. Production continued to fall till 2001 and then increased, but reduced again in 2006 to 1417 million packs which was 17% below that of the previous year (Table 4). The market share of imported cigarettes gradually increased over the whole period, from 1% to 7% between 1991 and 1998 (the early period of market opening) and from 13% to 22% between 1999 and 2006. The market share of domestic cigarettes gradually decreased from 99% in 1991 to 78 % in 2006 (Table 6).

Cigarette consumption

In 1991 there were about 12 million current smokers (Table 7) including daily and occasional smokers, or 32% of the population aged over 15 years (Figure 4). Smoking prevalence declined by a third over the next fifteen years to about 22% of the adult population in 2006. Male smoking prevalence decreased from 59% in 1991 to 42 % in 2006, and female prevalence dropped from 5% in 1991 to 2.8% in 2006. The 1991, 1996, 1999, 2004 and 2006 surveys by NSO included data about young smokers under 14 years; there were some 17 684 young smokers in Thailand during the survey period accounting for about 0.15% of cigarette consumption.

Adult daily consumption of cigarettes (manufactured and roll your own) fell from an average of 12.4 sticks in 1991 to 8.9 sticks in 2006 (Figure 5). Male smokers used about 9 sticks per day and female smokers about 7 sticks in 2006. Overall an estimated 55 billion sticks of tobacco were consumed in 1991, which had dropped, by 35%, to 36 billion sticks in 2006.

About 49% of all smokers smoked predominantly manufactured cigarettes (52.5% of male smokers, and 32.2% of female smokers). About 49.5% were predominantly smokers of roll-your-own (46.4% of male smokers and 62.4% of female smokers). The remaining smokers used other types of tobacco (Table 11).

The total annual consumption of manufactured cigarette (excludes RYO) estimated from the surveys was about 1313 million packs in 1991. By 1996 this had increased by 22%, possible due to the opening of the market to foreign cigarettes. Following the economic crisis of 1998, the total annual consumption of manufactured cigarette decreased again by 21% and continued to fall with the declining smoking prevalence of the Thai population both male and female, to 862 million packs in 2006.

Estimation of cigarette tax avoidance

Method 1: Estimate cigarette tax avoidance from consumption and tax paid sales data

Throughout the period of the report (1991-2006) tax paid sales of manufactured cigarettes considerably exceeded manufactured cigarette consumption as estimated from the survey data. These results therefore do not provide an estimate of cigarette tax avoidance. This may have been due to the underreporting of manufactured cigarette consumption in the surveys, and to inaccuracies in reporting whether cigarette consumption was of manufactured cigarettes or RYO. (Some smokers used more than one type of tobacco and the surveys included information of the type of cigarette most frequently used. The average proportion using predominantly manufactured cigarettes was taken as a proxy to estimate manufactured cigarette use.) It should also be noted that domestic consumption as estimated from the surveys, decreased over the years although domestic production and domestic sales did not change in the same direction or magnitude. This suggests an increasing bias which could be a combination of major underreporting and illegal consumption. A further source of underreporting could be due to the omission from the surveys of migrant workers and neighbors from Myanmar, Cambodia and Lao PDR who live on or near the Thai borders. There were about 1 277 000 migrants workers and their family members officially registered in Thailand, however, the actual number of migrants possibly exceeds two million (Migrants in Thailand, 2009). These migrants were likely to have consumed legal or tax paid

cigarettes but were not included in the survey. Consumption of tax paid cigarettes by the large tourist population in Thailand was also excluded from the surveys. There may also have been temporary effects due to short term hoarding of cigarette packs before tax increases, in order to maximize profits of the tobacco company. It is unlikely that legal or tax paid cigarettes are smuggled out of Thailand to neighboring countries, as the price of Thai cigarettes is higher than that in neighboring countries.

However it cannot be concluded that there were no illegal or smuggled cigarettes used in Thailand during 1991 to 2006. Two possible scenarios were considered to examine the discrepancy - one with and one without underreporting of consumption. If no underreporting is assumed, tax paid sales exceeded consumption as reported in the surveys on average by 40% between 1991 and 2006. A similar discrepancy was reported in the US, and was attributed to underreporting due to the influence of health education against smoking. Method 2 was therefore used to obtain an alternative estimate of smuggling.

Method 2: Investigating the discrepancies between recorded exports and recorded imports of cigarettes to detect any trends in smuggling

The magnitude of illicit cigarettes trade was estimated from the discrepancy between the trade quantity of cigarettes exported to Thailand (as reported by each country of origin) and the quantity imported to Thailand (as reported by Thailand). Using 16 years of data from 1991 to 2006, the results indicated that the net trade discrepancy between reported exports and imports fluctuated from 21 million in 1991 to 514 million packs in 1997; the latter occurred around 1997, and amounted to some 81% of exports of manufactured cigarettes to Thailand as recorded by countries of origin. The discrepancy then fell to 2005 but increased again in 2006 to 355 million packs or about 39% of exports to Thailand as recorded by exporting countries. Cigarette excise taxes increased during this time indicating that the increases in cigarette excise taxes do not appear to have affected the discrepancy in recorded trade volumes, which serve as an approximation for illicit trade.

There are natural lags between exports and imports, so a three year moving average was used to smooth the annual differences between exports and imports. The assumption of Method 2 is that these smoothed discrepancies represent the amount of smuggling of

cigarettes into Thailand. Accordingly some 10% of all cigarettes consumed in Thailand (242 million packs) between 2004 and 2006 were illegally sold and consumed in the period 2004/6. This would have caused a loss of revenue to the Thai Government of some 4508 million Baht in 2002 prices or 14% of the total cigarette tax revenue.

Revenue from tobacco taxation

The trends in consumption and in excise tax rates in Thailand over this period confirmed a strong negative relationship between them. Excise tax rates were raised from 55% of the factory price in 1991 to 79% in 2006 while the reported consumption decreased from 1313 million packs in 1991 to 862 million packs in 2006. Per capita consumption fell by one third from about 238 packs in 1991 to 165 in 2006. The increasing excise tax rates appear to have played an important role in reducing cigarette consumption.

Conclusion and policy implication

Raising cigarette excise taxes appears to have reduced cigarette consumption in Thailand, and policy makers should continue to use tobacco taxation as a form of tobacco control. According to economic theory, the optimal tax is the level where the marginal social benefits are equal to the marginal social costs of the last cigarette consumed. The actual social costs and social benefits are unknown and difficult to measure, because both internal costs and external costs are imposed by smokers on their family members and others concerned. It is suggested that rather than setting an optimal tax level, the policymaker should set the tax component of the retail price of a pack of cigarette between two-thirds and four-fifths as a yardstick (The World Bank, 1999). The latest rate of cigarette tax in Thailand at 85% of factory price is about two thirds of the retail price and so at the low end of the World Bank recommended level. Therefore, it can be concluded that the cigarette excise tax could be raised to the level that meets the specific policy objectives such as continuing to reduce the cigarette consumption level, improving public health targets and maximizing the government revenues.

This report found a large discrepancy between export and import trade data to Thailand. If the manufactured cigarettes represented by these discrepancies, are consumed illegally in Thailand, then the level of illicit manufactured cigarette consumption in

Thailand would be of the order of 10% of total cigarette consumption, resulting in an annual loss of tobacco tax revenue of 4508 million Baht in 2002 prices.

There is also a very high level of consumption of roll your own tobacco which has a negligible rate of tax, and so similarly results in encouraging smoking, damaging public health and a loss of revenue to the Government. The level of this tax needs to be reconsidered.

There is a need for regional coordination to reduce the incentives for legal or illegal tax avoidance.

Chapter 1: Introduction

The World Health Organization (WHO) has ranked the global tobacco epidemic as a top priority for public health, and urged political leaders in every country of the world to take action to reverse the preventable epidemic of tobacco related health problem. It has been predicted that by the year 2030, the number of tobacco related deaths will exceed 8 million people a year. Unless urgent action is taken to fight the tobacco epidemic, it could kill one billion people during the 21st century (WHO, 2008).

The WHO Framework Convention on Tobacco Control (FCTC) was a major step in the global fight against the tobacco epidemic, establishing an international law which has played a vital role in helping parties of 168 countries (WHO, 2010) to the treaty, to implement provisions to protect their population's well-being. Thailand became the 36th country to ratify the WHO FCTC in 2004. Following the requirements of the General Obligation of Article 5, a number of new actions and tobacco control policies were implemented in Thailand, specifically tobacco tax increases above inflation; a comprehensive ban on smoking in public areas including public transportation, elevators, hospitals, education institutions and restaurants; a ban on advertising and promotion of tobacco products; and display of tobacco packs are prohibited at the point of sale. Thailand's comprehensive tobacco control policies are some of the strongest in South East Asia.

Thailand's tobacco control policies implemented between 1991 and 2006 were examined by Levy D.T., et al. using the "SimSmoke" simulation model. The results showed that over this period the smoking prevalence decreased by 25% compared to what it would have been in the absence of the policies. The study also reported that of all the tobacco control policies implemented in Thailand, tax increases on cigarettes and the advertising bans, had had the largest impact on the prevalence rate (Levy, 2008).

It is well established from many countries that one of the most effective policy interventions to reduce tobacco use is "taxation". Various studies support the policy, demonstrating that raising tobacco taxes will reduce consumption as the retail price increases. There is also evidence that this will prevent young people from starting to smoke and help increase government revenue. However the benefits of raising tobacco tax may be reduced if there is tax avoidance, and the full public health benefits of

higher cigarette prices are lost, if smokers or smugglers purchase cigarettes at lower prices in the black market (Centreill, 2008). Tobacco tax increases may also create price differentials between neighboring communities or countries encouraging cross border tax avoidance.

Studies have indicated the serious harm to public health brought about by tobacco smuggling by undermining tobacco tax policies, reducing average prices for cigarettes and making tax-free cigarettes available to young people and price-sensitive smokers. Smuggling also impacts on government tax revenues. Tobacco manufacturers and wholesalers on the other hand, may profit from smuggling by creating a supply of cheap cigarettes with low prices, which boosts demand, increases tobacco company profits, and at the same time enables their lobbyists to press for lower rates of tobacco taxes in the legal market (Lieberman, 2003) to further boost demand.

Cigarettes are the world's most widely smuggled legal consumer product. The empirical analyses conducted by Merriman, Yurekli and Chaloupka (2000) indicated that 6% to 8.5% of global cigarette consumption was smuggled. Transparency International's Index of Countries indicated a strong correlation between levels of perceived corruption and the incidence of tobacco smuggling (Daily News, 2003). In the WHO FCTC Article 6, taxation is addressed as one of the most effective measures for reducing tobacco consumption, and increasing levies on tobacco products is recommended to combat cigarette use in Southeast Asia. The Thai government and policy makers have been urged to impose higher taxes on tobacco products and cigarettes to control smoking related health problems and economic losses, and according to the report by SEATCA (2008), Thailand now has applied one of the highest tobacco tax rates in Southeast Asia. At 85% of the factory price (about two thirds the retail price) plus 2% surcharge tax dedicated for health promotion, the rate is higher than in most other ASEAN countries, and compares with 54% in Malaysia, 45% in Vietnam, 37% in Indonesia 20% in Cambodia and 15-30% in Lao PDR. Between 1994 and 2006 Thailand increased the tobacco taxes six times. Over these years there was a decline in the number of legal cigarette packs sold from 2.3 million packs in 1994 to 1.8 million packs in 2006 (Vitsarutwong, 2007). In May, 2009, the Apisit's administration increased the ceiling of cigarette tax from 80% to 90%, hence cigarette tax is 85% of the factory price (about two thirds of the retail price) as of May 1, 2009 (Excise

Department, 2009). Tobacco companies opposed the tax increases, arguing that higher taxes were an incentive for smuggling. However, others have argued that smuggling occurs even in states and countries with low tax rates and is in fact not closely related to tobacco tax rates (Joossens, 2005).

It has been estimated that worldwide governments lose about forty billion dollars in tax revenues every year from illicit cigarette trade (Joossens et al., 2009). It is imperative for countries to estimate the level of illicit tobacco trade in their markets in order to combat it. Thailand is no exception and this study aims to identify the knowledge gap, and provide evidence for further tobacco control effort.

This paper is divided into six chapters: chapter 1 is the Introduction; chapter 2 presents the methodology of the analysis; chapter 3 discusses the cigarette production and trade in Thailand; chapter 4 presents the cigarette consumption in Thailand estimated from survey data; chapter 5 presents the results of the analysis of cigarette tax avoidance in Thailand and the last chapter discusses the conclusion and policy implication.

Research objectives

This research has two main objectives relating to estimating cigarettes tax avoidance in Thailand, namely:

1. To investigate whether there is evidence of cigarette tax avoidance in Thailand and to quantify its magnitude.
2. To investigate the loss of government revenues resulting from any tax avoidance.

Chapter 2: Methodology

Definition of Cigarette tax avoidance

Cigarette tax avoidance includes both legal and illegal behaviors or practices related to production, consignment, delivery, sale or purchase which are difficult to directly observe. The illegal circumvention of taxes is termed “tax evasion” and is the major problem, while legal circumvention is called “tax avoidance”.

Illegal Tax Evasion: There are a number of illegal activities which circumvent tobacco taxes. These include:

1. Large-scale smuggling or wholesale smuggling which evades taxes on tobacco products by diverting them from the legal market, while they are in the wholesale distribution chain, or in transit between a country of origin and an official destination.
2. Small-scale smuggling or bootlegging, which involves the purchase of tobacco products by individuals in one low tax country in amounts that exceed the limits set by customs regulations for resale in another country, without payment of taxes or duties.
3. Illegal manufacturing and counterfeit, which includes illegal production of tobacco products.

Legal Tax Avoidance: Joossens, et al (2000) categorize a number of types of legal tax avoidance, as follows:

1. Legal cross-border shopping, which involves the purchase of cigarettes for personal use, in a neighboring lower tax jurisdiction at a price that includes all relevant local taxes. The smoker’s incentive for this type of cross-border shopping depends on the differences in taxes and prices between neighboring tax jurisdictions.
2. Legal tourist shopping which involves the purchase of tobacco products in non-neighboring jurisdictions in amounts allowable under customs

regulations. The incentives depend on the magnitude of the differences in prices between countries and the extent of international travel.

3. Legal duty-free sales are legal tourist purchases of tax-free tobacco products in amounts within specific allowances
4. Switching to a substitute with low or no tax.

The term “cigarette tax avoidance” will be used in this study to refer to a general definition of avoidance. We aim to investigate and measure non tax paid cigarette trade in Thailand. The analysis is based on official data of cigarette production, cigarette trade and sales, surveys of smoking behavior and on reports related to the tobacco consumption in Thailand.

Sources of data

Multiple sources of data were used to examine cigarette consumption and tax avoidance in Thailand.

1. Cigarette production and sales are derived from the annual reports of Thailand Tobacco Monopoly (TTM), and internal data from the Excise Department
2. Tax information was retrieved from the Excise Department, Ministry of Finance and Thailand Tobacco Monopoly (TTM) in order to assess the number of cigarette tax-paid-sales at wholesale level
3. The data of recorded exports to Thailand by all other countries in the world were retrieved from the United Nations Commodities and Trade Statistics Database (UN Comtrade), and recorded imports to Thailand from the Customs Department of the Thai Ministry of Finance

Cigarette consumption including smoking prevalence and intensity (average number of cigarettes smoked per day) were estimated from the six waves of data based on national survey reports conducted by the National Statistics Office (NSO); Health and Welfare Survey (HWS), in the years 1991, 1996, 1999 and 2006, and the Cigarette Smoking and Alcoholic Drinking Behavior Survey in the years 2001 and 2004.

National Statistics Office (NSO) survey questions related to smoking behavior

The NSO's surveys were conducted using two-stage stratified sampling. The population was stratified into two strata before sampling. The first stratum was the population in municipal and non-municipal areas and the second stratum was households and individuals. The survey tools were not the same every year but were modified to capture new information about smoking behavior and knowledge. Some questions were not included in all the survey questionnaires, for example the following:

How old were you when you first started smoking?

What was the reason for initiation?

Have you received any information or suggestions about the harmfulness of cigarette smoking?

How much on average do you spend on cigarettes in a day?

Did you observe warnings on the packs?

Do you smoke at home while other family members are present?

Have you ever tried to quit? Why was it not a success?

Questions to elicit information about current smoking status and its intensity included: smoking frequency (for daily and occasional smokers), smoking quantity (daily cigarette consumption), and the type of tobacco used, as presented below in Table 1.

Table 1: Survey questions for smoking behavior (National Statistical Office)

Question	National surveys conducted by NSO					
	HWS 1991	HWS 1996	HWS 1999	CSADBS 2001	CSADBS 2004	HSW 2006
<p>Current Smoking Behavior</p> <p>Q1: Do you currently smoke?</p> <p>Yes, daily.</p> <p>Yes, occasionally.</p> <p>No</p>						
<p>Q2: Normally what type of tobacco you most frequently smoke as first, second and third order ?</p> <p>First.....</p> <p>Second.....</p> <p>Third.....</p> <p>For 2001 specify as</p> <p>Manufactured cigarette</p> <ul style="list-style-type: none"> • Domestic • Imported <p>RYO</p> <p>Others</p>						None
<p>Q3: How many cigarette do you smoke daily?</p> <p>Specify the number on average.....</p> <p>For 1996, 1999 have specified as</p> <p>All types on average;.....</p> <p>RYO on average;.....</p>						

Methods of analysis:

Two different approaches, involving different data sets, were used to investigate the magnitude of cigarette tax avoidance.

Method 1:

This method is used to estimate the magnitude of cigarette tax avoidance in Thailand based on the difference between consumption, estimated from the survey data, and the official tax paid sales data. This method estimates total consumption from survey data (what smokers say they smoke) and legal domestic sales using government sales tax data.

Estimates of a country's tobacco consumption can be derived from various types of data: survey data, aggregate production and trade statistics, and tax paid sales (Guindon, 2003). Merriman, Yurekli and Chaloupka (2000) suggest that tax paid sales provide a useful base for measuring legal consumption (the level of cigarette sales on which the government collects excise taxes), and for modeling and estimating smuggling.

We followed this model and assessed legal consumption from tax paid sales including both domestic manufactured cigarette and imported manufactured cigarettes. Two data sources were used: the Excise Department, Ministry of Finance, and the Thailand Tobacco Monopoly. Slight differences were apparent between the two: TTM reported 0.93% higher sales of domestic manufactured cigarette than did the Excise Department, and TTM reported 3.87% more imported cigarette sales compared to the Excise Department. The average of the reported sales data is used in this report.

These tax paid sales, derived from tax collection data, are assumed to be the most objective data on legal sales. They exclude duty-free sales most of which are for non-residents and are not consumed in the country.

$$\text{Total cigarette tax paid sales volume} = \text{domestic cigarettes produced for domestic market} + \text{imported cigarette sales}$$

Secondly, total cigarette consumption, including illicit sales, was investigated in order to provide insights into the changes and patterns of consumption by gender. The estimation of cigarette consumption was based on secondary data from the Health and Welfare Surveys (HWS) for the years 1991, 1996, 1999, and 2006, and the Cigarette

Smoking and Alcoholic Drinking Behavior Survey (CSADBS) in the year 2001 and 2004 conducted by the National Statistical Office (NSO).

The surveys included questions about the use of different types of tobacco, and respondents were asked to specify the type of tobacco they most frequently used as first, second and third orders. Choices were between manufactured cigarettes, roll-your-own and other types. For example, they could state that manufactured cigarettes were the main form of tobacco that they smoked, and RYO the second, if they smoked both types of tobacco. In estimating consumption, the frequency of each type specified by the respondents was used to weight the use of that type of tobacco.

Prevalence of smoking was defined as the proportion of population over 15 years who were current smokers at the time of the survey. The number of current smokers aged above 15 years, directly obtained from the NSO survey reports is identified according to gender for each year of the surveys.

The intensity of smoking was defined as the number of cigarettes smoked per day per smoker. The data on daily cigarette consumption came from the study of Situation of Tobacco Consumption of the Thai Population in 1991-2006 conducted by the Tobacco Control Research and Knowledge Management Center (TRC, 2008).

$$\text{Total annual tobacco consumption} = \text{total number of current smokers} \times \text{the number of cigarettes smoked per day per smoker} \times 365 \text{ days}$$

Only manufactured cigarettes (including domestic and imported cigarettes) were taken into account for the estimation of consumption, to be ARYO and other types of tobacco are taxed at a very low level or not at all and so were subtracted from the total number of cigarettes consumed annually.

$$\text{Annual estimated manufactured cigarette consumption} = \text{total annual tobacco consumption} \times (1 - \% \text{ of RYO and } \% \text{ of other types used})$$

Theoretically the difference between manufactured cigarette consumption from the surveys, and tax paid sales, should provide evidence of the presence of cigarette tax avoidance in Thailand. This assumes that survey reporting is accurate (no

underreporting) and that the surveys and population data represent the whole population of Thailand.

$$\text{Survey based estimation of cigarette consumption} = \text{Annual estimated manufactured cigarette consumption}$$

$$\text{Tax paid sales} = \text{Legal cigarette sales}$$

$$\text{Estimated cigarette tax avoidance} = \text{annual estimated manufactured cigarette consumption} - \text{tax paid sales}$$

Cigarette tax avoidance is then presented as a percentage of annual estimated manufactured cigarette consumption, where:

$$\% \text{ of cigarette tax avoidance} = \frac{\text{Estimated manufactured cigarette tax avoidance}}{\text{Annual manufactured cigarette consumption}} \times 100$$

Method 2:

This method is used to estimate the magnitude of cigarette smuggling by comparing and investigating any discrepancies between recorded exports as recorded by exporting country and imports of cigarettes as recorded by importing country. This second method of assessing illegal trade compares recorded exports to, with the recorded imports into, a country. Any discrepancy between recorded exports and imports are considered as approximations of smuggling or tax avoidance. In this study, it is assumed that there is no error in recording (any time difference effects are smoothed by taking three year moving averages), and discrepancies between imports and exports estimated using the following steps:

1. Retrieve data on exports of cigarettes to Thailand from all countries during the years 1991-2006 from the International Trade Center (ITC) sourced by UN-Comtrade (<http://www.intracen.org/mat/trademap.aspx>). Retrieve data on Thailand's reported imports of cigarette from these international trade counterparts during year 1991-2006 from Thai Customs Department.
2. Assess the discrepancies between recorded export and recorded import data. The smoothed differences between these two sets of data for Thailand by all

other countries to be considered as an approximation of the extent of cigarette tax avoidance (Merriman et al, 2000).

- Estimated tax avoidance = the sum of recorded exports to Thailand by all other countries in the world, minus the recorded imports to Thailand from these countries.
3. Investigate and discuss discrepancies due to under-invoicing, inaccurate records, time differences or missing import/export data by comparing the international data with Thailand's official data.
 4. Identify trends in trade discrepancies over time, and investigate relationships with tax changes.
 5. Make estimates of cigarette avoidance as a percentage of total manufactured cigarette consumption.
 6. Assess tax revenue loss from this tax avoidance

Chapter 3: Cigarette Production and Trade in Thailand

History and structure of cigarette taxes in Thailand

Cigarette excise tax is a tax on cigarettes produced or imported for domestic sale. The tax is usually collected from the producer or the wholesaler. In Thailand both specific and ad valorem cigarette taxes have been applied at different times since 1938 (Visaruthvong, 2007).

- Specific tax is levied on the quantity of products by piece (or weight or volume) either when produced or consumed. For example a tax of 3 Baht per gram or per cigarette.
- Ad valorem taxes are levied as a percentage of the value of tobacco products based on the retail price or cost to manufacturers or importers.
- Between 1938 and 1965, only specific rates were initially applied in Thailand. In 1938 the rate was 0.2 Baht per gram for both domestic and imported cigarettes. Differential rates for domestic and imported cigarettes were introduced in 1943.
- From 1966-1985 only ad valorem rates were levied on domestic cigarettes based on the retail price. However imported cigarette were still taxed using a specific rate (Baht per gram).
- In 1990, a standard ad valorem rate was imposed on every brand of cigarette, both domestic and imported, based on the retail price.
- From 1992 up till the present, the base of cigarette excise tax has been adjusted from ad valorem at retail price to ad valorem of factory price for domestic cigarettes, and the C.I.F. plus tariff for imported cigarettes. The same rate of excise taxes is imposed on domestic and imported cigarettes.

In the Tobacco Act, B.E. 2509 (1966), the specific tax ceiling was set at 0.60 baht/gram, and ad valorem tax at 80% of the ex factory price. In May 2009 the Apisit's administration increased the ceiling rate of cigarette excise tax from 80% to 90% of the ex factory price. The current excise tax for manufactured cigarettes is set at 85% of the ex factory price (about two thirds the retail price), while other tobacco products such as

shredded tobacco which is used for roll your own cigarettes is set at 0.1% (Table 2) which is very low (Visarutwong, 2009).

Table 2: Thailand's taxation of tobacco products (2009)

Items	Ad Valorem Rates (%)	Specific Rate	Unit
		Unit / Baht	
1. Shredded Tobacco	0.1	0.01	Ten Gram or part thereof
2. Tobacco	90	3	
	(Ceiling Rate)	(Ceiling Rate)	
2.1 Cigarette	85	-	
2.2 Cigar	10	0.5	Gram or part there of
2.3 Other rolled Tobacco	0.1	0.02	Five Gram or part there of
2.4 Blended Shredded Tobacco	10	0.5	Gram or part there of
2.5 Chewing Tobacco	0.1	0.09	Gram or part there of

Source: Visarutwong C. et al. 2009. Tobacco Law. Tobacco Control Research and Knowledge Management Center. P.32

The manufactured cigarette excise tax in Thailand has been adjusted almost every two years in relation to the country's economic situation, with an increasing trend. The main objectives of these tax increases have been to improve public health and to increase the government revenue (Table 3). There is a large consumption of roll your own cigarettes (about half the cigarette consumption in Thailand), due to the very low tax imposed on shredded tobacco and the substitution effect.

Cigarette Tax Structure

Domestic cigarettes: tax value = tax rate x ex factory price

Imported cigarette: tax value = tax rate x [CIF Price + Tariff]

Following the ASEAN Free Trade Area (AFTA) agreement, the tariff levied on cigarettes traded (imported) within the Southeast Asian region is 5%, and 60% for non-ASEAN countries.

Table 3: Cigarette tax structure (1992-2009)

Month/Year	Domestic cigarette		Imported cigarette	
	Tax rate %	Tax base	Tax rate %	Tax base
Jan.-92	55	Ex Factory price	55	import price or CIF +Tariff
Dec-93	60	Ex Factory price	60	import price or CIF +Tariff
Jan-95	62	Ex Factory price	62	import price or CIF +Tariff
Oct-96	68	Ex Factory price	68	import price or CIF +Tariff
Oct-97	70	Ex Factory price	70	import price or CIF +Tariff
Oct-99	71.5	Ex Factory price	71.5	import price or CIF +Tariff
Mar-01	75	Ex Factory price	75	import price or CIF +Tariff
Dec-05	79	Ex Factory price	79	import price or CIF +Tariff
Aug-07	80	Ex Factory price	80	import price or CIF +Tariff
May-09	85	Ex Factory price	85	import price or CIF +Tariff

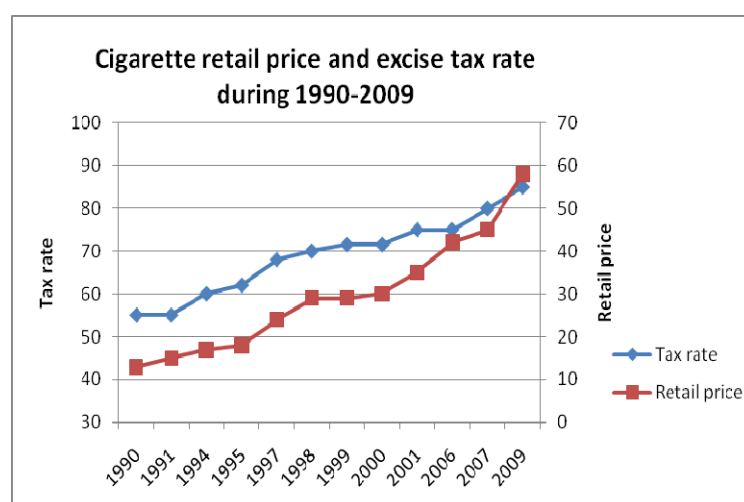
Source: Chonlathan Visaruthvong, 2007 Excise Tax Collection for Cigarette Smoking Control. Tobacco Research and Knowledge Management Center, Mahidol University.

Excise tax increases affect the retail price of cigarettes. The recent increase of the excise tax rate (May 2009) to 85% of factory price, resulted in the increase in the domestic cigarette retail price from 45 Baht to 58 Baht (high price brand) and imported cigarettes from 65 Baht to 81 Baht. Consequently the government revenue increased. Table 4 sets out the retail prices for different time periods, according to the level of the excise tax rate.

Table 4: The domestic cigarette retail price during fiscal years 1990-2009

Cigarette retail prices (High price brand) for fiscal years		
Year	Retail price	Tax rate
1990	13	55
1991	15	55
1994	17	60
1995	18	62
1997	24	68
1998	29	70
1999	29	71.5
2000	30	71.5
2001	35	75
2006	42	75
2007	45	80
2009	58	85

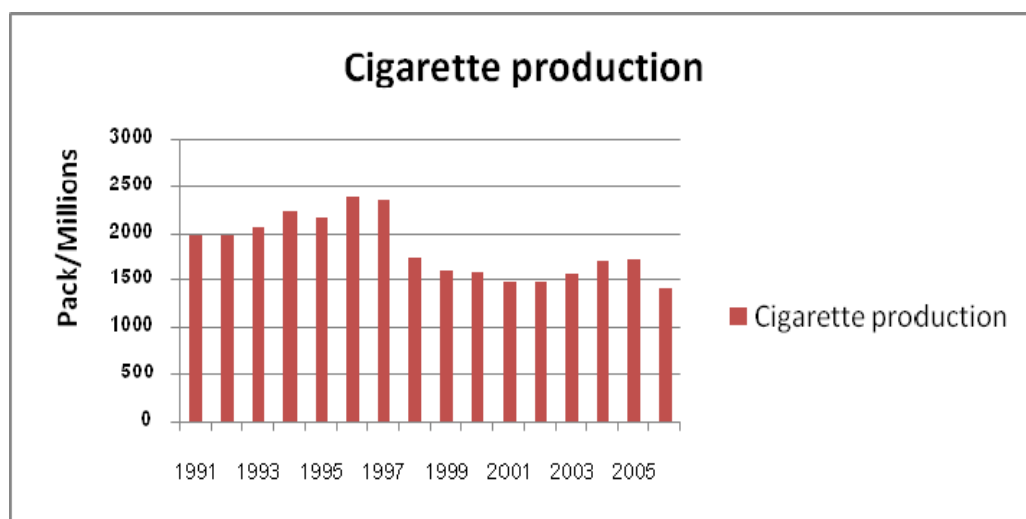
Source: TTM and Excise Department, MOF

Figure 1: Cigarette retail price and excise tax rate during the years 1990-2009

Cigarette production and sales

The tobacco industry in Thailand is operated by the state-owned Thailand Tobacco Monopoly (TTM) under the control of the excise department of the Ministry of Finance. TTM is the only legal manufacturer of cigarettes, contributing revenues to the government for supporting the development of the country. The production of cigarettes by TTM was about 2356 million packs before the economic crisis in 1997. During the economic crisis, production dropped dramatically by about 26% to 1728 million packs from 1997 to 1998. This was due to the economic downturn, widespread unemployment and reduced incomes, a slight increase in cigarette imports, a higher use of RYO cigarettes, and higher cigarette smuggling. Since the crisis, cigarette production has fluctuated annually (decreasing by 17% between 2005 and 2006) but has mostly remained fairly steady. There were about 1417 million packs of cigarettes manufactured in 2006 as presented in Table 5 and Figure 2. Some short term trends may be due to hoarding of cigarettes products prior to tax increases to increase profits, or for meeting the target of government revenues collected from tax paid sales.

Figure 2: Cigarette production in Thailand over 1991-2006



Source of data: Thailand Tobacco Monopoly 1991-2006

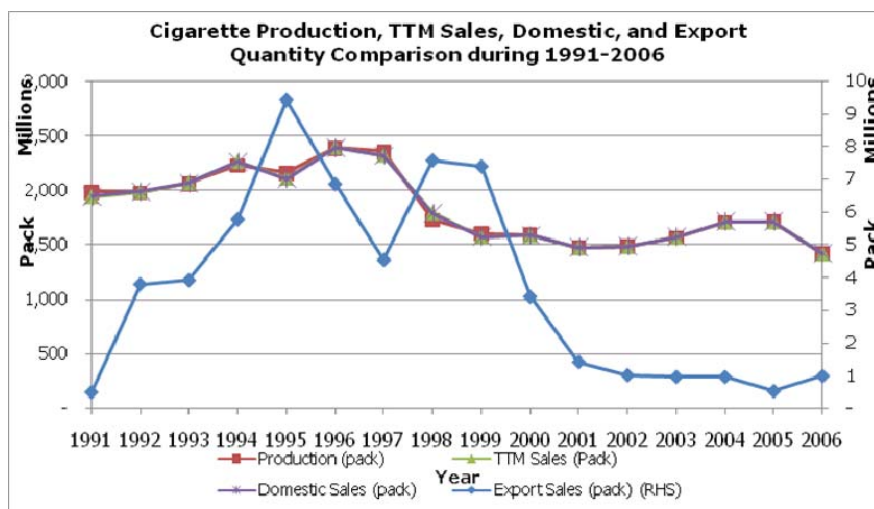
Table 5: The production and sales of cigarette in Thailand (20sticks in a pack)

Year	TTM Production (Million Pack)	% Change in Production	TTM Sales (Million Packs)	Export of TTM cigarette (Million Pack)	Local sales of TTM cigarette (Million Pack)
1991	1,986	-	1,943	0.50	1,942
1992	1,979	-0.32	1,987	3.80	1,983
1993	2,061	4.11	2,069	3.92	2,065
1994	2,227	8.06	2,263	5.78	2,257
1995	2,159	-3.05	2,110	9.42	2,100
1996	2,387	10.58	2,394	6.86	2,387
1997	2,356	-1.31	2,321	4.54	2,316
1998	1,728	-26.65	1,793	7.58	1,785
1999	1,601	-7.37	1,575	7.39	1,567
2000	1,589	-0.71	1,588	3.41	1,584
2001	1,475	-7.17	1,477	1.42	1,475
2002	1,483	0.51	1,484	1.02	1,483
2003	1,567	5.68	1,568	0.97	1,567
2004	1,707	8.95	1,709	0.97	1,707
2005	1,710	0.19	1,712	0.54	1,711
2006	1,417	-17.16	1,418	1.00	1,417

Source of data: Thailand Tobacco Monopoly 1991-2006

The data on cigarette production and cigarette sales were derived from the annual reports of TTM. Production should approximately equal sales, and these figures are indeed very similar. However Table 5 shows a difference for some years, due to time-lags between production and sales of cigarettes (mainly domestic sales, as exports represented a very small proportion of total sales) but this is insignificant as displayed by overlapping trajectories of cigarette production and sales quantity in Figure 3.

Figure 3: Thailand Tobacco Monopoly Cigarette Production, Domestic sales and Export during 1991-2006



Source of data: Thailand Tobacco Monopoly, 1991-2006

More than 90% of the cigarettes produced by TTM were for domestic sale and less than 10% for export. Exports fluctuated between 1991 and 2000 and considerably shrank in the year 2000. There was a slight decrease after that, from year 2001 to 2006, as shown in Table 5 and Figure 3. The decreasing trend of TTM exports was a consequence of at least three factors: the global economic downturn, the world anti-tobacco campaign, and a reduction in the number of Thais working in foreign countries, resulting in lower demand for exported TTM cigarettes by Thai overseas workers, and the switch to RYO (Piriyarungsan, 2005). Also TTM products faced competition from other foreign cigarettes in the international market.

TTM cigarette production for domestic sales reached a peak of 2387 million packs in 1996. There was then a gradual downward trend during 1997-2002 as shown in Table 5 and Figure 3. This decline may have resulted from the national economic crisis in 1997/8. The impact may have also affected the cost of cigarette production, so imported cigarettes were able to increase their market share in Thailand.

Imported cigarettes sales

Since 1991 foreign cigarettes have been allowed to enter Thailand in line with the General Agreement on Tariffs and Trade (GATT) decision (Vathesatogkit, 2000), and since then, there has been an influx of legally imported cigarettes into the Thai market

(THPI, 2002). According to Thailand's commitment to the Common Effective Preferential Tariff (CEPT) scheme of ASEAN Free Trade Area (AFTA) agreement, the tariff rates levied on tobacco traded within the region have to be reduced to 5% (Sarntisart, 2005). Since 2002, foreign brand cigarettes imported to Thailand from ASEAN countries have been charged a 5% tariff, and from non- ASEAN countries a 60% tariff. Reductions in the tariff rate levied on tobacco traded could be one of the main causes of the foreign market share increase in Thailand. Table 6 shows the negative relationship between cigarette market share and tax rate for both domestic and imported cigarettes respectively. The domestic market share decreased while the excise tax rate increased over the years from 1991-2006, and the imported market share increased while the tariff rate decreased in the same period.

Table 6: The relationship between cigarette market share and tax rate

Year	Domestic market share	Excise tax rate	Imported market share	Tariff rate
1991	99.4%	55%	0.6%	30%
1994	97.0%	60%	2.9%	22.5%
1995	96.7%	62%	3.2%	22.5%
1997	95.8%	68%	4.1%	20.0%
1998	92.7%	70%	7.3%	15.0%
1999	86.6%	70%	13.3%	10.0%
2000	86.8%	71.5	13.1%	10.0%
2001	85.2%	75.0%	14.8%	5.0%
2002	84.9%	75.0%	15.0%	5.0%
2003	82.2%	75.0%	17.7%	5.0%
2004	79.9%	75.0%	20.1%	5.0%
2005	77.8%	75.0%	22.2%	5.0%
2006	77.9%	79%	22.1%	5.0%

Source of data: Thailand Tobacco Monopoly Annual reports, 1991-2006 Excise tax rate derived from Vitsarutwong (2007), Tariff rate from Vathesatogkit (2002)

Imported cigarettes increased from 50 million packs in 1992 to 487 million packs in 2005 (Table 7). The increasing market share of imported cigarettes to 22% in 2005 could be partly explained by the effect of the ASEAN Free Trade Area (AFTA) which reduced tariff rates on imported tobacco products (Sarntisart, 2005). As a result, the market share of domestic cigarettes gradually decreased from 97% in 1996 to 78 % in 2006 while the imported cigarette market share increased from 3% to 22 % in the same years as presented in Table 7.

Table 7: Domestic and imported cigarette market share

Year	Domestic cigarette sale Pack/million	Domestic market share	Imported cigarette sale Pack/million	Imported market share	Legal cigarette sales
1991	1,943	99%	12	1%	1,955
1992	1,983	98%	50	2%	2,033
1993	2,065	97%	59	3%	2,124
1994	2,257	97%	68	3%	2,325
1995	2,101	97%	71	3%	2,172
1996	2,387	97%	77	3%	2,464
1997	2,316	96%	100	4%	2,416
1998	1,786	93%	140	7%	1,926
1999	1,567	87%	241	13%	1,808
2000	1,584	87%	239	13%	1,823
2001	1,475	85%	255	15%	1,730
2002	1,483	85%	263	15%	1,746
2003	1,567	82%	338	18%	1,905
2004	1,708	80%	428	20%	2,136
2005	1,711	78%	487	22%	2,198
2006	1,417	78%	402	22%	1,819

Source of data: Thailand Tobacco Monopoly Annual reports, 1991-2006 and Excise Department, 1991-2006

Chapter 4: Cigarette Consumption in Thailand

The number of current smokers, as assessed from the survey data, decreased about a downward trend from 12.3 to 11.1 million current smokers aged 15 and over (both daily and occasionally smokers) during the NSO survey period of 1991 to 2006 as presented in Table 8.

Table 8: Number of current smokers aged 15 and over categorized as daily smoking and occasionally smoking over the years 1991-2006

Year	Number of Current smokers	Cigarette Smoking Habit			
		Daily smoking		Occasionally Smoking	
1991	12,287,100	11,402,700	92.8	884,400	7.2
1996	12,548,000	11,254,300	89.7	1,293,700	10.3
1999	11,991,700	10,230,600	85.3	1,761,100	14.7
2001	11,964,100	10,551,200	88.2	1,412,900	11.8
2004	11,361,457	9,631,926	84.8	1,729,535	15.2
2006	11,050,370	9,541,065	86.3	1,509,304	13.7
Average	100%		87.9		12.1

Source of data: Health and Welfare Survey, National Statistical Office, 1991, 1996, 1999 and 2006. The Cigarette Smoking and Alcoholic Drinking Behavior Survey, NSO, 2001 and 2004.

About 88% of the current smokers were daily smokers and 12% were occasional smokers. There were very significant differences in cigarette use patterns between genders. Thailand has particularly high male smoking prevalence and much lower female prevalence during the six waves of NSO surveys in 1991-2006 as presented in Table 9.

Table 9: The number of current smokers aged 15 and over categorized as daily smoking and occasionally smoking by gender during the years 1991-2006

Year	Total current smokers	Daily Smoking				Occasionally smoking			
		Male		Female		Male		Female	
1991	12,287,000	10,565,000	86%	838,000	7%	767,000	6%	118,000	1%
1996	12,548,000	10,644,000	85%	610,000	5%	1,131,000	9%	163,000	1%
1999	11,992,000	9,638,000	80%	592,000	5%	1,609,000	13%	152,000	1%
2001	11,964,000	9,993,000	84%	558,000	5%	1,292,000	11%	121,000	1%
2004	11,361,000	9,106,000	80%	526,000	5%	1,601,000	14%	129,000	1%
2006	11,050,000	9,021,000	82%	520,000	5%	1,299,000	12%	210,000	2%

Source of data: Health and Welfare Survey, National Statistical Office, 1991,1996, 1999 and 2006.The Cigarette Smoking and Alcoholic Drinking Behavior Survey, NSO, 2001 and 2004.

The NSO surveys in 1991, 1996, 1999, 2004 and 2006 also included data for young smokers aged 14 or less. The average of 17684 young smokers made up about 0.15% of all smokers during the survey period as presented in table 10.

Table 10: The number of young smokers aged 14 and under by cigarette smoking habit during 1991-2006

Year	Cigarette smoking habit of young smokers aged 14 and under				
	Total No. of young current smoker	Daily Smoking		Occasionally Smoking	
1991	29,700	24,400	82%	5300	18%
1996	22,800	14,100	62%	8700	38%
1999	11,700	10,900	93%	800	7%
2004	7,177	4,240	59%	2,936	41%
2006	17,041	5,283	31%	11,758	69%

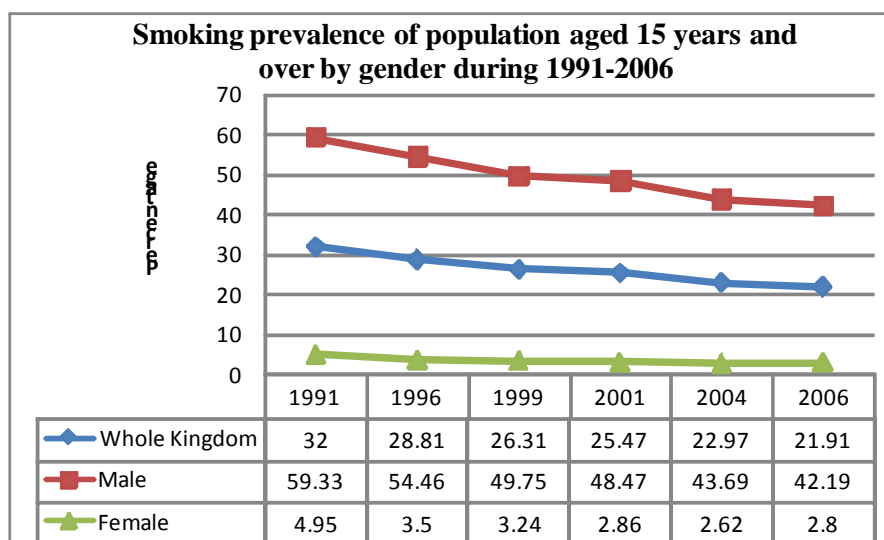
Source of data: Health and Welfare Survey, National Statistical Office, 1991,1996, 1999 and 2006.The Cigarette Smoking and Alcoholic Drinking Behavior Survey, NSO, 2001 and 2004.

Smoking prevalence by gender

The national surveys in 1991 reported that 32% of the population aged 15 and over smoked (daily or occasional smoking). This rate decreased over time, so that by 2006, only 21.9% of the population aged 15 and over smoked as shown in Figure 4. This decrease can be explained by the introduction of effective tobacco control policies in Thailand (Vathesatogkit, 2002 and Chitanondh, 2007).

In 1991 there was a high smoking prevalence amongst Thai males (59.3%) whereas this was low for females (4.95%). Smoking prevalence among both male and female smokers gradually decreased over the next 15 years as presented in Figure 4. The national trends in consumption from 1991-2006 therefore exhibited a steady decline over the period of surveys.

Figure 4: Smoking prevalence of population age 15 and over by gender during 1991-2006

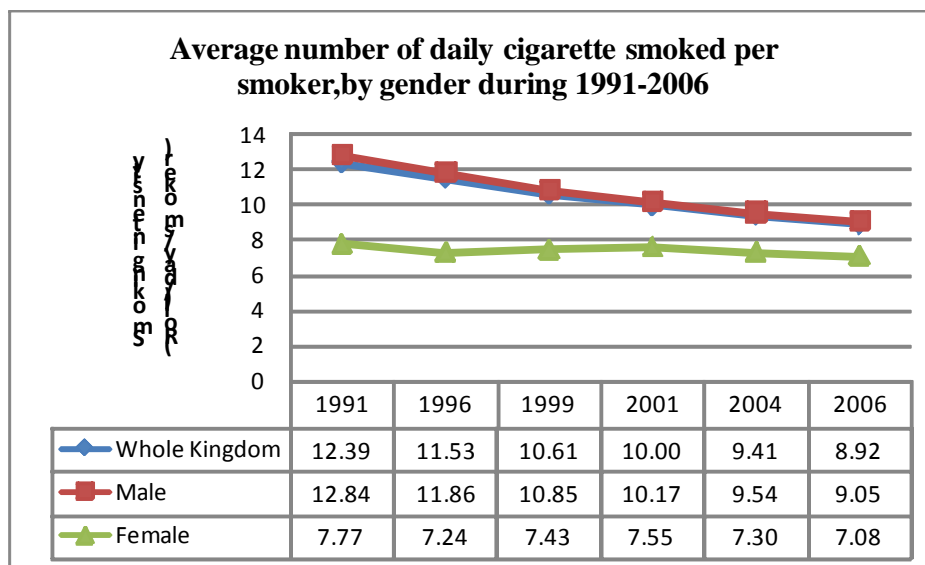


Source of data: Situation of Tobacco Consumption of the Thai Population, 1991-2006. TRC 2008.

Smoking intensity

Smoking intensity per smoker declined from 12.39 sticks per day in 1991 to 8.92 sticks per day in 2006, which was mostly driven by male smokers (Figure 5).

Figure 5: Average number of daily cigarette smoked per current smoker by gender over the year 1991-2006



Source of data : Benjakul S, Kengkarnphanich M., Termsirikulchai L, Teskayan N., Nakju, Situation of Tobacco Consumption of the Thai Population 1991-2006, Tobacco Control Research and Knowledge Management Center, 2008, p. 51-54 **Note:** The intensity for the year 1999 is derived from the interpolation between of the year 1996 and 2001.

Annual cigarette consumption estimated from the surveys

Using the data on the number of current smokers and their intensity of smoking from the previous section, the total annual cigarette consumption (all types of cigarettes) was estimated by multiplying the number of current smokers by gender by the smoking intensity over 365 days. The estimated total annual tobacco consumption based on the survey data was about 55 billion sticks in 1991. Consumption, including of RYO, gradually dropped to 36 billion sticks in the year 2006 as presented in Table 11.

Table 11: Annual tobacco consumption (all types) by current smokers by gender over the year 1991-2006 (Million sticks)

Year	Whole kingdom	Male	Female
1991	55,567.47	53,106.21	2,710.13
1996	52,807.21	50,974.53	2,041.41
1999	46,448.40	44,526.11	2,017.42
2001	43,668.97	41,892.34	1,870.33
2004	39,022.63	37,283.52	1,743.28
2006	35,977.79	34,092.44	1,885.15

Source of data: The estimation based on the number of current smokers and intensity of tobacco used surveyed by National Statistical Office, 1991-2006

The estimation of manufactured cigarettes and roll-your-own consumption

In the NSO surveys the types of cigarettes used by smokers were identified as domestic manufactured cigarettes, imported manufactured cigarettes, roll-your-own (RYO) and other types of cigarettes. For comparability with the tax paid sales data, only manufactured cigarettes are taken into account for the analysis of legal cigarette consumption. In order to estimate the annual manufactured cigarette consumption, we estimated the proportion of cigarettes smoked as roll-your-own and other types of tobacco, and subtracted this from the estimate of the total annual tobacco consumption.

The types of cigarettes specified as smoked by current smokers were about 49.5% as RYO, 49.1 % as manufactured cigarettes and 1.4% as other tobacco products. About 46.4% of male smokers and 62.5% of female smokers used RYO as presented in Table 12.

Table 12: The proportion of different tobacco products used by gender, 1991-2006

Year	Manufactured Cigarette	Roll-your-own	Other
Whole Kingdom			
1991	45.08%	53.92%	1.00%
1996	58.25%	41.20%	0.55%
1999	51.44%	48.22%	0.28%
2001	46.90%	52.90%	0.10%
2004	47.30%	49.60%	3.13%
2006	47.25%	50.27%	2.50%
Average	49.06%	49.53%	1.39%
Male			
1991	47.98%	51.53%	0.48%
1996	61.49%	38.21%	0.30%
1999	55.24%	44.56%	0.21%
2001	51.07%	48.79%	0.15%
2004	50.48%	46.57%	2.95%
2006	48.83%	48.96%	2.20%
Average	52.52%	46.44%	1.05%
Female			
1991	28.42%	66.33%	5.25%
1996	31.77%	64.89%	3.35%
1999	32.66%	65.65%	1.69%
2001	33.25%	66.16%	0.59%
2004	35.47%	53.71%	10.82%
2006	31.82%	58.00%	10.19%
Average	32.23%	62.46%	10.19%

Source of data: TRC,2008 for the years 1991,1996,2001,2004. The figures for 1999 were derived by interpolating between years 1996 and 2001, and for 2006 between years 2004 and 2007 due to the missing data in these years.

The annual manufactured cigarette consumption was then estimated by multiplying the annual number of all types of cigarettes consumed, by the proportion of smokers consuming manufactured cigarettes. Between 1991 and 1996, the early period of the market opening to foreign tobacco, the number of manufactured cigarettes used by male smokers increased from 1274 million packs to 1567 million packs, which represented a 22% increase. In the next few years, when Thailand faced the economic crisis, the male consumption of manufactured cigarettes continually decreased to 1229 million packs by 1999. It continued to decrease to 1070 million packs in 2001, 941 million packs in 2004 and 832 million packs in 2006 respectively. Female consumption of manufactured cigarettes, was only 39 million in 1991 continually decreased to 30 million in 2006 as presented in Table 13. The total consumption of manufactured cigarettes was estimated by combining male and female consumption. This declined over the period of the surveys from about 1313 million packs in 1991 (238 packs per capita), to 862 million (165 packs per capita) in 2006. Consumption decreased by 21% between 1996 and 1999, by 13% to 2001, 12% to 2004 and 11% to 2006.

Table 13: The estimation of total annual consumption of manufactured cigarettes and percentage of change over the year 1991-2006

Year	Male consumption of manufactured cigarette (packs)	Female consumption of manufactured cigarette (packs)	Total annual consumption of manufactured cigarettes (packs)	% change consumption over years	Per capita manufactured cigarette consumption (packs)
1991	1,274,150,693	38,510,938	1,312,661,632	-	237.55
1996	1,567,211,896	32,427,774	1,599,639,670	+21.9	219.25
1999	1,229,811,206	32,944,431	1,262,755,637	- 21.1	204.91
2001	1,069,720,909	31,094,195	1,100,815,104	-12.8	196.18
2004	941,036,138	30,917,043	971,953,181	-11.7	180.98
2006	832,367,009	29,992,664	862,359,674	-11.3	165.42

Source of data: Estimations based on the survey data of NSO 1991-2006 and TRC, 2008

Chapter 5: Results of the analysis of cigarette tax avoidance

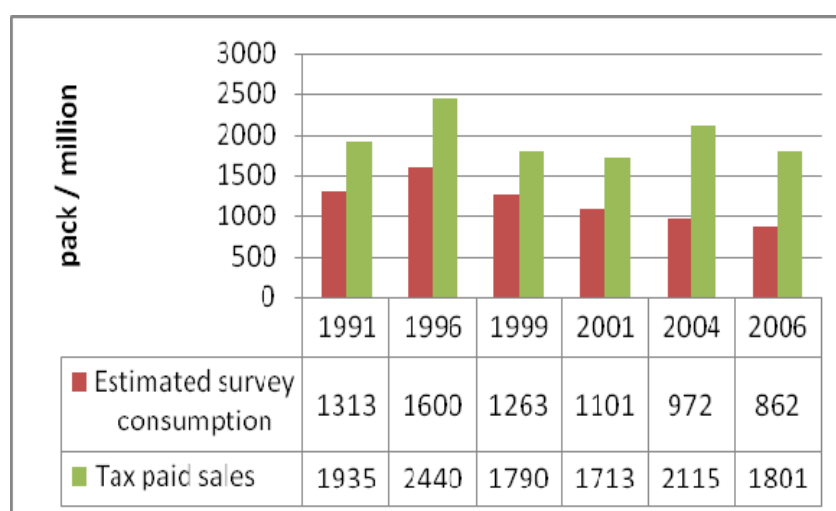
Method 1: Estimate cigarette tax avoidance from consumption and tax paid sales data

The Excise Department sets the maximum retail price of imported and domestic cigarettes in Thailand and is responsible for taxes. Normally, there are three types of taxes for cigarettes: import duty; excise tax of 85% of the factory price (since May 2009) and value added tax (VAT) of 7%. There is also a 2% surcharge for Thai Health Promotion Foundation.

The approach used here to measure the magnitude of cigarette tax avoidance, is to identify it with any discrepancy between reported consumption from survey data on manufactured cigarettes and the tax paid sales from official statistics. It was assumed that 1% of cigarettes were not consumed due to damage or product loss. Therefore the tax paid sales have been reduced by 1% for the analysis of the discrepancy as presented in Table 14.

As can be seen in Table 14, the difference was in fact the opposite from that expected; legal sales (tax paid sales) were found to be considerably higher than the reported consumption estimated from the surveys. The net difference between tax paid sales and survey consumption was on average about 781 million packs or 40% of the legal sales. In 2004, tax paid sales exceeded the reported consumption by 1143 million packs or 54% of the legal sales, which was the highest for the whole period as presented in Figure 6 and Table 14.

Figure 6: The differences between estimated survey consumption and tax paid sales during 1991-2006



Source of data: Thailand Tobacco Monopoly, Excise Department, and National Statistical Office, 1991-20. **Note:** Assuming damages or product loss is 1%, the estimated tax paid sales when compared to consumption was 1% less than the official data of tax paid sales.

Table 14: The differences between legal sales and survey consumption as percentage of legal sales and percentage of change during 1991-2006

Year	Tax paid sale of cigarettes (million packs)	% change of tax paid sales over years	Estimated survey consumption (million packs)	% change of consumption over years	Net differences between tax paid sales and survey consumption (million packs)	Net differences as % of legal sales
1991	1,935	-	1,313	-	622	32%
1996	2,440	26%	1,600	21.9	840	34%
1999	1,790	-27%	1,263	-21.1	528	29%
2001	1,713	-4%	1,101	-12.8	612	36%
2004	2,115	23%	972	-11.7	1,143	54%
2006	1,801	-15%	862	-11.3	938	52%
Average	1,966		1,185		781	40%

The changes in tax paid sales and in estimated consumption from the survey data, were similar in 1996, 1999 and 2006, but in 2001 whereas reported consumption decreased by 13% the tax paid sales decreased by only 4%. In 2004 the reported consumption decreased by 12% while the tax paid sales increased by 23%. Consumption appeared to decrease considerably more than tax paid sales over the period.

As the discrepancies between the two data series are in the wrong direction (Table 14), they do not provide evidence of cigarette tax avoidance when the simple Method 1 is employed. The tax paid sales were much greater than the reported consumption for all years. We cannot conclude however that there were no illegal or smuggled cigarettes used in Thailand during the period of study. This may be concealed by underreporting and by other problems specific to Thailand, that do not allow sufficiently refined estimates of the manufactured cigarette consumption from survey data. Other methods of analysis for cross- validation are needed to assess the magnitude of cigarette tax avoidance in Thailand.

Explanation of the anomalous results

What can explain this outpacing of tax paid sales over the survey reported consumption? Underreporting of prevalence and intensity of smoking is a common finding in survey data. This is particularly likely where there is strong health promotion about the effects of smoking, and also if there are adjacent questions on health in the survey. A similar finding is reported by Stehr, (2005) using data from the US where, between 1985 and 2001, manufactured cigarette consumption estimated similarly from consumption survey data, was some 55% lower than the official legal sales data. His explanation for this is that there was a high level of underreporting in a situation of high information about the health effects of smoking. This applies similarly to our data. Also in our analysis it was necessary to make a number of assumptions in ascribing shares to manufactured and RYO cigarettes, which may have introduced inaccuracies in the share of RYO smokers.

There are several other possible contributors to the low estimates of consumption. The NSO surveys of cigarette consumption were of Thai households and individuals, and did not include migrant workers. There were about 1,277,000 migrant workers with family members officially registered in Thailand; however, the actual number of

migrants in Thailand possibly exceeds two million. The large tourist population in Thailand was also not included in the surveys, although would include consumers of cigarettes. There may also have been consumption of Thai legal manufactured cigarettes by populations in neighboring countries adjacent to the Thai borders. All these people were likely to consume legal or tax paid cigarette not included in the survey report, resulting in underestimation of the consumption from the surveys. It is possible that the hoarding of tobacco before taxes increases, in order to maximize profit of the tobacco company, could account for some year by year differences, but not the overall tendency. Thailand is an unlikely source of smuggled tax paid cigarettes out to neighboring countries, as Thailand has high prices relative to neighboring countries.

Two possible scenarios were considered to explore this problem: one without underreporting of consumption and one with underreporting.

Without underreporting

It is quite usual in surveys of household smoking behavior, for respondents to underreport their daily cigarette consumption because of the perceived stigma associated with smoking, or the desire to respond in a manner consistent with what they believe the enumerator wants to hear. In the context of Thai society, whereas smoking is not a behavior that many male smokers may feel compelled to hide, smoking rates have reduced markedly and the health implications of smoking are well publicized and understood, which is bound to affect reporting; female smokers in particular might feel embarrassed to disclose their smoking behavior and may have been a major source of underreporting.

In the case of no underreporting, the consumption shortfall from tax paid sales was on average 40% of legal sales. If correct, this figure may not specifically indicate that Thailand is a source of smuggling out of legal or tax paid cigarettes to neighboring countries. The higher relative price of Thai cigarettes compare to neighboring and bordering countries means that the explanation must lie with other possible issues with the data as mentioned above.

With underreporting

If there is no smuggling or tax avoidance, the accuracy of survey reporting of consumption can be validated by direct comparison with equivalent data of tax paid

sales (Jackson, 1985; Stehr, 2005) and many countries have used this method to assess underreporting. Sales and consumption should be equal in the situation where there is no tax avoidance. In this analysis the large gap between consumption and tax paid sales as presented in Table 14 could be attributed to underreporting of consumption in the survey.

The net difference between tax paid sales and the survey consumption = underreported consumption

- Underreported consumption = tax paid sales volume – survey based consumption

- % of underreported consumption = $\frac{\text{underreported consumption} \times 100}{\text{Tax paid sales}}$

Tax paid sales

In Table 14 the difference between reported consumption and tax paid sales is attributed to underreported consumption: 32% in 1991, 34% in 1996, 29% in 1999, 36% in 2001, 54% in 2004 and 52% in 2006. The average underreported consumption was 40%. These figures are very high, but actually lower than the US situation reported above. Underreporting is probably not the sole reason for the discrepancies. Applying a minimum of 5% as a lower bound and 15% as an upper bound, a sensitivity analysis was carried out to explore residual discrepancies with different rates of underreporting as presented in Table 15 below.

Sensitivity analysis

In order to probe how the rate of underreporting of consumption might affect the magnitude of consumption, the level of cigarette tax avoidance and the percentage of cigarette tax avoidance over sales, sensitivity analyses, or what-if scenarios were implemented assuming different rates of underreporting. By applying different rates of underreported consumption, the difference between consumption and tax paid sales were estimated. If 5% underreporting in survey consumption was assumed, the result indicated that tax paid sales exceeded consumption by 36% on average. This implies that more than a third of the legal cigarette sales were not consumed by domestic smokers. Even when 15% underreporting was assumed, the result still indicated that tax paid sales exceeded consumption by 29% on average.

Table 15: Sensitivity analysis showing differences between consumption and tax paid sales assuming different rates of underreporting in the surveys, 1991-2006

Year	Assumed underreporting in surveys as percentage of sales			
	0%	5%	10%	15%
1991	32%	29%	25%	20%
1996	34%	31%	27%	23%
1999	29%	26%	22%	17%
2001	36%	32%	29%	24%
2004	54%	51%	49%	46%
2006	52%	50%	47%	44%
Average difference between consumption and tax paid sales as percentage of sales	40%	36%	33%	29%

These results suggest that Method 1 is not a good approach for Thailand due to the shortcomings of the surveys, and we cannot conclude from the results of this method what is the level of smuggling, or whether smuggling is related to the tax level or not. However we have another approach and can now consider the results of Method 2 to further explore these issues.

Method 2: Investigating the discrepancies between recorded exports and recorded imports of cigarettes to detect any trends in smuggling

Import and export statistics obtained from the United Nations Commodity Trade Statistics Database (UN Comtrade) are provided by the statistics authorities of around 200 countries. National reports may omit some private trade data, they are not obliged to provide their trade statistics for every single year, and there are some missing years when trade is not reported. This incompleteness leads to data underestimation for some set of countries. Moreover, export data from countries of origin are not always consistent with imports data of its destination counterparts. The discrepancy may be a result of several factors including valuation (imports include Cost Insurance and Freight [CIF], whereas exports are Free On Board [FOB]), time lags in reporting, but also and importantly, smuggling (UN Comtrade, 2008).

We here estimate the magnitude of illicit cigarettes trade based on the discrepancy between the trade value of cigarettes exported to Thailand (as reported by the country of origin) and imports to Thailand (as reported by Thailand). Exports may include legal cigarettes destined to be legally imported to Thailand; it may also include contraband. Contraband could be concealed to get around Customs in order to illegally import to Thailand, or to re-export to other countries. Some discrepancy between recorded exported data and the recorded import data from the country of origin and from Thailand, may be caused by valuation of import (CIF) and export (FOB), or by time lags as mentioned above, but after these legitimate adjustments are allowed for (usually excluding imports for duty-free sales to travelers), import data should be close to export data.

Table 16 shows annual exports and imports from 1991 to 2006. The figures were drawn from UN Comtrade, which are used by international agencies and are accepted as accurate. The figures show that through the period from 1991 to 2006, recorded imports were consistently lower than recorded exports. For example in 2006, 914 million packs of cigarettes were exported to Thailand, but only 559 million packs were recorded as imported into the country, a difference of 355 million packs, about 39% of exports, were missing. This huge amount of missing exported cigarettes represented some 19% of legal sales in that year, which could be illegally sold cheaply in Thailand or to third countries.

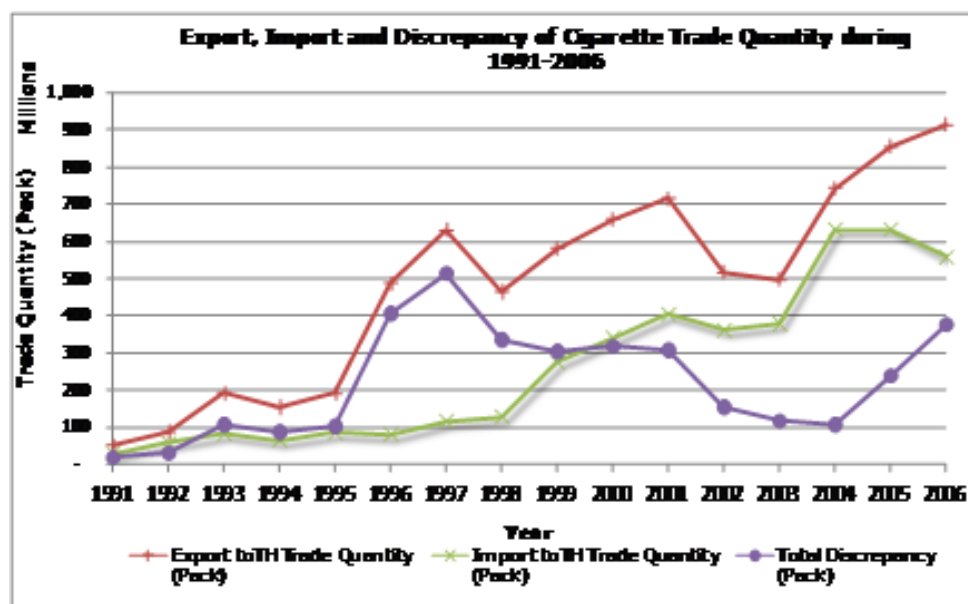
During this period the difference between exports and imports to Thailand fluctuated between 21 million packs in 1991 to 514 million packs in 1997. The highest percentage of missing exports was 83% in the year 1996 as presented in Table 16 and Figure 7. It should be noted that the trade quantity was reported as net weight in kilograms, which has been converted into sticks (1 gram=1 stick) then converted into packs (20 sticks in a pack).

Table 16: Discrepancies between exports to Thailand and Imports into Thailand, 1991-2006

Year	Export quantities as recorded by countries exporting to Thailand (Million Packs)	Import quantities as recorded by Thailand (Million Packs)	Trade discrepancy (Million Packs)	% of imported cigarette missing over reported exports
1991	53.01	31.85	21.16	40
1992	89.06	60.00	29.06	33
1993	194.13	85.06	109.06	56
1994	155.69	66.69	89.00	57
1995	192.91	87.40	105.51	55
1996	488.61	81.26	407.35	83
1997	631.64	117.28	514.36	81
1998	466.31	129.26	337.05	72
1999	581.78	277.15	304.63	52
2000	660.53	341.38	319.15	48
2001	715.79	406.42	309.37	43
2002	518.60	363.07	155.53	30
2003	499.06	379.85	119.21	24
2004	742.87	634.14	108.73	15
2005	855.60	634.28	221.33	26
2006	914.43	559.83	354.60	39

Source of data: UN-Comtrade, 2008 and Thai Customs Department

Figure 7: Exports, Imports and discrepancies in cigarettes trade during 1991-2006 (Million Packs)

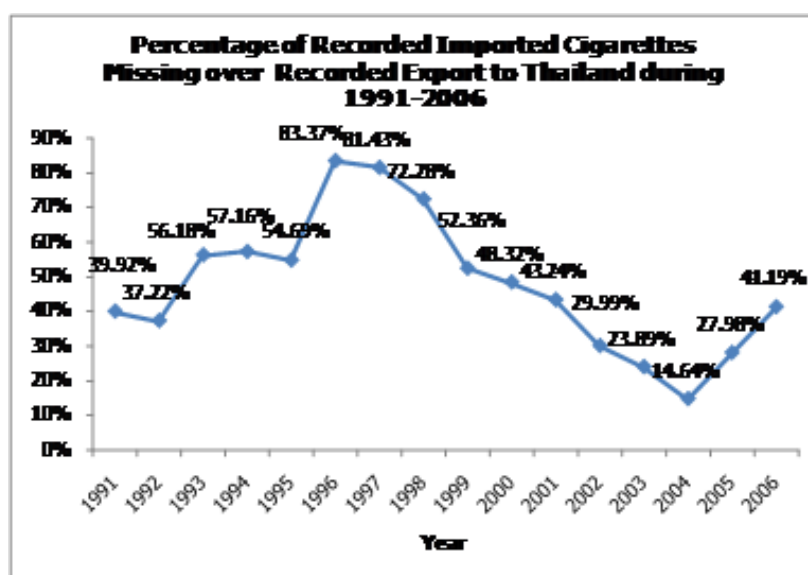


Source of data: UN-Comtrade, 2008 and Thai Customs Department

Figure 7 shows the cigarette trade discrepancies estimated from the trade quantity between the exports as reported by exporting countries and the imports as reported by Thailand. The discrepancy quantity shows a slightly increasing trend, with high variability across the whole period.

Figure 8 below illustrates the trade discrepancies as percentages of total cigarette exports to Thailand. These percentages peaked in 1996 and 1997 during the economic crisis in Thailand. It implies that during that period there was more illicit cigarette trade between the countries of origin and Thailand. During the economic crisis the Thai Baht was devalued on July 2, 1997. The exchange rate went up from 25.09 in 1994 to 47.24 in 1997 (Chainuvati et al, 1999). This had an effect on the cost of imports of goods to Thailand, and so affected local demand for foreign cigarettes. It may therefore have led to increased illicit trade to avoid taxation and reduced transaction costs.

Figure 8: Imported cigarettes missing as percentage of exports, 1991-2006



Source of data: UN-Comtrade, 2008 and Thai Customs Department

During the period 1991 to 2006, Indonesia, Philippines, Singapore, Malaysia and USA were the top five partners for cigarette trade to Thailand, followed by Germany, Hong Kong, China, UK and Japan as shown in Table 17. Most of the discrepancy is accounted for by trade with Indonesia.

Table 17: Top ten leading partners of cigarette trade with Thailand, 1991-2006

Country	Exported record to Thailand Net Weight (kg)	Imported record by Thailand Net Weight (kg)	Discrepancy Net Weight (kg)	% of discrepancy over export
Indonesia	75,302,221	19,093,324	56,208,897	75%
Philippines	39,395,899	36,907,664	2,488,235	6%
Singapore	12,783,798	4,949,352	7,834,446	61%
Malaysia	11,695,361	7,906,232	3,789,129	32%
USA	5,320,688	6,315,427	-994,739	-19%
Germany	5,095,487	495,478	4,600,009	90%
China, Hong Kong SAR	1,630,597	477,949	1,263,198	77%
China	1,605,037	2,188,241	100,101	6%
United Kingdom	615,393	4,146,038	-3,530,645	-574%
Japan	497,825	468,978	28,847	6%

Source of data: UN-Comtrade, 2008 and Thai Customs Department

Estimation of smuggling using method 2

To allow for the lags and short term variations in trade, three year averages of the Thai cigarette trade discrepancies (between exports and imports) are given in Table 18. On the assumption that these are consumed within Thailand they may be considered to be approximate estimates of smuggling of cigarettes into Thailand. The total consumption of cigarettes in Thailand would then be the sum of the consumption of smuggled cigarettes and the legal sales of cigarettes as presented in Table 18. The estimates of the level of smuggling are variable over the period, rising steadily from 3% in the early 1990s to peak at 17 % around the time of the crisis in 1998, and declining again steadily to 7% around 2004, followed by a sudden rise again around 2005 to 10% of total consumption. The smuggling represents a loss of revenue to the government.

Table 18: Smuggling and total consumption of manufactured cigarettes from Export and Import discrepancy (method 2) during 1991-2006

Period (Year)	Tax paid sales of cigarettes (Million Packs)	Trade Discrepancy Quantity (smuggled cigarettes) (Million Packs)	Three year average of smuggled cigarettes (million packs)	Total estimated consumption =Tax paid sales of cigarettes+ smuggled cigarettes (Million Packs)	smuggled cigarettes as percentage of total estimated consumption %
1991	1935	21.16			
1992	2013	29.06	53.09	2066	2.6
1993	2103	109.06	75.71	2178	3.5
1994	2302	89.00	101.19	2403	4.2
1995	2150	105.51	200.62	2351	8.5
1996	2440	407.35	342.40	2782	12.3
1997	2392	514.36	419.59	2811	14.9
1998	1907	337.05	385.35	2292	16.8
1999	1790	304.63	320.28	2110	15.2
2000	1805	319.15	311.10	2116	14.7
2001	1713	309.51	261.40	1974	13.2
2002	1729	155.53	194.75	1923	10.1
2003	1886	119.21	127.82	2014	6.3
2004	2115	108.73	155.70	2270	6.9
2005	2176	239.38	241.59	2418	10.0
2006	1801	376.66			

Source of data: Thailand Tobacco Monopoly Annual reports, 1991-2006 and Excise Department, 1991-2006; UN-Comtrade, 2008 and Thai Customs Department

Excise Tax Rates and Consumption

Tobacco taxation is important as an effective policy for long-term tobacco control and public health strategy in Thailand. The trend of consumption and taxation in Figure 9 shows evidence of a negative relationship between excise tax rates and cigarette consumption. Excise tax rates have soared from 55% in 1991 to 79% in 2006, and resulted in a major reduction in reported consumption from 1313 million packs(238 per capita) in 1991 to 862 million packs(165 per capita) in 2006 as presented in Table 19. Other tobacco control policies have operated over this time, but excise tax rates appear to be a major contributing factor to the reduction in cigarette consumption.

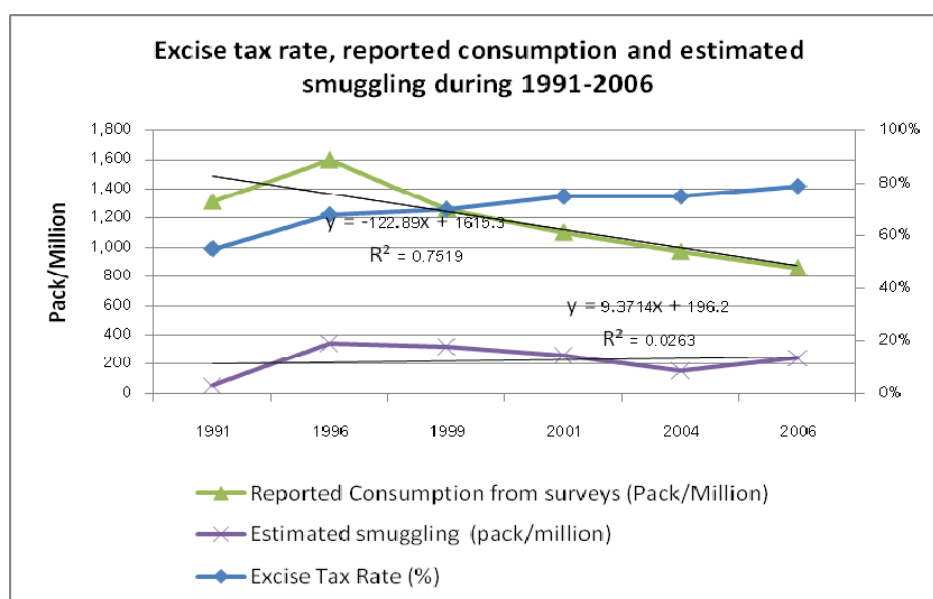
Table 19: Excise tax rate, consumption and smuggling over the year 1991-2006

Year around	Excise Tax Rate (%)	Reported Consumption from surveys (Pack/Million)	Percapita manufactured cigarette consumption (packs)	Estimated smuggling (pack/million)
1991	55.0%	1313	238	53
1996	68.0%	1600	219	342
1999	70.0%	1263	205	320
2001	75.0%	1101	196	261
2004	75.0%	972	181	156
2006	79.0%	862	165	242

Source of data: NSO, 1991-2006; TTM, 1991-2006; Excise Department, 1995-2001; Tax rate adopted from Vitsarutwong (2007).

It is sometimes stated, particularly by the international tobacco companies, that increasing cigarette tax may lead to increased smuggling. There is no empirical evidence of this from our analysis. No evidence was found relating illegal cigarettes used during the period from 1991-2006 to the excise tax rate. The trend line of estimated smuggling varies with slight increases while the excise tax continually increased as presented in Figure 9. There is no correlation between excise tax rate and estimated smuggling ($R^2 = 0.026$).

Figure 9: The relationship between taxation, consumption and smuggling over the years 1991-2006



Source of data: NSO, 1991-2006; TTM, 1991-2006; Excise Department, 1995-2001; Tax rate adopted from Vitsarutwong (2007).

Government Tax Revenue

Real revenue loss is the unpaid duty or tax avoided on the illicit cigarette consumption. Total real revenues (in 2002 values) from licit cigarette consumption are given in Table 20. From the official tax paid cigarette quantities and the tax revenues adjusted to real revenue in 2002 Baht, the average tax per pack (column 4) is estimated by dividing the real tax revenue from legal sales (column 2) by the number of tax paid cigarettes. The value of tax revenue lost from the illegal sales is estimated by multiplying the estimated smuggled cigarettes by the average tax per pack.

Cigarette tax revenue increased by 23% from 1991 to 1996, reduced by 21% in 1999, increased by 8% in 2001 and 13% in 2004, and then dropped again in 2006 by 8%. The percentage of tax revenue lost by tax avoidance (smuggling) ranged between about 1% in 1991 to 18% in 1999 with the most recent data indicating 14% of the total real tax revenue lost in 2006, as presented in Table 20.

Table 20: Cigarette sales and excise tax revenue over the years 1991-2006

Year	Real tax revenue from legal sales, 2002 Baht (Million)	% Real revenue change from preceding survey wave	Average real tax per pack (Baht)	Estimation of smuggling (in million of packs)	Tax revenue loss due to smuggling, 2002 Bath (Million)	real tax revenue loss as % of real tax revenue from legal cigarette sales
1991	29,856	-	15.37	21	323	1.1%
1996	36,823	23.3%	14.94	342	5109	13.9%
1999	29,160	-20.8%	16.11	320	5155	17.7%
2001	31,386	7.6%	17.70	261	4620	14.7%
2004	35,554	13.3%	16.64	156	2596	7.3%
2006	32,757	-7.9%	18.63	242	4508	13.8%

Source of data: Real tax revenue data from Excise Department, Ministry of Finance

Chapter 6: Conclusion and policy implication

The comparison of survey consumption and tax paid sales (method 1) showed no evidence of cigarette tax avoidance during the years of data availability in 1991-2006, assuming no underreporting of survey consumption. Rather, it revealed a large gap between survey consumption and tax paid sales data. Survey based estimates tend to underreport the number of cigarettes consumed when compared to sales based data (WHO 1998). Generally, the NSO's smoking behavior survey provides valid estimates of the prevalence and intensity of cigarette smoking. Underreporting problems may be encountered for a variety of reasons and it is very difficult to estimate the true level without empirical testing such as cotinine testing, but the level can be influenced by social stigma and omission of certain groups such as migrants and tourists. Consumption may also be underestimated due to uncertainties about the proportion of cigarettes smoked as roll your own.

The analysis of cigarette tax avoidance using trade data from multiple countries (method 2) does reveal a large gap between records of exports to Thailand and Thai records of imports to Thailand. The discrepancy between export and import records ranged from 15% to 83% of the recorded exports to Thailand during the period of 1991-2006. The results suggest tax avoidance on foreign cigarettes exported to Thailand by multinational companies. There is a supporting data from the recent NSO survey on The Cigarette Smoking and Alcoholic Drinking Behavior Survey 2007 indicated that about 19% of smokers in the whole kingdom consumed internationally manufactured cigarettes without label warnings on the package, while 23% of smokers in the Bangkok Metropolitan area, and 40% of smokers in the southern region reported they used international manufactured cigarette without label warnings on the package (NSO, 2007). The more people used internationally manufactured cigarette without label warnings on the pack, the more cigarette tax avoidance occurs because it is generally accepted that unlabelled cigarettes are illegal.

The empirical results confirm that even though Thailand has a high cigarette tax policy, there is no evidence of this being related to illicit domestic cigarette consumption. Raising excise tax did not appear to be related to the level of cigarette smuggling in

Thailand. However there was a clear effect of the tax on consumption. The empirical work indicated that annual cigarette consumption decreased by 22% from its peak in 1996 to 1999 and gradually decreased about 11% - 13% from 2001 to 2006. Smoking prevalence declined and the number of smokers decreased significantly over the period of rising cigarette tax rates. The evidence is suggestive that an increase in the excise tax rate led to a decrease in consumption. In turn, the lower consumption reduced the number of deaths and risk of morbidity resulting from tobacco use. Therefore policymakers should continue to use tobacco taxation as a form of tobacco control. The tobacco excise tax should be raised until the social cost of the tax equals the social benefits.

The research has limitations and the findings are only as good as the quality of the data, because secondary data from different sources were employed for the analysis. Due to limited data, other methods are needed to study the illicit cigarette trade in order to confirm the nature of illicit cigarette trade in Thailand.

Further study is needed on the smoking behavior survey of other sub groups of the population in Thailand in order to account for the large gap between cigarette consumption and tax paid sales found in this study.

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