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REDUCTION OF TOBACCO CONSUMPTION THROUGH IMPROVED TAX POLICY IN CAMBODIA

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Financial support from
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Thai Health Promotion Foundation

REDUCTION OF TOBACCO CONSUMPTION THROUGH IMPROVED TAX POLICY IN CAMBODIA

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Any ideas, findings, interpretations, conclusions, and recommendations expressed in this paper are entirely that of the author and are not necessarily shared by the institution, which the author represents.

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EXECUTIVE SUMMARY

Introduction

Smoking cigarettes causes many dangerous diseases such as lung cancer and coronary thrombosis. It also leads to an increase in the cost of health care, absenteeism from work, loss of productivity and related loss of income, premature death as well as cause poor families to fall into poverty. Therefore, many countries use measures to fight tobacco use and to protect the well being of the people. Based on experiences, increasing the excise tax on tobacco products has been one of the most effective ways to discourage youth from starting to smoke and motivate current smokers to quit.

The Royal Government of Cambodia had ratified the WHO's Framework Convention on Tobacco Control (FCTC) on 15th of November 2005. Cambodia has made many encouraging moves towards tobacco control over the last 10 years. The Inter-Ministerial Committee (IMC) has drafted and proposed the National Tobacco Control Law consistent with the FCTC. The proposed law includes increasing taxes on tobacco products, improving health warnings on cigarette packages, prohibition of trafficking of tobacco products, prohibition of advertisement on tobacco and the establishment of smoke free areas in public places.

Description of Cambodia's Tobacco Industry

The tobacco industry was formed in Cambodia in the 1980s. At present, there are 14 local tobacco manufacturers that are registered with the Tax Department. British-American Tobacco Cambodia (BAT) is a leading company in the tobacco industry. The BAT is the major producer in the tobacco market, accounting for about 40.3% of the total market share.

It is estimated that about 12 billion cigarettes are imported into Cambodia that are not destined for domestic consumption. They are instead transshipped into other countries, primarily Vietnam. These cigarettes are being imported to Cambodia under preferential terms. They are subject to import duties, excise tax (or specific tax)[1] and a preferential value-added tax (VAT). These cigarettes do not have to carry Cambodia Tax stamps.

Stamp tax on cigarettes was introduced in 2001. Local manufacturers and importers of cigarettes into the Kingdom of Cambodia need to affix a stamp tax to the packs of cigarettes before they are sent to the local market. Stamp tax is not intended for exported and re-exported cigarettes.

The hand rolled cigarettes in Cambodia are also subject to a preferential tax treatment. The majority of so called "hand rolled cigarettes" are in fact produced by a machine typically owned by a small scale producer. Between 1998 and 2002 the market share for hand rolled cigarettes increased from zero to about 30%[2]. Currently, one in three

[1] Excise tax equal "specific tax" in the terminology of Cambodian law.

[2] BAT report, March 2002. The National Institute of Statistics (NIS) estimates that the market share of hand rolled was 29% in 2004.

cigarettes consumed in Cambodia is a hand rolled cigarette. This has become a major issue for the large manufacturers as well as the Tax Department. The large manufacturers worry about their market share and criticize the unfair tax treatment of tobacco products on the market. The Tax Department sees hand rolled cigarettes as a potential for additional tax collection since these cigarettes are not subject to excise tax. The current lack of income growth in Cambodia combined with the lack of capacity to tax hand rolled cigarettes may increase the popularity of "hand rolled" cigarettes. Therefore, there is a need for the government to address this issue.

Prevalence and Consumption in Cambodia

The survey on tobacco use in Cambodia started in 1994, but there was no accurate and reliable assessment of national tobacco use prevalence, consumption or expenditure. In 1999, the first reliable data came from the national socioeconomic survey. In 2004, Cambodia conducted a survey on the prevalence of smoking in the country. The 2004 survey found that the overall prevalence among males and females aged 20^+ in Cambodia is 53.9% and 6.0%, respectively. The overall smoking prevalence among males and females aged 20^+ in the urban areas is 39.8% and 5.2%, respectively. The overall smoking prevalence among males and females aged 20^+ in the rural areas is 56.2% and 6.1%, respectively. Smoking prevalence is much higher among both men and women who have not attended school, in which it was estimated to be 67.4 %and 11 %, respectively[3].

Based on the 2004 survey, the total average monthly household income and consumption in Cambodia are US$80.5 and US$67.8, respectively. Consumption of households in the urban areas amounted to US$149.5 per month, and the consumption of households in the rural areas is estimated at US$55.4 per month. Annual spending on tobacco by a smoker in Cambodia was approximately US$35.8 on average, which amounts to an average of 3.6% of total monthly household expenditure[4].

Current Situation of Cigarette Price and Taxation in Cambodia

Over the last 12 years, Cambodia has not seen any significant increase in the prices of cigarettes while over the same period the prices of all other consumer goods have increased in line with inflation. The 2004 survey has shown that the most expensive cigarettes are Marlboro and 555 which costs US$1.10 and US$1.38 per pack, respectively. The least expensive cigarettes are Khmer tobacco and hand rolled cigarettes costing US$0.06 per pack. The hand-rolled cigarette is the most popular and accounted for 29% of the cigarette market; followed by Khmer tobacco at 24%, and locally produced cigarette brand ARA at 14%. ARA is the most popular cigarette in the urban areas. The people living in rural areas prefer to smoke local products more than the urban people. We speculate that the people in the rural areas choose to smoke less expensive tobacco because they may not be able to afford more expensive brands.

[3] The Analysis of Smoking Behavior Survey in Cambodia 2004, NIS, Ministry of Planning.
[4] The Analysis of Smoking Behavior Survey in Cambodia 2004, NIS, Ministry of Planning.

The Royal Government of Cambodia derives its revenues from many sources, with most of the revenues collected from custom duties. Approximately two-third of excise tax is collected from imported goods. The government income from excise tax on domestic tobacco products has been steadily increasing since 1995. However, the relative role of the tobacco industry in the domestic tax collection has decreased from 2004 to 2005. The overall contribution of the tobacco industry to the total domestic tax revenue is very small: it represented only 3% and 3.4% of the total domestic tax revenue in 2004 and 2005, respectively.

Most of the cigarette importers and large manufacturers are subjected to the Real Tax Regime (self-assessment system), meaning that they are subject to all types of taxes. Hand rolled cigarette producers are subject to the Estimated Tax Regime, therefore they pay only a turnover tax (2% of the value of their products) and patent tax. VAT is not imposed on those in the Estimated Tax Regime. Excise tax is paid only by some hand rolled cigarette producers in the Estimated Tax Regime due to weak tax collection capability.

Compared to other countries in the region, Cambodia has the lowest tobacco tax measured by the share of tax in average retail price: tax represents only about 20% of the final price. In Thailand, for example, the tax represented 78% of the final price in 2005. Both import and domestic tobacco products intended for local consumption carry tax stamps. The tax treatment in Cambodia should be similar for hand rolled and the manufactured cigarettes. This would increase the government revenue and reduce consumption of hand rolled cigarettes as well as the overall consumption of tobacco due to an increase in the price of hand rolled cigarettes.

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Results of the Tax Analysis

The results of this study show that an increase in cigarette excise tax will result in a decrease in cigarette consumption and in an increase of the government's tax revenues for all years after raising excise tax rates.

Assuming the price elasticity of cigarette demand is between -0.2 and -0.6, we estimated that cigarettes consumption would decrease by 1.84% to 5.52%, respectively, if the tax rate was 20% instead of 10% in 2005. The consumption of cigarettes would have decreased further, by 3.7% to 10.98%, if the tax rate was 30% in 2005. In other words, the number of cigarettes smoked would have decreased by 1.15 - 3.45 million packs with the tax rate of 20%, and by 2.29 - 6.86 million packs with the tax rate of 30% in 2005. At the same time, the cigarette tax revenue would have increased by 6,145 - 6,647 million riels under the 20% tax rate scenario. Under the 30% tax increase scenario, the cigarette tax revenue would have increased by 11,476 - 12,973 million riels in 2005.

These potential gains could have been even larger in 2006 and in 2007 due to the current trend in cigarette consumption, which is increasing. For example, even under the assumption of relatively high price elasticity of -0.6, a 30% excise tax can reduce the cigarettes consumption by at least 10.98% in 2007 or by 7.58 million packs. In this case, the cigarette tax revenue would increase by 12,671 million riels in 2007.

Our estimates also revealed a weakness in the current tax administration system. We found that the 2005 government revenue from domestic cigarette consumption represents only 16.9% to 11.7% of the potential cigarette tax revenue. Therefore, an improvement in the tax collection administration in addition to a cigarette tax increase could lead to a substantial increase in the government revenue.

Raising excise tax on tobacco products is one of the most effective measures in Cambodia. This measure will improve public health of the Cambodian people and fulfill the government's commitment to WHO in implementing the Framework Convention on Tobacco Control. The recommendations based on our research are as follows:

In the short-term:

- Increase excise tax rates from 10% to 30% for all cigarettes;
- Subject the hand rolled industry to specific tobacco tax. This would mean removing small-scale manufacturers from the Estimated Tax Regime and subject them to the Real Tax Regime;
- Impose similar tax structure on all manufactured cigarettes, including the "hand rolled" cigarettes made by machines. All cigarettes are equally harmful to health and therefore should be taxed equally; and
- Strengthen Tax Administration through enforcing Stamp Tax on all cigarettes.

In the medium-term:

- Introduce Special Cigarette Industry Licenses (Special Tobacco Licensing for all importers, manufacturers, hand rolled producers, distributors, wholesalers, and retailers) to improve tax collection and to reduce transshipment of cigarettes abroad; and
- VAT should be equally applied to all sellers of tobacco products including importers and small manufacturers.

1. INTRODUCTION

In 1999, the World Bank published "Curbing the Epidemic: Governments and the Economics of Tobacco Control", which summarizes the trends in global tobacco use and the resulting huge and growing burden of disease and premature death. Tobacco is becoming one of the single biggest causes of death worldwide. By 2030 it is expected to kill 10 million people per year. The epidemic is increasingly affecting developing countries, where most of the world's smokers (82% or 950 million) live. Close to half of all men in low-income countries smoke daily and the number of smokers is increasing. For example, smoking prevalence among Chinese men increased from 40% in the 1950s to 63% in 1996[5]. Women's smoking rates are also increasing fast.

By 2030, developing countries will account for 70% of all tobacco deaths. Many deaths and much disease could be prevented by reducing smoking prevalence. This means that in the coming decades, developing countries will face increasing costs from tobacco use in terms of health care expenditure and lost productivity[6].

Tobacco use is affecting poverty. Smoking can result in many diseases such as lung cancer and coronary thrombosis. Smoking increases the cost of health care, absenteeism from work, loss of productivity and related loss of income, and the likelihood of premature death. Tobacco use also causes poor families to fall into poverty.

In Cambodia, people spent US$69.44 million annually on tobacco. If this expenditure was spent on food and other essential household needs, more people will be lifted out of poverty. If Cambodians were to use the US$69.44 million more wisely, they would be able to buy 274,304 tons of high quality rice or build 27,778 units of big wooden houses in the rural areas[7].

There is evidence from around the world showing that there are effective policies and interventions that can curb the tobacco epidemic.

Increasing the excise tax on tobacco products has been one of the most effective ways to reduce tobacco consumption in the whole population and to discourage youth from starting to smoke. According to a National Cancer Institute expert panel, an increase in cigarette excise tax may be the most effective single approach to reducing tobacco use by youth. A 10% increase in cigarette price worldwide would reduce consumption by 4% in high-income countries and by 8% in low and middle-income countries. Of the smokers alive in 1995, about 42 million would stop smoking and about 10 million premature deaths would be prevented[8].

[5] Chinese Academy of Preventive Medicine 1996.
[6] Curbing the epidemic, 1999.
[7] Secondary analysis of the 1999 socioeconomic survey, NIS Analysis by Lidee Khmer.
[8] Jha P. and Chaloupka F.J., 2000, Tobacco Control in Developing Countries, Price and Other Measures to Reduce Demand is Key to Tobacco Control, Oxford University Press for the World Bank and World Health Organization, Oxford.

In Cambodia, there have been many encouraging movements in tobacco control over the last 10 years. The Health Sector Strategic Plan recognizes the importance of tobacco control. Therefore, in 2002 an inter-ministerial committee (IMC) was established consisting of 9 ministries chaired by the Minister of Health. The National Center for Health Promotion (NCHP) is the Secretariat for the IMC. The IMC has drafted the National Tobacco Control Law consistent with the WHO's Framework Convention on Tobacco Control (FCTC). The law has been submitted to the Council of Ministers for approval. The proposed law includes increasing taxes on tobacco products, improvement in health warning on cigarette packages, prohibition of trafficking of tobacco products, prohibition of advertisement of tobacco and establishment of smoke free areas in public places.

The Royal Government of Cambodia (RGC) had ratified the WHO's FCTC on 15th of November 2005.

Many achievements were made on tobacco control and they included: the establishment of voluntary smoke free places such as universities, schools and hospitals; the production and execution of educational media campaign on television and radio; development of smoking cessation programs; support of smoke free cyclo (this is a local transportation in Cambodia); and the development of centers anti smoking materials to be used in schools. Now, it is time for the government of Cambodia to take an action in the area of tobacco taxation. In order to comply with the FCTC, the government needs to increase excise tax rates on tobacco products including hand-rolled cigarettes. The purpose of this paper is to assess the impact of such a tax increase on cigarette consumption and on government tax revenue.

Following this introduction, the report is organized as follow: Part 2 describes the role of the tobacco industry in the Cambodian economy including both manufactured and hand-rolled products. Part 3 explains the overall smoking prevalence, the average income spent on tobacco, and tobacco consumption in Cambodia. Part 4 examines cigarette prices, tax revenue and tax system for tobacco products in Cambodia. Part 5 describes the analytical approach to estimating the impact of higher tobacco taxes on cigarette consumption in Cambodia. Part 6 summarizes the findings in terms of changes in tobacco consumption and in government revenue. It also provides policy recommendations. The methodology and data used in this study are explained in the Tables and Appendix 1 and 2.

2. DESCRIPTION OF CAMBODIA'S TOBACCO INDUSTRY

2.1 The Manufacturers and Importers of Tobacco

The tobacco industry was formed in the 1980s, after the end of the Khmer Rouge Regime, The industry was then a state owned enterprise. In the 1990s it was privatized. Presently, there are 14 local tobacco manufactures registered with the Tax Department. Among these companies are 9 manufacturers registered with the Large Taxpayer Bureau. British-American Tobacco Cambodia (BAT) is the leading tobacco company. BAT has been investing in the tobacco industry of Cambodia for a long time. Prior to 1975 BAT managed the Manufactures de Cigarettes du Cambodge, a company supported by French investments. The 2006 BAT report indicated that BAT has been operating in Cambodia for more than 10 years (BAT did not operate in the country during the Khmer Rouge Regime). BAT estimates that it provides 400 full time jobs directly, and a further 200 jobs at its distributor. This represents an insignificant percentage of the total employment in Cambodia. BAT also claims that it has a contract with 800 farmers and engages 1,700 seasonal workers (who cannot be counted as full time employees) every year. Again, this employment is insignificant compared to the total number of people employed in the agricultural sector**.** BAT reports that it spends US$3.5 million per year on the purchase of tobacco leaf in Cambodia.

Table 1 shows the market share among local manufacturers in 2005. BAT is the major producer, accounting for about 40.3% of the total market. The second most important producer is Viniton, a Chinese Cambodia joint venture, which represents 28.6% of total market. The third important company is Altadis, a foreign company operating outside Cambodia, which owns 18.8% of the cigarette market. Altadis has a Cambodian distributor, Hutraco, which distributes imported cigarettes such as Alen Delon.

Table 1: The Market Share

Name of Companies	Market Sharing
BAT	40.3%
PMI	0.7%
JTI	0.3%
Altadis	18.8%
Viniton	28.6%
Hong	6.3%
Rock	0.3%
Other	5.0%

Source: British-American Tobacco, "Proposals for tobacco taxation and industry management in Cambodia", September 2006.

According to the 2006 BAT report, cigarettes constitute the largest share of Cambodia's imports. BAT estimates that the 12 billion cigarettes (1.2 cases) imported into Cambodia a year represent 150% of the estimated demand for all cigarettes in Cambodia. This means that a lot of the valuable foreign exchange is spent on a harmful product. This cannot be a good recipe for economic growth. These cigarettes are being imported under preferential terms and they are not destined for domestic consumption (they are subject to import duties, special tax and a preferential VAT system and do not have to carry a tax stamp). Instead of being consumed in Cambodia these cigarettes are being transshipped into other countries, primarily Vietnam[9].

The current tax system is complex and confusing. According to the tax law, Specific Tax (excise tax) is levied on Ex-factory price, but the law does not clearly define the ex-factory price. VAT is levied on domestic cigarette production (and paid by local manufactures), but cigarette importers are subject to a preferential VAT treatment. Small manufactures (those in Estimated Regime) are not subject to VAT at all. Tax on Public Lighting (PTL) is widely evaded by both wholesalers and retailers. Import duties are lower for importers of cigarettes than for importers of raw materials to manufacture cigarettes. The importer receives the refund of VAT that was paid when the goods entered Cambodia after the goods leave the country. However, some of the re-exported cigarettes can also be found in the local market in Cambodia. There is suspicion that the cigarette exporters collect VAT refunds, but still sell some of these cigarettes on the domestic market. We believe that the business of re-exporting cigarettes is not sustainable in the long term as the countries for which these products are destined will gradually open their markets to imports.

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2.2 Hand rolled cigarettes

In Cambodia, most of the hand rolled cigarettes are machine made cigarettes. The hand rolled cigarettes compete with machine made cigarettes produced by large cigarette manufacturers. Since they are taxed on lower levels, the Tax Department suspects that their increasing popularity causes the decline in the tax revenue from the cigarette industry. Hand rolled cigarettes in many developing countries have provided a low priced alternative to machine made cigarettes.

In some provinces many producers use old cigarette making machines to make hand rolled cigarettes in industrial quantities. This type of production is done at villages and with no quality control. In Cambodia the production sites are principally located in Kompong Cham Province where most of Cambodia's tobacco is produced. The cigarettes produced in this province are then being distributed throughout Cambodia. One inspection found forty two machines just in Kompong Cham province alone. Assuming a production rate of 500 cigarettes per minute, this province itself has the annual capacity of over 7.0 billion hand rolled cigarettes (assuming 16 hour work day shift 365 days a year). This is more than twice the total demand for hand rolled cigarettes in Cambodia.

[9] Report from BATC, "Proposals for tobacco taxation and industry management in Cambodia", September 2006.

Since 1998 to 2002 the hand rolled cigarette's presence in the market place has increased from zero to an average of 30% of all cigarette products[10]. According to the 2002 BAT report, the total cigarette market volume has remained stagnant over the past few years and the growth of hand rolled cigarette market was brought about by the increased in the number of smokers who switched from smoking machine made cigarettes.

Table 2 shows BAT's estimates of the volume of the hand rolled cigarettes produced in the Western, Eastern, and Central markets. In the Western market (7 provinces), hand rolled cigarettes account for about 41.57% of the cigarette market, while in Phnom Penh, Kandal and Kg. Spue, hand rolled cigarettes account for only 17.57% of this market. In general, hand rolled cigarettes account for 30.02% of the market for cigarettes in the whole country. With the weak economy and no effort to control their production, it can be expected that more and more people will turn to the cheaper hand rolled cigarettes.

Table 2: Average Monthly Volume of Manufactured and Hand Rolled Cigarettes (Million sticks)

Province	Manufactured Cigarette	Hand Rolled	Total Industry	Market share of Hand Rolled
West of Country*	126.50	90.00	216.00	41.57%
East of Country**	121.62	62.50	184.12	33.95%
Phnom Penh, Kandal, Kg. Spue	213.50	45.50	259.00	17.57%
National	461.62	198.00	659.62	30.02%

Source: Report from British-American-Tobacco, March 2002.

* Including Siem Reap, Kompong (Kg.) Som, Battambang, Kg. Chhanang, Kg. Thom, Pursat, Bantey Meanchey.

** Including Kg. Cham, Kampot, Takeo, Prey Veng, Svay Rieng, Stung Treng, and Kratie.

[10] BAT report, March 2002. The National Institute of Statistics estimate of the market share of hand rolled was 29% in 2004.

3. PREVALENCE AND CONSUMPTION IN CAMBODIA

3.1 Overall Smoking Prevalence

The first survey collecting information on tobacco use in Cambodia was conducted in 1994, but this information did not provide an accurate and reliable assessment of national tobacco use or expenditure on tobacco products. It was the first national socioeconomic survey conducted in 1999 that provided the first reliable information on the smoking prevalence in the country.

According to the results of the 1999 socioeconomic survey in Cambodia, smoking is more widespread in the rural areas where almost 85% of the Cambodian population lives. The average smoking rate across all ages in the rural areas is 16.9% as opposed to 13.1% in urban areas. However, the rate for males is substantially higher: 30.2% and 23.8% in rural and urban areas, respectively. Limiting the estimates to adult populations, the male smoking rates are even higher: it is 46.8% for age 15 and over, 53.7% over 18, 58.7% over 20 and 72.1% over 40. The corresponding rates for females are much lower. The national smoking prevalence for women 20 years and older are 7.2%[11].

In 2000, The Cambodian Demographic and Health Survey provided additional information on women's tobacco use. The results showed that older women (age 40 and above) are more likely to smoke than younger women. Women living in rural areas are twice (6%) as likely to smoke tobacco as women living in urban areas (3%). About 6% of women chew tobacco, while 8% chew betel nuts. In general, women with no education chew more tobacco and betel nuts than women with primary or higher education. The lower prevalence of smoking among women compared to men reflects the social, cultural and traditional barriers for women to engage in smoking, and is a typical phenomenon in SEA.

The 2004 survey conducted by the National Institute of Statistics (NIS) stressed that prevalence of smoking among men remains very high compared to other countries. The national male smoking prevalence for age 15^{+} is 44.1%. 41% of males smoke daily, 43% in rural areas and 30% in urban areas.

The 2004 survey confirmed that the smoking prevalence among females is much lower compared to males. The overall prevalence for women aged 15^{+} was 5.1% for the country.

The 2004 survey[12] also indicated that smoking prevalence among the Cambodia population is negatively related to education. Among those who have not attended school, smoking prevalence is much higher among both men and women, in which it was estimated to be 67.4% and 11% respectively. In addition, the smoking prevalence decreased gradually as educational levels increases for both sexes. This situation applies

[11] Cambodian Socio-Economic Survey of 1999.
[12] Report on "The Analysis of Smoking Behavior Survey in Cambodia 2004".

for both the rural and urban areas. So, providing better education could help to reduce smoking prevalence in Cambodia.

The Cambodian Socio-Economic Survey (CSES) 2004[13] showed that less than half of the current smokers in the urban and rural areas desire to stop smoking, with the female smokers having a stronger desire (41.8%) than the male smokers (32.1%). Almost 97% of current smokers who desire to stop smoking have attempted to do so, but did not succeed. Generally, male smokers in Cambodia begin to smoke tobacco around the age of 20 years. The mean age of smoking initiation for females is 26 years of age.

The National Center for Health Promotion and the Adventist Development and Relief Agency (ADRA) have estimated tobacco use prevalence, brand preference and attitudes to tobacco control policies among Phnom Penh residents, health professionals, youth, Buddhist monks, soldiers and teachers. The report found that the prevalence is highest among poor and lesser-educated people. For example smoking prevalence among the Cambodian men who have not attended school is 67.4%. There is a high level of support for tobacco control policies in all groups such as from the Phnom Penh residents, health professionals, youth, Buddhist monks, soldiers and teachers. About 90% of the Cambodian population is aware of the harmful effects of tobacco use on health and 57.4% wish to quit, however they have a poor understanding of the true risk and specific diseases caused by tobacco use. Overall, about 21% of urban and 36% of rural population does not believe that smoking has a big impact on their health. This indicates a need for more information and education among the population.

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3.2 Tobacco Expenditure in Cambodia

The 2004 tobacco survey estimated the average monthly household income and consumption in Cambodia to be US$80.5 and US$ 67.8, respectively. The household income in the urban areas is higher, about US$140.5 per month as opposed to US$71.3 per month in the rural areas. The consumption of households in the urban areas amounted to US$149.5 per month, and the consumption of households in the rural areas has been estimated at US$55.4 per month[14].

A household with a smoker spends on average 2.3% and 3.8% of total expenditure on tobacco in the urban and rural areas, respectively. The lowest income groups bear the highest burden of tobacco consumption because they spend the greatest percent of their expenditures – about 4.8% - on tobacco[15]. The average monthly expenditure on tobacco was about US$3 per household with a smoker.

In Cambodia, the average number of cigarettes smoked daily is about 14 cigarettes per smoker. To compare with other countries, the average consumption in the UK is 15

[13] Cambodian Socio-Economic Survey of 2004.
[14] Report on the Analysis of Smoking Behavior Survey in Cambodia 2004, Southeast Asia Tobacco Control Alliance monograph publication., February 2006.
[15] The Analysis of Smoking Behavior Survey in Cambodia 2004, Southeast Asia Tobacco Control Alliance monograph publication.

cigarettes, in the US 19 cigarettes,[16] and in China 15 cigarettes[17]. About one fifth of smokers in Cambodia are heavily addicted to cigarettes, since they smoke within 5 minutes after waking up. About one third of smokers smoke cigarettes between 5 to 29 minutes after waking up and are also considered to be very dependent on tobacco. Based on this measure, more than half of smokers in Cambodia are very addicted to tobacco.

About 75.5% of the population of Cambodia is exposed to second hand smoke. The exposure is higher in the urban areas (81.0% of people living in urban areas are exposed) compared to the rural areas (74.7% of people living in rural areas are exposed). About 65.9% of the population in Cambodia believe that smoking tobacco is dangerous to the smokers (78.8% of the urban population believes so, and 63.8% of people living in rural areas had this opinion). The awareness and knowledge was similar among both sexes, but the urban population is apparently more aware of the danger of smoking compared to the rural population.

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[16] Adda J. and Cornaglia F., 2004, Price, Cigarette Consumption, and Smoking Intensity. Available at: http://www.rand.org/labor/adp_pdfs/2005adda.pdf.
[17] Mackay and Dr. Michael Eriksen, 2002, The Tobacco Atlas. World Health Organization.

4. CIGARETTE PRICE AND TAXATION IN CAMBODIA

4.1 Prices of Tobacco Products and Brand Preferences

The information in this section is primarily based on the 2004 survey which collected data from 4,200 households living in 300 villages distributed in all 24 provinces in Cambodia. The survey focused on smoking behavior and covered both the urban and rural areas of Cambodia[18].

The 2004 survey showed that several types of tobacco are consumed in Cambodia. Table 8 (see Appendix) shows the average prices of 36 tobacco brands sold in Cambodia. The most expensive is Marlboro and 555 cigarette brands that cost US$1.10 and US$1.38, respectively. The least expensive are Khmer tobacco and Hand rolled cigarettes which cost US$0.06. The seven most popular brands include Alain Delon, ARA, Khmer tobacco (filter less), Hand rolled cigarettes, Cambo and Crown.

To find out if the cigarette prices are changing over time, we conducted a survey in the middle of 2006 to record the cigarette prices of the same brands as covered by the 2004 survey (Table 8). We randomly selected 10 retail stores from several markets in Phnom Penh. The survey showed that the prices of cigarettes have not changed for most brands, such as ARA. There were some negligible changes in prices in other brands while some brands were no longer for sale and some new brands appeared on the market.

The 2004 survey showed that the hand-rolled cigarettes are the most popular and were preferred by 29% of smokers, followed by Khmer Tobacco (24%), and ARA (14%). ARA is the most popular cigarette brand in the urban areas. These 3 most popular brands are local products. The most popular imported brand is Alain Delon which is preferred by only 2.9% of smokers[19]. The smokers in rural areas prefer local brands to the larger degree than the urban smokers. This could be due to lower income in rural areas and higher prices of foreign cigarette brands.

According to the 2004 survey, a smoker consumed 5205 cigarettes per year. One out of five smokers reported smoking imported cigarettes. However, a person who preferred imported cigarettes also had smoked a mix of local and imported products. On the other hand, a person who preferred local products also consumed imported products from time to time.

A cigarette market can be characterized by price elasticity which measures the sensitivity of customers to changes in cigarette prices. Presently, there are no estimates of price elasticity of tobacco demand in Cambodia. This kind of study requires data that currently do not exist in Cambodia. However, there are several studies in low income countries in South East Asia that can provide that information. For example, price elasticity of

[18] Report on the Analysis of Smoking Behavior Survey in Cambodia 2004, National Institute of Statistics, Ministry of Planning, Phnom Penh, Cambodia, February 2006.
[19] CSES 2004.

cigarette demand in Vietnam is estimated to be -0.5[20], in Sri Lanka -0.53[21], in Myanmar -1.62[22], and the estimates range from -0.32 to -0.57 in Indonesia[23]. These estimates can be used for the analysis of the tobacco market in Cambodia.

4.2 Tax Revenue

The Royal Government of Cambodia derives its revenue from many sources such as import and export taxes, domestic taxes, non tax revenue based on fees and charges. The Treasury Department under the Ministry of Economy and Finance collects all revenues. The Cambodia National Revenue is divided into Central Revenue and Provincial or Municipality Revenue (local tax revenue). The Central Revenue consists of import and export taxes and some domestic taxes such as payroll tax (salary tax), profit tax, rental tax, value added tax, and excise tax (specific tax). The local tax revenue (provincial or municipality revenue) includes turnover tax, patent tax, public lighting tax, unused land tax, registration tax, slaughter tax, vehicles tax (mean of transportation tax), accommodation tax and cigarette stamp tax.

Excise taxes in Cambodia are collected on several items, including tobacco, alcohol and luxury goods. Approximately two-third of excise tax is collected from imported goods. Table 3 shows the central tax revenue and its two separate components from 2002 to 2005. Tax revenue on domestic goods is collected by the Tax Department. Tax revenue on imported goods is collected by the Custom and Excise Department. In general, the total fiscal revenue increased from 1,228,459 million riels to 1,792,997 million riels from 2002 to 2005. Most government revenue is collected from custom duties. Excise tax collection on both imported and locally produced goods also increased between 2002 to 2005 in absolute amounts. . During the same time, the share of excise tax in imports has also increased.

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[20] Hong V.K, Ross, H, Levy, D., Nguyen T.C., Evidence on Imposing a High Uniform Tobacco Tax in Vietnam, VINACOSH, 2004

[21] Arunatilake N., 2002, An Economic Analysis of Tobacco Demand in Sri Lanka, Sri Lanka economic Journal. Vol. 3 (1), p. 96-120.

[22] Djutaharta T. et al., 2002, The Impact of Cigarette Tax Rate Increase on Consumption and Government Revenue: Aggregate Analysis, Un published paper commissioned by the World Bank.

[23] Arunatilake N., 2002, An Economic Analysis of Tobacco Demand in Sri Lanka, Sri Lanka economic Journal. Vol. 3 (1), p. 96-120.

Table 3: Central Revenue and Excise Tax in Cambodia (In Million Riels*)

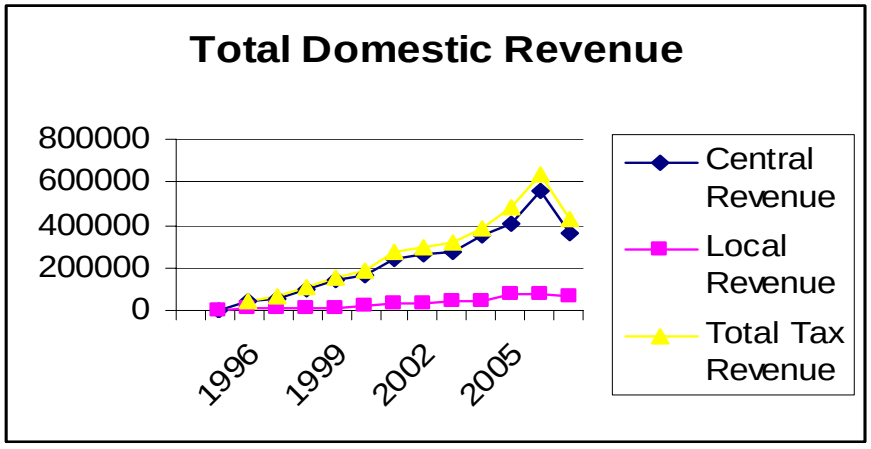
Total Fiscal Revenue (TR)	**1,228,459**	**1,221,083**	**1,578,948**	**1,792,997**
Total Excise Taxes	210,350	197,637	304,408	363,277
Excise Taxes share to TR	0.17	0.16	0.19	0.20
Total Revenue from imports	951,535	875,241	1,172,880	1,234,686
Excise Taxes from imports	181,186	164,244	255,376	302,678
Excise share in imports tax	0.19	0.19	0.22	0.25
Total Revenue - domestic goods	276,924	345,842	406,068	558,311
Excise Taxes - domestic goods	29,164	33,393	49,032	60,599
Excise tax share in domestic revenue	0.11	0.10	0.12	0.11

Source: Ministry of Economy and Finance, 2006.
*Riel is Cambodia currency, at current foreign exchange 4,500 Riels is equal to 1US$

Figure 1 illustrates the trends for total domestic tax revenue from 1995 to the first semester of 2006. Total domestic tax revenue excludes export and import tax and consists of both central revenue (as described in the last 3 rows of Table 3) and local tax revenue. This report focuses on the domestic tax revenue since it reflects the amount of cigarette taxes collected from Cambodian smokers. The cigarettes which are subject to import tax are not usually consumed in Cambodia.

Central domestic revenue is a very important source of financing government activities and it has been rising dramatically from 1995 to 2005. We expect it to increase further in 2006 because it already reached 361,283 million riels in just the first six months of 2006 (see Table 9 in Appendix). The local tax revenue is very small compared to the total domestic tax revenue. However, even this tax revenue has been increasing slightly.

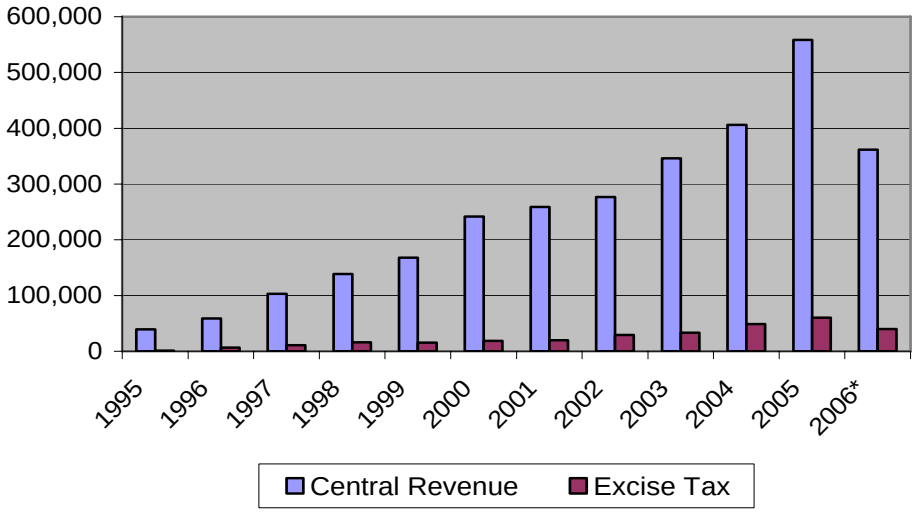
Figure 1: Total Domestic Tax Revenue (In Million Riels)



Source: Ministry of Economy and Finance, Financial Act 2006.

Figure 2 indicates the proportion of excise tax collected on local goods to total central revenue from domestic activities from 1996 to the second quarter of year 2006. In general, the proportion of excise tax to central revenue ranges between 8% and 12% during last ten years. The average increase in central domestic revenue from 1996 to 2005 was about 29.74% per year. The slowest growth occurred in 2001 and 2002 when this revenue increased by 6 - 7% (see Table 10 in Appendix). The trend in the average excise tax collection on domestic products between 1996 and 2006 was similar to the trend of the central domestic revenue with the annual average increase of 28.99%. The largest increase occurred in 1997 when the excise revenue grew by 62.25%.

Figure 2: Proportion of Excise Tax to Central Domestic Revenue (In Million Riels)



Source: Ministry of Economy and Finance, Financial Act 2006.
* data for 2 quarters only

There were four main types of cigarette tax: Value Added Tax, Excise Tax, Public Lighting Tax (PTL) and Stamp Tax. The PTL is earmarked tax to support public lighting in cities and is imposed on alcohol, soft drinks and cigarettes. The rate is 3% of invoiced price and a cascading system is applied. For example, 3% of invoiced price is levied to a manufacturer and another 3% at the retailer level. However, in practice, this tax is collected only from the manufacturers, so it impacts the final price only as a 3% tax. Stamp tax on cigarettes was introduced in 2001. Local manufacturers and importers of cigarettes into Cambodia must affix a stamp tax on the packs of cigarettes before they are sold on the local market. Stamp tax is not required for exported and re-exported cigarettes.

Table 4 shows how much central domestic tax revenue (value added tax and excise tax) and local tax revenue (public lighting tax and stamp tax) has been collected from the 14

local cigarette manufactures in 2004, 2005, and for the first nine months of 2006 (with the revenue prediction for 2006).

Table 4: Domestic Tax Revenue from Manufactured Cigarettes (In Million Riels)

Type of Taxes	2004	2005	2006 (9 Months)	2006 Estimation
Value Added Tax	5,199	5,999	4,383	6,553
Excise Tax	6,209	6,752	5,321	7,095
Public Lighting Tax	3,178	4,221	3,627	4,836
Stamp Tax	1,564	1,983	1,368	2,736
Total	**16,150**	**18,955**	**14,699**	**21,220**

Source: Tax Department, Ministry of Economy and Finance, 2006.

The total tax collection from cigarette manufacturers increased from 16,150 million riels to 18,955 million riels from 2004 to 2005, and it is estimated to reach 21,220 million riels in 2006. Excise Tax collection also increased during this period.

Since the total domestic tax revenue was 481,168 and 634,348 million riels in 2004 and 2005, respectively, the tobacco industry contributed only 3.4% and 3.0% to this revenue, respectively.

The total central domestic tax collection was 406,068 and 558,311 million riels in 2004 and 2005, respectively. The total contribution of the tobacco industry to the central domestic revenue in those years was 11,408 and 12,751 million riels. That means that the tobacco industry contributed only 2.8% and 2.3% to the central domestic revenue in 2004 and 2005, respectively.

As shown in Table 3, the total excise tax collected on domestic production was 49,026 and 60,437 million riels in 2004 and 2005, respectively. In these two years, the tobacco industry contributed revenue just 12.7% and 11.2% in the domestic excise tax revenue, respectively.

Looking at the local tax revenue, the industry contributed 4,742 in 2004 and 6,204 million riels in 2005. This represents 6.3% and 8.2% of the local revenue in those two years.

To summarize, the relative role of the tobacco industry in the domestic tax collection has decreased from 2004 to 2005, with the exception of the local tax revenue, which plays a minor role in the total domestic tax revenue. The overall contribution of the tobacco industry to the total domestic tax revenue is very small: it represents only about 3% of the total domestic tax revenue.

Unfortunately, data on the share of tobacco import taxes in the total tax revenue from import is not available. While interesting from the point of income generation, this information has lower relevance for the tobacco control in Cambodia since the majority of imported cigarettes are not consumed by local consumers.

4.3 Tobacco Taxes

Excise Tax in Cambodia (called "Specific Tax on Certain Merchandise and Services") was introduced in 1985, with a tax rate of 50% for alcohol, cigarettes and tobacco. This tax was reduced in 1995 to 20% for oil and petroleum products and 10% for cigarettes. In 1997, the Finance Act of 1994 and the Finance Act of 1995 were amended to introduce the new excise tax rates of 30%, 20%, 10%, and 2%. The 10% rate applied to all types of beverages and tobacco products. Tobacco taxation system in Cambodia is controlled by two authorities: the Custom and Excise Department and the Tax Department, both under the Ministry of Economy and Finance. The Custom and Excise Department is responsible for the collection of import and export duties and excise tax on imported cigarettes. The Tax Department is responsible for the collection of domestic excise taxes. Excise tax is a part of the central government revenue.

Tobacco manufacturers in Cambodia are subject to various types of taxes: import taxes, excise/specific taxes on import and domestic production, VAT, PLT, Salary taxes, Profit Tax, Stamp tax and Turnover tax. The following Table 5 summarizes tax rates and tax bases for both importers and exporters as well as for domestic producers. For locally produced cigarettes, the retail price equals ex-factory price plus excise tax plus value added tax plus PLT. So, the final tax incidence is 24.6% of the ex-factory price (cumulatively adding 10% + 10% + 3%), but only 19.8% of the retail price[24]. For imported cigarettes, the purchase price equals the sum of CIF price, import tariff, VAT, excise tax, and the PLT tax if consumed in the country. That means that imported cigarettes are subject to 33.4% tax rate based on the percentage of CIF (cumulatively adding 7% + 10% + 10% + 3%), but only up to 25.0% of the retail price. Compared to other countries in the region, Cambodia has the lowest tobacco tax share in average retail price: in Bangladesh, Indonesia, Malaysia, Vietnam, and China the tax represents between 30% to 38% of retail price, in the Philippines about 62%, and in Thailand 79% of retail price[25].

[24] In fact, the tax as % of retail price would be even lower, since this calculation does not include the retail margin.

[25] G. Emmanuel, Anne-Marie P., and D. Boisclair: "Higher Tobacco Prices and Taxes in Southeast Asia. *An Effective Tool to Reduce Tobacco Use, Save Lives and Generate Revenue".* Health, Nutrition and Population (HNP) Discussion Paper.

Table 5: Summary of Tax Rates and Tax Bases

Type of Taxes	Tax Rates	Tax Bases
Import Duty	7%, 15%, 35%	CIF (Cost + Insurance + Freight)
Export Duty	0%	
Excise Tax on Import	10%	CIF, including import duty.
Excise Tax on Domestic Products	10%	Ex-Factory Price
Value Added Tax	10%	CIF + import duty + Excise Tax for imports; Ex-Factory Price + Excise Tax for domestic
Public Lighting Tax (PLT)	3%	Invoice value including all taxes, except VAT.
Tax on Profits	0% - 20%	Progressive
Tax on Salary	0% - 20%	Progressive
Turnover Tax	2%	Only companies in Estimated regime pay this tax, because they do not pay VAT and profit tax.
Stamp Tax	4,2 riels per stamp	

Source: Ministry of Economy and Finance, 2006.

Note: Import duties are 15% for leaves raw materials, 7% for cigarettes, and 35% for cigars.

In order to improve excise tax collection, the Ministry of Economy and Finance (MEF) issued PRAKAS No.515/MEF on 27 July 2001 that introduced Tax Stamps on all imported and domestic tobacco products sold on the domestic market. According to this regulation, the Tax Stamps (Banderoles) are affixed to a cigarette pack as they leave the manufacturer or are released by the importer to the domestic distribution. The tax stamp covers two or three surfaces of a cigarette pack. All importers and local manufactures should be registered with the Tax Department of MEF who has the only authority to print the stamps. The price on the stamp is set by MEF and each stamp costs 4.2 riel (this rate was set in 2001 and has not changed since). This price is determined by the cost of production for these stamps. Both the Custom and Excise Department and the Tax Department manage and sell tax stamps.

Currently, there are two Tax Regimes in Cambodia: the Real Tax Regime (Self-Assessment System) and the Estimated Tax Regime. The choice of regime is based on the classification of enterprises, the form of the business, the type of business activity, and the level of turnover. Most cigarette importers and manufacturers are subjected to the Real Tax Regime, meaning they are subject to all tobacco taxes in Cambodia (excise tax, profit tax, salary tax, VAT, PLT, stamp tax). However, hand-rolled cigarette producers are subjected to the Estimated Tax Regime, therefore they do not pay VAT and profit tax, but are subject to tobacco excise tax, 2% turnover tax and PLT. It is easy for the hand-rolled manufacturers to escape both excise tax and PLT.

According to the law, all cigarettes sold in the market, including hand rolled, should affix the stamps to the cigarette packs. However, most of the hand rolled cigarettes do not display a tax stamp. It means that the majority of hand rolled cigarette manufacturers do not pay the excise or other tobacco taxes. They pay only turnover tax based on the

Estimated Tax Regime. This situation results in a significant loss of potential revenue for the government. If machine-made hand rolled cigarettes (about 80% of the hand rolled market) were subject to the Real Tax Regime, the total government revenue, according to BAT, would increase by US$1.3 million[26]. Our calculation shows that taxing machine-made hand-rolled cigarettes would bring US$712,800 to the state budget per year in the form of excise tax (see Appendix 3 for details). Taxing hand rolled cigarettes would not only increase tax collection, it would also decrease the consumption of tobacco due to a price increase on the hand rolled cigarettes.

Cigarette importers and manufacturers have the responsibility to pay taxes to the government. Introducing licensing for the tobacco companies and distributors of cigarettes in Cambodia would improve the government's control over the tobacco industry to assure that it complies with the law and pays proper taxes.

[26] BAT report, 2003.

5. ANALYSIS OF THE IMPACT OF TAX INCREASE

5.1 Research Objective and Hypothesis

Excise taxes are intended to discourage the consumption of a specific commodity. In most countries in the world, the governments impose these taxes on tobacco products to reduce tobacco use.

This chapter has two specific objectives:

1) To develop evidence on the relationship between tobacco tax and tobacco consumption in Cambodia.
2) To estimate the impact of a tobacco tax increase on tobacco consumption and tax revenue in Cambodia.

The result of this analysis will provide important information for the Royal Government of Cambodia, primarily for the Ministry of Economy and Finance and the Ministry of Health, so that they can propose the best policies to improve the health of the people of Cambodia and to increase government tax revenue.

Our research hypothesis is that higher tobacco excise tax rates will reduce tobacco consumption and increase government revenue. Government revenue can be further increased if the tax collection method is improved and if hand rolled cigarettes are also taxed.

We assume that the level of tobacco smuggling will not change as a result of a tax increase. There can be some substitution from manufactured cigarettes to hand rolled cigarettes if taxes on hand rolled cigarettes continue to stay low.

5.2 Methodology

We applied a standard economic theory to calculate the changes in tobacco consumption and government revenue after an increase in tobacco excise tax in Cambodia.

We used secondary data on tobacco sales and inflation rate, as well as data from 1999 and 2004 national surveys on cigarette brand choices and cigarette prices.

Macro-economic indicators for Cambodia were obtained from the July 2006 report[27] issued by the International Monetary Fund. Because excise tax in Cambodia is applied ad valorem, the tax collected is automatically adjusted for inflation. On average, inflation rate in Cambodia is 5%. However, the tobacco prices have been constant between 2004 and 2006 based on the 2004 survey and the 2006 small price survey in Phnom Penh. This means that the real prices of tobacco in Cambodia are declining.

Our calculation shows changes in retail price of the most popular local brand, ARA, as well as changes in consumption as a result of a tax increase. It also demonstrates how much of additional income the government will gain each year in nominal terms after an increase in the excise tax and strengthening of the tax administration.

[27] International Monetary Fund 's report, July 2006.

We will express the level of tax using the international standard that expresses tax as a percentage of retail price. In Cambodia, the tax law stipulates the tax level as percentage of value on which tax is levied (ex-factory price). Since this value is not a retail price, we first calculated the tax as a percentage of retail price.

We assume that the average price of a pack of cigarette in Cambodia is equal to the price of the most popular brand ARA, and that the price of this brand is not going to change in nominal terms in 2007. ARA brand cost 1200 riel per pack in 2006.

Many studies have examined the effects of taxes and prices on cigarette demand using standard economic models and various econometric methods. Some countries have used aggregate time-series data for a single geographical unit, while others have employed pooled cross-sectional time series data; and others have used individual level data from surveys. Most of the price elasticity estimates fall within the relatively narrow range from -0.3 to -0.5. In Southeast Asia, Thailand exhibits cigarette demand price elasticity of -0.4[28], Malaysia -0.5[29], and Vietnam has an estimated price elasticity of between -0.53 to -1.18[30]. The Word Bank estimates the regional price elasticity at -0.7[31]. We will rely on these international estimates of price elasticity in our calculation since similar estimate is not yet available in Cambodia. This approach can be justified by the assumption that the people living in Southeast Asia may have similar preferences with respect to consumption of cigarettes and other products. In this study we will use 3 price elasticity estimates: -0.2, -0.4, and -0.6. This will allow us to present our results under 3 different scenarios for each proposed tax increase. We can reexamine these results in the future when we obtain the exact price elasticity estimates for Cambodia, but we are confident that the range of our estimates reflect the current market conditions in Cambodia.

We will calculate the impact of excise tax increase on domestic products only, since the domestic cigarettes have the largest share of the market. The impact of higher excise tax on the consumption of imported cigarettes and on the excise tax revenue from cigarette imports will be a subject of another study.

We propose two public policy options in this paper. The first option is to increase tobacco excise tax from the current 10% to 20%; the second option is to increase this tax from 10% to 30% of ex-factory price. We will use data from Table 4 in the previous section to calculate the increase in tax revenue in 2007 based on the actual tax revenue in 2005, and the unrealized tax collection in 2005 and 2006 due to keeping the tax on the current level. We will assume that the consumption of cigarette increases by 5% a year. This assumption is based on the comparison of the actual tax collection in 2005 and the estimate of tax collection in 2006, because the tax collection is a proxy measure of cigarette consumption.

[28] Isra Sarntisart. et al., 2003, The Economics of tobacco in Thailand.
[29] Hana Ross, Nabilla A M Al-Sadat: "Demand Analysis of Tobacco in Malaysia", 2006, Nicotine and Tobacco Research Journal and Southeast Asia Tobacco Control Alliance monograph publication.
[30] Hoang V. K., Hana R., et al., 2006, "The Case of a High and Uniform Tabacco Tax in Vietnam", Southeast Asia Tobacco Control Alliance monograph publication.
[31] G. Emmanuel Guindon, Anne-Marie P., and D. Boisclair, 2003, "Higher Tobacco Prices and Tax in Southeast Asia.

In addition to the calculation of the impact of higher tax on the tax collection and tobacco consumption, we also compare taxed cigarette consumption with the estimate of actual cigarette consumption provided by BAT and with the estimate based on the 2004 NIS household survey. We calculated the amount of taxes that could be collected based on these alternative estimates of cigarette consumption.

5.3 Calculation and Interpretation

For all scenarios, we apply the same formulas and steps. There are six steps in each calculation. First step is to calculate excise tax as the percentage of retail price. Second step is to calculate the new tax after a tax increase from 10% to 20% and from 10% to 30%. Third step is to calculate the change in price after a tax increase. The fourth step computes expected percentage decline in cigarette consumption after a tax increase by using price elasticity estimates of -0.2, -0.4, and -0.6. Fifth step computes new tobacco consumption after a tax increase. Finally, the sixth step estimates the impact of the new tax on potential revenues in 2005, 2006, and 2007. This is the amount of revenue the government could have received with the increased excise tax as opposed to the actual revenue collected. The complete list of formulas for calculation is listed in Appendix 1 and 2. Table 6 lists symbols and parameters used in the calculation. We assume that the average retail price of cigarettes (ARA) is constant at 1200 riels per pack from 2005 to 2007.

Table 6: Parameters

Parameters	Symbols	Value
Average Retail Price	P_{AR}	1200 riel
Excise Tax (as ex-factory tax)	t_1	10%
Propose New excise Tax	T_2 and t_3	20% and 30%
Price Elasticity	H	-0.2, -0.4, and -0.6
Total Tax Revenue in 2005	TR_{2005}	6,752 M riels
Estimated Tax Revenue in 2006	TR_{2006}	7,095 M riels
Estimated Tax Revenue in 2007[32]	TR_{2007}	7,450 M riels

Note: M = million

Other symbols such as P_{EX}, t_N, t_F, M_C, $P_{20\%}$, $P_{30\%}$, ▲, and C_E will also be used in our calculations and each symbol has the following meaning:

P_{EX} is ex-factory price;
t_N is new tax;
t_F is tax as a percentage of final retail price;
$t_{10\%}$ is the current tax per pack in riel;
$t_{20\%}$ is tax per pack in Riel after tax increased to t_2;
$t_{30\%}$ is tax per pack in Riel after tax increased to t_3;
Mc is the number of cigarette packs taxed per year (is it equal to total tax revenue divided by tax per pack);

[32] We assume that the excise tax collection will increase by 5%, even without a tax rate increase.

$P_{20\%}$ is new price after tax has proposed to increase to 20% of $P_{EX;}$
$P_{30\%}$ is new price after tax has proposed to increase to 30% of $P_{EX;}$
▲ is the percentage changes in prices or quantities;
C_E is the expected change in consumption of cigarettes after a price change.

Scenario 1: Assuming the price elasticity is -0.2; considering an excise tax rate increase from 10% to 20% or from 10% to 30%.
First step – calculate excise tax as the percentage of retail price.

- Convert the ex-factory tax to tax as the percentage of retail price:
  $t_F = t/(1+t) = 0.1/(1+0.1) = 0.09$ or 9%;
- Calculate the current tax in riels per pack:
  $t_{10\%} = P_{AR} * t_F = 1200$ riels * 9% = (1200*9)/100 = 108 riels;
- Ex-Factory price:
  $P_{EX} = P_{AR} - t_{10\%} = 1200$ riels - 108 riels = 1092 riels ;

Second step – calculate the new tax after a tax increase from 10% to 20%, or from 10% to 30%.

- Calculate new tax per pack:
  $t_{20\%} = P_{EX} * t_2 = 1092$ riels * 20% = (1092) * (0.2) = 218.4 riels;
  $t_{30\%} = P_{EX} * t_3 = 1092$ riels * 30% = (1092) * (0.3) = 327.6 riels;
- This is increase in tax by
  110.4 riels = 218.4 riels - 108 riels; or (110.4)/(108) = 1.02 or 102%;
  219.6 riels = 327.6 riels - 108 riels; or (219.6)/(108) = 2.03 or 203%;

Third step – calculate the change in price after tax increase.

- New Price after tax increase:
  $P_{20\%} = P_{EX} + t_2 = (1092 + 218.4) = 1310.4$ riels;
  $P_{30\%} = P_{EX} + t_3 = (1092 + 327.6) = 1419.6$ riels;
- Increase in price:
  (1310.4 riels - 1200 riels) = 110.4 riels; and
  (1419.6 riels - 1200 riels) = 219.6 riels;
- Percentage change in price:
  (110.4)/(1200) = 0.092 = 9.2%; and
  (219.6)/(1200) = 0.183 = 18.3%;

Fourth step – compute expect % change in consumption of tobacco by using price elasticity estimates: -0.2.

- Expected decline in consumption of tobacco:
  - At price increase by 9.2% → $C_E = ▲P * \eta = (9.2) * (0.2) = 1.84\%$;
  - We expect consumption of tobacco will decrease by 1.84%.
  - At price increase by 18.3% → $C_E = ▲P * \eta = (18.3) * (0.2) = 3.66\%$;
  - We expect consumption of tobacco will decrease by 3.66%.

Fifth step - Compute total tobacco consumption after a tax increase

- Number of Cigarettes in Packs that are taxed:

- For year 2005, TR_{2005} = 6,752 M riels
  $M_C = TR_{2005}/ t_R$ = (6,752 M riels)/(108 tax per pack) = 62.5 M packs;
  - A decrease in consumption by 1.84%, means
    (62.5M)/(100*1.84) = 1.15 M packs;
    New consumption after tax increase:
    (62.5 M - 1.15 M) = 61.35 M packs;
  - A decrease in consumption by 3.66%, means
    (62.5M)/(100*3.66) = 2.29 M packs;
    New consumption after tax increase:
    (62.5 M - 2.29 M) = 60.21 M packs;
- For year 2006, TR_{2006} = 7,095 M riels
  $M_C = TR_{2006}/ t_R$ = (7,095 M riels)/(108 tax per pack) = 65.7 M packs;
  - A decrease in consumption by 1.84%, means
    (65.7M)/(100*1.84) = 1.21 M packs;
    New consumption after tax increase:
    (65.7 M - 1.21 M) = 64.49 M packs;
  - A decrease in consumption by 3.66%, means
    (65.7M)/(100*3.66) = 2.41 M packs;
    New consumption after tax increase:
    (65.7 M - 2.41 M) = 63.29 M packs;
- For year 2007, TR_{2007} = 7,450 M riels
  $M_C = TR_{2007}/ t_R$ = (7,450 M riels)/(108 tax per pack) = 69 M packs;
  - A decrease in consumption by 1.84%, means
    (69M)/(100*1.84) = 1.27 M packs;
    New consumption after tax increase:
    (69M - 1.27 M) = 67.73 M packs;
  - A decrease in consumption by 3.66%, means
    (69M)/(100*3.66) = 2.53 M packs;
    New consumption after tax increase:
    (69 M - 2.53 M) = 66.47 M packs;

Sixth step – estimate the impact on new tax revenue.

New Tax Revenue collection:

- Year 2005, TR_{2005} = 6,752 M riels, $t_{10\%}$ = 108 riels, $t_{20\%}$ = 218.4 riels:
  $TR_N = CN * t_N$ = (61.35 M packs) * (218.4 riels) = 13,399 M riels;
  Increase in tax collection by 6,647 M riels = 13,399M riels - 6,752M riels.
  - At $t_{30\%}$ = 327.6 riels:

  $TR_N = CN * t_N$ = (60.21 M packs) * (327.6 riels) = 19,725 M riels;
  Increase in tax collection by 12,973M riels = 19,725M riels - 6,752M riels.
- Year 2006, TR_{2006} = 7,095 M riels, $t_{20\%}$ = 218.4 riels:
  $TR_N = CN * t_N$ = (64.49 M packs) * (218.4 riels) = 14,085 M riels;
  Increase in tax collection by 69,90M riels = 14,085M riels - 7,095M riels.
  - At $t_{30\%}$ = 327.6 riels:

  $TR_N = CN * t_N$ = (63.29 M packs) * (327.6 riels) = 20,734 M riels;
  Increase in tax collection by 13,639M riels = 20,734M riels - 7,095M riels.
- Year 2007, TR_{2007} = 7,450 M riels, $t_{20\%}$ = 218.4 riels:

$TR_N = CN * t_N$ = (67.73M packs) * (218.4 riels) = 14,792 M riels;
Increase in tax collection by 7,342 M riels = 14,792 M riels-7,450 M riels.

- At $t_{30\%}$ = 327.6 riels:

$TR_N = CN * t_N$ = (66.47 M packs) * (327.6 riels) = 21,776 M riels;
Increase in tax collection by 14,326 M riels = 21,776M riels-7,450M riels.

Scenario 2: Assuming the price elasticity is -0.4; considering an excise tax rate increase from 10% to 20% or from 10% to 30%.

Steps 1-3 similar to Scenario 1.

Fourth step – compute expect % change in consumption of tobacco by using price elasticity estimates: -0.4.

- Expected declining in consumption of tobacco:
  - At price increase by 9.2% → $C_E = \blacktriangle P * \eta$ = (9.2) * (0.4) = 3.7%;
  - We expect consumption of tobacco will decrease by 3.7%.
  - At price increase by 18.3% → $C_E = \blacktriangle P * \eta$ = (18.3) * (0.4) = 7.32%;
  - We expect consumption of tobacco will decrease by 7.32%.

Fifth step - Compute total tobacco consumption after a tax increase.

- Number of Cigarettes in Packs that are taxed:
- For year 2005, TR_{2005} = 6,752 M riels
  $M_C = TR_{2005}/ t_R$ = (6,752 M riels)/(108 tax per pack) = 62.5 M packs;
  - A decrease in consumption by 3.7%, means
    (62.5M)/(100*3.7) = 2.31 M packs;
    New consumption after tax increase:
    (62.5 M - 2.31 M) = 60.19 M packs;
  - A decrease in consumption by 7.32%, means
    (62.5M)/(100*7.32) = 4.58 M packs;
    New consumption after tax increase:
    (62.5 M - 4.58 M) = 57.92 M packs;
- For year 2006, TR_{2006} = 7,095 M riels
  $M_C = TR_{2006}/ t_R$ = (7,095 M riels)/(108 tax per pack) = 65.7 M packs;
  - A decrease in consumption by 3.7%, means
    (65.7M)/(100*3.7) = 2.43 M packs;
    New consumption after tax increase:
    (65.7 M - 2.43 M) = 63.27 M packs;
  - A decrease in consumption by 7.32%, means
    (65.7M)/(100*7.32) = 4.81 M packs;
    New consumption after tax increase:
    (65.7 M - 4.81 M) = 60.89 M packs;
- For year 2007, TR_{2007} = 7,450 M riels
  $M_C = TR_{2007}/ t_R$ = (7,450 M riels)/(108 tax per pack) = 69 M packs;
  - A decrease in consumption by 3.7%, means
    (69M)/(100*3.7) = 2.55 M packs;
    New consumption after tax increase:
    (69 M - 2.55 M) = 66.45 M packs;

- A decrease in consumption by 7.32%, means
  (69M)/(100*7.32) = 5.05 M packs;
  New consumption after tax increase:
  (69 M - 5.05 M) = 63.95 M packs;

Sixth step – estimate the impact on new tax revenue.

New Tax Revenue collection:

- Year 2005, TR_{2005} = 6,752 M riels, $t_{10\%}$ = 108 riels, $t_{20\%}$ = 218.4 riels:
  $TR_N = CN * t_N$ = (60.19 M packs) * (218.4 riels) = 13,146 M riels;
  Increase in tax collection by 6,394 M riels = 13,146M riels - 6,752M riels.
  - At $t_{30\%}$ = 327.6 riels:

  $TR_N = CN * t_N$ = (57.92 M packs) * (327.6 riels) = 18,975 M riels;
  Increase in tax collection by 12,223M riels = 18,975M riels - 6,752M riels.
- Year 2006, TR_{2006} = 7,095 M riels, at $t_{20\%}$ = 218.4 riels:
  $TR_N = CN * t_N$ = (63.27 M packs) * (218.4 riels) = 13,818 M riels;
  Increase in tax collection by 6,723M riels = 13,818M riels - 7,095M riels.
  - At $t_{30\%}$ = 327.6 riels:

  $TR_N = CN * t_N$ = (60.89 M packs) * (327.6 riels) = 19,948 M riels;
  Increase in tax collection by 12,853M riels = 19,948M riels - 7,095M riels.
- Year 2007, TR_{2007} = 7,450 M riels, at $t_{20\%}$ = 218.4 riels:
  $TR_N = CN * t_N$ = (66.45 M packs) * (218.4 riels) = 14,513 M riels;
  Increase in tax collection by 7,063 M riels = 14,513 M riels - 7,450M riels.
  - At $t_{30\%}$ = 327.6 riels:

  $TR_N = CN * t_N$ = (63.95 M packs) * (327.6 riels) = 20,950 M riels;
  Increase in tax collection by 13,500 M riels = 20,950M riels-7,450M riels.

Scenario 3: Assuming the price elasticity is -0.6; considering an excise tax rate increase from 10% to 20% or from 10% to 30%.

Steps 1-3 similar to Scenario 1.

Fourth step – compute expect % change in consumption of tobacco by using price elasticity estimates: -0.6.

- Expected decline in consumption of tobacco:
  - At price increase by 9.2% → $C_E = \blacktriangle P * \eta$ = (9.2) * (0.6) = 5.52%;
  - We expect consumption of tobacco will decrease by 5.52%.
  - At price increase by 18.3% → $C_E = \blacktriangle P * \eta$ = (18.3) * (0.6) = 10.98%;
  - We expect consumption of tobacco will decrease by 10.98%.

Fifth step - Compute total tobacco consumption after a tax increase.

- Number of Cigarettes in Packs that are taxed:
- For year 2005, TR_{2005} = 6,752 M riels
  $M_C = TR_{2005}/ t_R$ = (6,752 M riels)/(108 tax per pack) = 62.5 M packs;
  - A decrease in consumption by 5.52%, means
    (62.5M)/(100*5.52) = 3.45 M packs;
    New consumption after tax increase:

(62.5 M - 3.45 M) = 59.05 M packs;

- A decrease in consumption by 10.98%, means
  (62.5M)/(100*10.98) = 6.86 M packs;
  New consumption after tax increase:
  (62.5 M - 6.86 M) = 55.64 M packs;

- For year 2006, TR_{2006} = 7,095 M riels
  $M_C = TR_{2006}/ t_R$ = (7,095 M riels)/(108 tax per pack) = 65.7 M packs;
  - A decrease in consumption by 5.52%, means
    (65.7M)/(100*5.52) = 3.63 M packs;
    New consumption after tax increase:
    (65.7 M - 3.63 M) = 62.07 M packs;
  - A decrease in consumption by 10.98%, means
    (65.7M)/(100*10.98) = 7.21 M packs;
    New consumption after tax increase:
    (65.7 M - 7.21 M) = 58.49 M packs;
- For year 2007, TR_{2007} = 7,450 M riels
  $M_C = TR_{2007}/ t_R$ = (7,450 M riels)/(108 tax per pack) = 69 M packs;
  - A decrease in consumption by 5.52%, means
    (69M)/(100*5.52) = 3.81 M packs;
    New consumption after tax increase:
    (69 M - 3.81 M) = 65.19 M packs;
  - A decrease in consumption by 10.98%, means
    (69M)/(100*10.98) = 7.58 M packs;
    New consumption after tax increase:
    (69 M - 7.58 M) = 61.42 M packs;

Sixth step – estimate the impact on new tax revenue.

New Tax Revenue collection:

- Year 2005, TR_{2005} = 6,752 M riels, $t_{10\%}$ = 108 riels, $t_{20\%}$ = 218.4 riels:
  $TR_N = CN * t_N$ = (59.05 M packs) * (218.4 riels) = 12,897 M riels;
  Increase in tax collection by 6,145 M riels = 12,897M riels - 6,752M riels.
  - At $t_{30\%}$ = 327.6 riels:

  $TR_N = CN * t_N$ = (55.64 M packs) * (327.6 riels) = 18,228 M riels;
  Increase in tax collection by 11,476M riels = 18,228M riels - 6,752M riels.
- Year 2006, TR_{2006} = 7,095 M riels, at $t_{20\%}$ = 218.4 riels:
  $TR_N = CN * t_N$ = (62.07 M packs) * (218.4 riels) = 13,556 M riels;
  Increase in tax collection by 6,461M riels = 13,556M riels - 7,095M riels.
  - At $t_{30\%}$ = 327.6 riels:

  $TR_N = CN * t_N$ = (58.49 M packs) * (327.6 riels) = 19,161 M riels;
  Increase in tax collection by 12,066M riels = 19,161M riels - 7,095M riels.
- Year 2007, TR_{2007} = 7,450 M riels, at $t_{20\%}$ = 218.4 riels:
  $TR_N = CN * t_N$ = (65.19 M packs) * (218.4 riels) = 14,238 M riels;
  Increase in tax collection by 6,788M riels = 14,238 M riels - 7,450 M riels.
  - At $t_{30\%}$ = 327.6 riels:

  $TR_N = CN * t_N$ = (61.42 M packs) * (327.6 riels) = 20,121 M riels;
  Increase in tax collection by 12,671 M riels = 20,121M riels-7,450M riels.

Table 7 summarizes the results of our calculation. The cigarette consumption decreased in all of the cases. At the same time, the government's tax revenues increased when excise tax rates were raised.

Table 7: Summary of Results

	η	2005				2006				2007			
		Consumption Reduction (in million packs)		**Revenue Increase (in million Riels)**		**Consumption Reduction (in million packs)**		**Revenue Increase (in million Riels)**		**Consumption Reduction (in million packs)**		**Revenue Increase (in million Riels)**	
		20%	30%	20%	30%	20%	30%	20%	30%	20%	30%	20%	30%
Scenario 1	η= -0.2	1.15 or 1.84%	2.29 or 3.66%	6,647	12,973	1.21 or 1.84%	2.41 or 3.66%	6,990	13,639	1.27 or 1.84%	2.53 or 3.66%	7,342	14,326
Scenario 2	η= -0.4	2.31 or 3.7%	4.58 or 7.32%	6,394	12,223	2.43 or 3.7%	4.81 or 7.32%	6,723	12,853	2.55 or 3.7%	5.05 or 7.32%	7,063	13,500
Scenario 3	η= -0.6	3.45 or 5.52%	6.86 or 10.98%	6,145	11,476	3.63 or 5.52%	7.21 or 10.98%	6,461	12,066	3.81 or 5.52%	7.58 or 10.98%	6,788	12,671

Scenario 1:

- In 2005, assuming the price elasticity (η = -0.2) and the excise tax rate increased to 20% and 30% (from 10%), cigarette consumption would have decreased by 1.84% or 3.66%, respectively. The amount of cigarettes consumed would have been reduced by 1.15 million or 2.29 million packs, respectively. The cigarette tax revenue would have increased by 6,647 million riels when cigarette consumption decreased by 1.84% (20% tax rate). The cigarette tax revenue would have increased by 12,973 million riels when cigarette consumption decreased by 3.66% (30% tax rate).

- In 2006, assuming the price elasticity (η = -0.2) and the excise tax rate increased to 20% and 30% (from 10%), cigarette consumption would have decreased by 1.84% or 3.66% respectively. The amount of cigarettes consumed would have been reduced by 1.21 million or 2.41 million packs, respectively. The cigarette tax revenue would have increased by 6,990 million riels when cigarette consumption decreased by 1.84% (20% tax rate). The cigarette tax revenue would have increased by 13,639 million riels when cigarette consumption decreased by 3.66% (30% tax rate).

- In 2007, assuming the price elasticity (η = -0.2), and excise tax rate were to increase to 20% and 30% (from 10%), cigarette consumption would be expected to decrease by 1.84% or 3.66% respectively. The amount of cigarettes consumed would be reduced by 1.27 million or 2.53 million packs, respectively. The cigarette tax revenue would be expected to increase by 7,342 million riels when cigarette consumption decreases by 1.84% (20% tax rate). The cigarette tax revenue would be expected to increase by 14,326 million riels when cigarette consumption decreases by 3.66% (30% tax rate).

Scenario 2:

- In 2005, assuming the price elasticity (η = -0.4), and the excise tax rate increased to 20% and 30% (from 10%), cigarette consumption would have decreased by 3.7% or 7.32% respectively. The amount of cigarettes consumed would have been reduced by 2.31 million or 4.58 million packs, respectively. The cigarette tax revenue would have increased by 6,394 million riels when cigarette consumption decreased by 3.7% (20% tax rate). The cigarette tax revenue would have increased by 12,223 million riels when cigarette consumption decreased by 7.32% (30% tax rate).

- In 2006, assuming the price elasticity (η = -0.4), and the excise tax rate increased to 20% and 30% (from 10%), cigarette consumption would have decreased by 3.7% or 7.32% respectively. The amount of cigarettes consumed would have been reduced by 2.43 million or 4.81 million packs, respectively. The cigarette tax revenue would have increased by 6,723 million riels when cigarette consumption decreased by 3.7% (20% tax rate). The cigarette tax revenue would have increased by 12,853 million riels when cigarette consumption decreased by 7.32% (30% tax rate).

- In 2007, assuming the price elasticity (η = -0.4), and the excise tax rate were to increase to 20% and 30% (from 10%), cigarette consumption would be expected to decrease by 3.7% or 7.32% respectively. The amount of cigarettes consumed would be reduced by 2.55 million or 5.05 million packs, respectively. The cigarette tax revenue would be expected to increase by 7,063 million riels when cigarette consumption decreases by 3.7% (20% tax rate). The cigarette tax revenue would be expected to increase by 13,500 million riels when cigarette consumption decreases by 7.32% (30% tax rate).

Scenario 3:

- In 2005, assuming the price elasticity ($\eta = -0.6$), and the excise tax rate increased to 20% and 30% (from 10%), cigarette consumption would have decreased by 5.52% or 10.98% respectively. The amount of cigarettes consumed would have been reduced by 3.45 million or 6.86 million packs, respectively. The cigarette tax revenue would have increased by 6,145 million riels when cigarette consumption decreased by 5.52% (20% tax rate). The cigarette tax revenue would have increased by 11,476 million riels when cigarette consumption decreased by 10.98% (30% tax rate).

- In 2006, assuming the price elasticity ($\eta = -0.6$), and the excise tax rate increased to 20% and 30% (from 10%), cigarette consumption would have decreased by 5.52% or 10.98% respectively. The amount of cigarettes consumed would have been reduced by 3.63 million or 7.21 million packs, respectively. The cigarette tax revenue would have increased by 6,461 million riels when cigarette consumption decreased by 5.52% (20% tax rate). The cigarette tax revenue would have increased by 12,066 million riels when cigarette consumption decreased by 10.98% (30% tax rate).

- In 2007, assuming the price elasticity ($\eta = -0.6$), and the excise tax rate were to increase to 20% and 30% (from 10%), cigarette consumption would be expected to decrease by 5.52% or 10.98% respectively. The amount of cigarettes consumed would be reduced by 3.81 million or 7.58 million packs, respectively. The cigarette tax revenue would be expected to increase by 6,788 million riels when cigarette consumption decreases by 5.52% (20% tax rate). The cigarette tax revenue would be expected to increase by 12,671 million riels when cigarette consumption decreases by 10.98% (30% tax rate).

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According to the BAT report published in March 2002[33], there were 461.62 million sticks of manufactured cigarettes sold in Cambodia per month in 2002. This is 276.972 million packs of manufactured cigarettes sold per year. Based on the tax collection, we estimated that there were 62.5 million packs sold in Cambodia in 2005, which is 4.4 times less compared to the 2002 BAT estimation. Given that the population surveys in 1999 and 2004 do not indicate any significant change in the smoking prevalence, and the tax revenue from the tobacco industry exhibits an increasing trend, this difference in consumption between 2002 and 2005 cannot be attributed to a change in smoking behavior.

The 2004 report produced by NIS entitled “The Analysis of Smoking Behavior Survey in Cambodia 2004" estimated that there are 2,086,234 smokers in Cambodia. The 2004 survey showed that each smoker consumes about 14 cigarettes per day. This would mean the total consumption of 533 million packs per year in 2004. This number would include purchased manufactured cigarettes, purchased hand rolled cigarettes and home production. BAT estimated that total cigarette consumption in Cambodia was 396 million

[33] BAT report, March 2002.

packs in 2002 (both manufactured and hand-rolled cigarettes)[34]. The difference between the NIS estimate and the BAT estimate may reflect the number of home-made cigarettes intended for home consumption and the number of home-made cigarettes used as barter.

Both the NIS and BAT estimates of the number of cigarette packs consumed in Cambodia per year are substantially higher compared to our estimate of 62.5 million packs, based on tax collection.

We propose two hypotheses to explain the difference in the estimated consumption of cigarettes in Cambodia:

1) Many cigarettes on the market, even those that are manufactured, are not taxed
2) Manufacturers declare artificially low ex-factory price for the purpose of assessment of tax amount. This results in effective tax lower than 9% that we used in our calculations. Using a lower than 9% tax per pack would increase our estimates of the number of cigarettes sold in the market.

The following is the calculation of the excise taxes that could be collected on cigarettes using the BAT and NIS estimates of cigarette consumption in Cambodia.

BAT estimates of 396 million packs per year (both manufactured and hand-rolled cigarettes).combined with excise tax of 108 riels per pack, would result in excise tax collection of 39,852 million riels or US$10.0 million per year[35]. Using the NIS estimates of cigarette consumption of 533 million packs per year and the same excise tax rate of 108 riels per pack, the total amount of excise tax should equal 57,564 million riels or US$14.4 million per year. The official statistics show that the total amount of excise tax collected from local manufacturers was only 6,752 million riels or US$1.7 million in 2005. That means that only 16.9% and 11.7% of the tax collection potential has been realized in 2005 according to the BAT and NIS estimates, respectively.

This calculation shows that there are large loopholes in cigarette collection in Cambodia and that an improvement in the tax collection administration in addition to a cigarette tax increase could lead to a substantial increase in government revenue.

[34] BAT report, March 2002.
[35] Exchange rate is 4000 riels = US$ 1.

6. CONCLUSIONS AND POLICY RECOMMENDATIONS

The results show that cigarette consumption decreases and the government's tax revenue increases after a tax increase in all presented scenarios. We conclude that higher excise tax on tobacco products in Cambodia will improve public health of Cambodian people as well as fulfill the government's commitment to WHO to execute the Framework Convention on Tobacco Control, which calls for adopting effective measures to control tobacco use, including tobacco tax increase.

Tobacco taxation plays an important role in the control of tobacco use. However, we found that the government collected only 11.7% to 16.9% of the potential cigarette tax revenue in 2005. Tobacco taxes should be collected on all cigarettes so that nobody could have an unfair tax advantage. Currently, the unfair advantage is given to those who operate outside the Real Tax regime (hand-rolled cigarettes producers). This has implications for cigarette prices, for government revenue and for public health. If hand-rolled cigarettes continue to be sold without excise taxes, some smokers are likely to switch to hand-rolled tobacco products after a tax increase and the full potential for public health improvement and higher tax collection are not going to be materialized. Therefore, specific/excise tax should be imposed on hand-rolled cigarettes and the tax collection administration should be improved. This will lead to additional reduction in consumption and additional increase in tax revenue above the estimates presented in this paper.

There is concern that an increase in the tax rate will induce more cigarette smuggling. For Cambodia, most imported cigarettes are not consumed locally but are re-exported. Informal reports indicate that cigarettes are being smuggled due to weak tax and custom administrations. If excise tax on imported cigarettes is increased, this can only lead to the reduction of the smuggling problem, because most imported cigarettes are re-exported. The exact impact of a tax change on cigarette imports can be a subject of another study.

In order to protect the health of the Cambodian people, fulfill the government's commitment to WHO to execute the FCTC, and raise more government revenue, we propose that the Royal Government of Cambodia and Cambodian Tax Administration consider these steps that can be taken in two stages:

Stage 1, the short-term public policy goals:

- Increase excise tax rates from 10% to 30% for all cigarettes;
- Subject the hand-rolled cigarette industry to the Real Tax Regime in order to collect tobacco taxes on machine-made hand-rolled cigarettes;
- Impose the same taxes on all cigarettes and require all cigarette packages to carry tax stamps;

Stage 2 in the medium-term public policy goals:

- Introduce a Special Cigarette Industry License that would be required for all importers, manufacturers, hand-rolled producers, distributors, wholesalers, and retailers;

- Require VAT to be paid on all tobacco products sold in Cambodia.

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APPENDIX

Appendix 1

Symbols:

Average Retail Price = P_{AR};
Excise Tax = t_1 (as ex-factory tax);
Ex-Factory Price = P_{EX};
New Tax = t_N;
Tax as Final Price = t_F;
Tax per pack as retail price = t_R ;
Price Elasticity = η;
New Price = P_N;
Percentage Change in Price = $\blacktriangle P$
Expectation of Tobacco Consumption = C_E;
New Consumption = C_N;
New Tax Revenue = TR_N;

Appendix 2

Formulas:

(1). Tax as a percentage of final prices:
$t_F = t/(1+t)$;

(2). Tax per pack as retail price:
$t_R = P_{AR} * t_F$;

(3). Ex-Factory Price:
$P_{EX} = P_{AR} - t_R$;

(4). New Tax per pack:
$t_{N/p} = P_{EX} * t_N$;

(5). New Price after tax increase:
$P_N = P_{EX} + t_N$;

(6). Expect consumption of tobacco:
$C_E = \blacktriangle P * \eta$;

(7). The Amount of Cigarette in Packs has been taxed:
$M_C = TR/ t_R$;

(8). New Tax Revenue:
$TR_N = CN * t_N$;

Appendix 3
Computed excise taxes not collected on hand rolled cigarettes

BAT statistics estimated 118.8M packs of hand-rolled in 2002 (assuming 20 sticks per pack), that is 2,376 million sticks per year. The market price of hand rolled cigarettes US$0.06 per pack in 2004 (appendix 4, table 4.1). Excise tax rate is 10%.

Tax Revenue per unit of output = tP_G ;
Total Tax Revenue = (tP_G) x Q_{2002};
where P_G [36] is price that consumers pay at the market, t is tax rate equals to 10%.
So, tax revenue per unit of output = US$0.06 * 0.10 = US$0.006 per packs;
Total Tax Revenue = US$0.006 * 118,800,000 packs = US$712,800

[36] The proper price to use would be the ex-factory price, but this information was not available to us. Given the low price of hand rolled cigarettes and the fact that they are not levied with taxes, we can expect that the difference between the ex-factory price and the retail price would not be large.

Tables

Table 8: Average Price of 36 Brands of Cigarettes sold in Cambodia in 2004

Cigarette Brands Sold in Cambodia	Average Prices in Riel (Per pack)	Average Prices in US$ (Per pack)
Marlboro	4,392	1.10
555	5,500	1.38
Fine	2,000	0.50
Alain Delon	1,681	0.42
Dunhill	3,500	0.90
Mild Seven	4,000	1.00
Royal	1,500	0.38
Prasat Meas	845	0.21
Hero	2,000	0.50
Embassy	2,000	0.50
ARA	998	0.25
Wave	1,500	0.38
Angkor	634	0.16
Luxury	1,503	0.38
Benthly	1,800	0.45
Wat Phnom	753	0.19
Khmer Tobacco (filter less)	228	0.06
Victory	800	0.20
Variety of tobacco leaves	543	0.14
Hand Rolled Cigarettes	249	0.06
Chewing Tobacco	271	0.07
Long Beach	1,500	0.38
Liberation	483	0.12
London	1,500	0.38
Apsara	751	0.19
West	1,500	0.38
L&M	1,500	0.38
Cambo	490	0.12
Crown	727	0.18
Others	1,202	0.30

Source: Cambodia Socio Economic Survey 2004.

Table 9: Domestic Tax Revenue from 1995 to 2006 (In Million Riels)

Year	Central Revenue (CR)	Local Revenue (LC)	Total Tax Revenue	Percentage to Total Revenue (CR)	(LR)
1995	39,441	8,039	47,480	0.83	0.17
1996	58,924	7,638	66,563	0.89	0.11
1997	103,229	8,745	111,947	0.92	0.08
1998	138,544	13,315	151,859	0.91	0.09
1999	168,157	16,969	185,146	0.91	0.09
2000	241,577	29,015	270,592	0.89	0.11
2001	258,690	34,290	292,980	0.88	0.12
2002	276,924	41,922	318,846	0.87	0.13
2003	345,842	38,962	384,804	0.90	0.10
2004	406,068	75,119	481,168	0.84	0.16
2005	558,311	76,037	634,348	0.88	0.12
2006*	361,283	65,501	426,783	0.85	0.15

Source: Tax Department, Statistic Office, MEF, 2006.

Note: * 6 months beginning of the year 2006.

Table 10: Proportion of Excise Tax to State Revenue from Domestic Production

Year	Central Revenue (In Million Riels)	Excise Tax (In Million Riels)	Proportion of Excise tax to Central Revenue	yearly % increase in excise tax revenue	yearly % increase in cental revenue
1996	58,924	6,848	0.12		
1997	103,229	11,111	0.11	62.25	75.19
1998	138,544	15,881	0.11	42.93	34.21
1999	168,157	15,561	0.09	-2.01	21.37
2000	241,577	18,967	0.08	21.89	43.66
2001	258,690	20,032	0.08	5.62	7.08
2002	276,924	29,165	0.11	45.59	6.38
2003	345,842	33,393	0.10	14.50	24.89
2004	406,068	49,026	0.12	46.82	17.41
2005	558,311	60,437	0.11	23.28	37.49
2006*	361,283	39,845	0.11	-34.07	-35.29

Source: Tax Department, Statistic Office, MEF, 2006.

Note: * 6 months beginning of the year 2006.

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About SEATCA

The Southeast Asia Tobacco Control Alliance (SEATCA) works closely with key partners in ASEAN member countries to generate local evidence through research programs, to enhance local capacity through advocacy fellowship program, and to be catalyst in policy development through regional forums and in-country networking. By adopting a regional policy advocacy mission, it has supported member countries to ratify and implement the WHO Framework Convention on Tobacco Control (FCTC)

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