

The Economics of Tobacco and Tobacco Taxation in Mexico

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“Raising the specific excise tax component to 20 pesos per pack by 2013 would increase total tax inclusive of VAT to 75% of retail price, prevent nearly 1 million deaths, and raise excise tax revenues of over 41 billion pesos.”



Monitor tobacco use and prevention policies

Protect people from tobacco smoke

Offer help to quit tobacco use

Warn about the dangers of tobacco

Enforce bans on tobacco advertising, promotion and sponsorship

Raise taxes on tobacco

ISBN: 978-2-914365-73-4

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Suggested citation: Waters H, Sáenz de Miera B, Ross H, Reynales Shigematsu

LM. The Economics of Tobacco and Tobacco Taxation in Mexico. Paris:

International Union Against Tuberculosis and Lung Disease; 2010.

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Abbreviations

| | | | |
|----------|--|--------|--|
| ARIC: | Rural Collective Interest Association of Tobacco Producers (<i>Asociación Rural de Interés Colectivo de Productores de Tabaco</i>) | GHL: | General Health Law (<i>Ley General de Salud</i>) |
| BAT: | British American Tobacco Mexico | GLTC: | General Law for Tobacco Control (<i>Ley General para el Control del Tabaco</i>) |
| Cigatam: | <i>Cigarros La Tabacalera Mexicana</i> | GYTS: | Global Youth Tobacco Survey |
| CLM: | <i>Cigarrera La Moderna</i> | IMSS: | Institute of Social Security (<i>Instituto Mexicano del Seguro Social</i>) |
| ENA: | National Addictions Survey (<i>Encuesta Nacional de Adicciones</i>) | INEGI: | National Institute for Statistics and Geography (<i>Instituto Nacional de Estadística y Geografía</i>) |
| ENIGH: | National Survey of Household Income and Expenditures (<i>Encuesta Nacional de Ingresos y Gastos de los Hogares</i>) | ISR: | Income Tax (<i>Impuesto Sobre la Renta</i>) |
| ENSA: | National Health Survey (<i>Encuesta Nacional de Salud</i>) | JTI: | Japan Tobacco International |
| ENSANut: | National Health and Nutritional Survey (<i>Encuesta Nacional de Salud y Nutrición</i>) | NAFTA: | North America Free Trade Agreement |
| FCTC: | Framework Convention on Tobacco Control | PM: | Philip Morris |
| GDP: | Gross Domestic Product | SHS: | Secondhand smoke |
| | | STPS: | Special Tax on Production and Services (<i>Impuesto Especial sobre Producción y Servicios</i>) |
| | | VAT: | Value added tax |

Executive Summary

On May 28, 2004 Mexico became the first country in the Americas to ratify the World Health Organization Framework Convention on Tobacco Control (FCTC). While Mexico has made substantial progress on tobacco control, cigarettes and other tobacco products remain affordable in comparison to many other countries. This paper provides a comprehensive analysis of the tobacco market in Mexico and the viability of using taxation as a strategy to limit smoking, save lives, and raise tax revenues.

Smoking Prevalence and Consumption

Tobacco use in Mexico is more concentrated in urban areas, with an estimated urban prevalence of 20.4% among those aged 12 to 65 (29.9% for males and 11.8% for females). Smoking prevalence is considerably higher for men than for women — in urban areas men are over 2.5 times more likely than women to smoke, and in rural areas men are nearly 7 times more likely to smoke than women.

Smoking rates for adolescents are alarmingly high — ranging by region from 13% to 28% in 2006. Smokers in Mexico begin smoking young; the average age of smoking initiation has declined, from 20.6 years among those born in 1930 to 16.6 years among those born in 1975-1978. The Global Youth Tobacco Survey (GYTS) found that between 8 to 15% of students in Mexico have tried cigarettes before the age of 13.

Health Burden of Tobacco in Mexico

Estimates of premature mortality attributable to smoking show that tobacco consumption is responsible for 25,000 to 60,000 deaths each year in

Mexico. Further, nearly 11 million Mexicans who have never smoked (25.5% of men and 22% of women) are exposed to secondhand smoke.

The total healthcare expenditures associated with smoking in Mexico were estimated to be 75.2 billion pesos (US\$ 5.7 billion)* in 2008.

Tobacco Industry Structure and Employment

The Mexican cigarette industry is dominated by two companies, *Cigarros La Tabacalera Mexicana* (Cigatam), which is associated with Philip Morris (PM), and British American Tobacco Mexico (BAT). Together, these two companies control 95% of the market.

As little as 0.05% of total cultivated area in Mexico was used for tobacco leaf production in 2007. The value of tobacco leaf production in the country represents just 0.1% of the total agricultural production value. Employment related to tobacco production accounts for 0.4% of all manufacturing jobs.

Price Elasticity of Demand and Affordability

Empirical research on cigarette consumption in Mexico provides an estimate of the price elasticity of demand of -0.52 .[†]

A 2009 study found that cigarettes in Mexico were the fourth most affordable (as measured by the percentage of per capita GDP needed to purchase 100 packs in 2006) among 16 middle-income countries. The amount of time a person needs to work to purchase a pack of cigarettes was calculated to be

* An exchange rate of US\$ 1 = 13.13 pesos (2010) is used throughout this report.

† Updated research suggests price elasticity estimates of -0.55 and -0.70 in 2006 and 2008, respectively. The 2008 estimate is likely to have been affected by the economic crisis in Mexico at that time, which might have made smokers more price-sensitive.

considerably lower in Mexico (22 minutes) than in other countries including the United Kingdom (35 minutes) and China (42 minutes).

Taxes and Price

There is solid evidence from countries at all income levels that taxation of cigarettes is highly effective in reducing consumption. Moreover, there is a strong economic rationale for governments to use higher taxes, given the well-documented negative effects of tobacco consumption on health status and economic productivity at both the individual and national level.

The current Special Tax on Production and Services (STPS) Mexico is an *ad valorem* tax set at 160% of the (pre-tax) price to the retailer. This excise tax accounts for 48.3% of the final price to consumers with taxes included, low in comparison to countries with successful tobacco control policies. Total tax (excise plus VAT) amounted to 61.4% of final price in 2009.

In November 2009 the legislature approved an increase in the STPS, introducing a specific excise tax of two pesos per packet to be phased in over the period 2010-2013. According to this legislation, the specific tax would be 0.80, 1.20, 1.60, and 2.00 pesos per pack in the years 2010, 2011, 2012, and 2013, respectively. However, without automatic upward adjustments for inflation, the effectiveness of the newly introduced specific tax will erode over time.

Revenue from tobacco taxes in 2008 was approximately 32.4 billion pesos. This included 25.5 billion pesos from the STPS, and 6.9 billion from the Value Added Tax (VAT). The average final price (including VAT) of a pack of cigarettes in Mexico is estimated to be 26.52 Mexican pesos (US\$ 2.02). When compared internationally, cigarette retail prices in Mexico are low.

Simulation of the Effects of Tax Increases

The impact of higher cigarette taxes on increased revenues, reduced smoking, and averted premature deaths is analyzed under four alternative scenarios

1. The law as approved in November 2009 — a specific tax of 0.80, 1.20, 1.60, and 2.00 pesos per pack in the years 2010, 2011, 2012, and 2013, respectively.
2. Immediate, inflation-adjusted implementation — implementing the 2.00 pesos specific tax per pack tax in 2010, and additional upward adjustments for inflation in the subsequent years.
3. *Ad valorem* tax increase — preserving the existing legislation of a specific tax, but adjusting it upward for inflation and increasing the *ad valorem* rate so that total tax (excise tax plus VAT) equals 75% of total price by 2013 — similar to the levels currently applicable in Chile.
4. Specific tax increase with subsequent inflation indexation — maintaining the *ad valorem* tax at 160% but increasing the STPS specific tax on cigarettes so that total tax is equal to 75% of total price by 2013, and would be indexed for inflation thereafter.

Under the legislation approved in November 2009 (Scenario 1) excise taxes reach 50% of the final price in 2013 and total taxes (excise plus VAT) reach 64% of final price. Real STPS excise tax revenues reach 28.6 billion pesos* and real total tax revenues reach 36.5 billion pesos (12% and 12.6% higher respectively than in 2009). Real price rises to 28.92 pesos in 2013, an increase of 9.1% over 2009. The number of smokers declines by 280,000, resulting in nearly 100,000 premature deaths averted.

* Real revenues throughout are expressed in terms of year 2009 pesos.

If the STPS specific tax is implemented immediately (Scenario 2) and is further adjusted upward for inflation, excise taxes reach 50.5% of retail price in 2010 and stay at that percentage through 2013, rather than the more gradual increase in Scenario 1. Total tax (excise plus VAT) similarly rises to 64.3% in 2010. Real STPS excise tax revenues reach 28.9 billion pesos and real total tax revenues reach 36.9 billion pesos in 2013 (13.5% and 13.8% higher respectively than in 2009). Real price rises to 29.32 pesos in 2013, an increase of 10.6% over 2009. The number of smokers declines by over 460,000, and more than 160,000 premature deaths are averted.

Under Scenario 3, excise taxes reach 61.5% of retail price in 2013, and total tax (excise plus VAT) reaches 75.3% in 2013. Real STPS excise tax revenues exceed 35 billion pesos and real total tax revenues reach 43 billion pesos in 2013 (37.6% and 32.7% higher respectively than in 2009). Real price rises to 48.86 pesos in 2013, an increase of 84.3% over 2009. The number of smokers declines by 2.58 million, and nearly 903,000 premature deaths are averted.

Revenue increases over 2010-2013 are the largest under Scenario 4. Excise taxes reach 61.4% of retail price in 2013, and total tax (excise plus VAT) reaches 75.2% in 2013. Real STPS excise tax revenues amount to 35.2 billion pesos and real total tax revenues reach 43.2 billion pesos in 2013 (37.9% and 33% higher respectively than in 2009). Real price rises to 48.58 pesos in 2013, an increase of 83.2% over 2009. The number of smokers declines by 2.79 million, and almost 1 million premature deaths are averted.

Evidence further suggests that the specific tax is preferable to the *ad valorem* tax increase — by reducing the variation in prices and the probability of brand switching in the face of a tax increase, the specific tax is ultimately likely to have an even greater impact on consumption and lives saved.

Conclusion and Recommendations

Based on the analysis of this report, we recommend the following:

1. **Increase excise taxes substantially** so that total taxes reach a level of 75% of retail price compatible with international best practices and characteristic of countries with successful tobacco control policies. This is likely to prevent nearly 1 million premature deaths from smoking-related illness in Mexico's population.
2. **Increase reliance on specific tobacco taxes over *ad valorem* taxes.** Specific taxes are typically easier to administer since they discourage the manipulation of prices. Further, they tend to reduce the dispersion in prices among brands, discouraging the tendency to substitute towards cheaper cigarettes when taxes are increased.
3. **Adjust specific taxes upwards for inflation.** It is also important that inflation adjustments be automatic, by administrative order.
4. **Strengthen tobacco tax administration.** For any tobacco tax strategy, successful tobacco tax administration will depend on comprehensive registration and licensing of all commercial producers, importers, and wholesale retailers. Licensing should include background checks to rule out a criminal background or prior involvement with smuggling, systematic accounting of the movement of tobacco products, and steps to increase the accountability of auditors.
5. **Consider earmarking part of the additional revenue resulting from a tobacco tax increase** to fund public health efforts to reduce tobacco consumption. Some of the newly

generated tax revenues could also be used for health services, including the Seguro Popular health insurance program, and to strengthen mechanisms to combat the illicit trade in tobacco products.

Most importantly, a reduction in smoking achieved through fiscal policy would create a win-win situation for Mexico — increasing tax revenue, while also countering tobacco use and its negative health and economic effects.

I. Introduction

On May 28, 2004 Mexico became the first country in the Americas to ratify the World Health Organization Framework Convention on Tobacco Control (FCTC). Mexico has made significant progress in tobacco control, and recent years have seen the application of a range of policies aimed at reducing tobacco consumption, including the prohibition of television and radio advertising for cigarettes, the mandatory placement of warning labels on cigarette boxes, and initiatives for smoke-free environments.

Efforts to curb tobacco consumption are critical in Mexico given current and past consumption patterns in the country and worldwide. Adult smoking prevalence (30.4% of men smoke) and a high rate of youth smoking initiation (8–15% of students have tried cigarettes before the age of 13) in Mexico imply that tobacco attributable deaths (currently between 25,000 and 60,000 each year) will continue to be a concern into the future and a clearly avoidable cause of lost lives and productivity.

An important consideration in Mexico's context is the fact that cigarettes remain affordable in comparison to other countries, suggesting that there is still considerable room to implement policies to increase the

relative price of cigarettes and other tobacco products. Taxation of tobacco products is one of the most effective strategies available to governments to reduce tobacco use, counter the negative health effects caused by smoking, and recoup costs related to both the provision of health services and lost productivity.

The report begins with a discussion of tobacco use patterns and the associated health costs in Mexico. It then examines the structure of Mexico's tobacco industry, and continues with a discussion of demand and affordability, including new estimates of the price responsiveness of cigarette demand. The structure of the tobacco tax system and recent policy steps towards higher taxes on tobacco are then analyzed.

The final focus of the report is a set of new simulations that quantify the projected reductions in consumption prevalence and premature mortality, and the increases in government revenues that result under different combinations of taxes. The projected impact of recent cigarette tax increases over a four-year horizon is compared to other tax policy scenarios that increase the real price of cigarettes by a larger margin, and through more immediate excise tax increases. The report concludes with a discussion of these results and recommendations for increasing the effectiveness of tobacco taxation.

II. Tobacco Consumption in Mexico

Smoking Prevalence

Adult Smoking

There are several different estimates of the prevalence of smoking in Mexico, on account of there being different surveys and data sources. A direct comparison of these estimates is not always possible, given the different methodologies and definitions employed by different surveys. The most recent estimates for the prevalence of smoking come from the National Health Survey (ENSA, or *Encuesta Nacional de Salud*, in Spanish) which calculated a smoking prevalence in Mexico City of 25.4% – 38.3% for men and 16.6% for women.* The 2000 ENSA estimated a prevalence of 21.5% for smoking in the population aged over 20 years – 33.7% for males and 10.1% for females.¹ In 2006, the second wave of this survey, known as the National Health and Nutritional Survey (ENSANut in Spanish), estimated the prevalence of any smoking among adults aged 20 or more to be 18.9% (30.4% for men and 9.5% for women). The prevalence of daily smoking was estimated to be 13.3% (21.6% for men, and 6.5% for women).

The National Addictions Survey (ENA – *Encuesta Nacional de Adicciones*), conducted five times over the years 1988 to 2008, is the basis for a slightly different

In 2008, smoking prevalence in urban areas was estimated to be 20.4% (29.9% for men and 11.8% for women).

set of estimates of smoking (Table 2.1). The surveys covered individuals aged 12 to 65 years and collected data on smoking behavior in the 12 preceding months. The 2002 and 2008 rounds differed from earlier rounds since they included both urban and rural areas, while the first three rounds had restricted themselves to urban areas. Among the population aged 12–65 years, the ENA found that 23.5% smoked in 2002, with an increasing trend among young women. In 2008, smoking prevalence in urban areas was estimated to be 20.4% (29.9% for men and 11.8% for women). In rural areas, prevalence was 11.3% (20.2% for men and 2.9% for women).²

The prevalence of smoking for men is about twice as high as for women. Tobacco use is more concentrated in urban areas, and prevalence is greater among individuals with higher education – the opposite of patterns seen in the U.S. and other high-income countries.³ Together, these estimates suggest that the prevalence of adult smoking in Mexico is somewhat lower than in most other countries in the Latin American region, including Argentina (30% in 2005) and Chile (37.9% in 2005), and is close to the level measured in Uruguay (24% in 2008).⁴

Table 2.1: Prevalence of any smoking (%) from the National Addictions Survey (Individuals ages 12 to 65, urban areas)

| Gender | Survey year and prevalence of any smoking (%) | | | | |
|---------|---|------|------|------|------|
| | 1988 | 1993 | 1998 | 2002 | 2008 |
| Males | 38.3 | 38.3 | 42.9 | 39.1 | 29.9 |
| Females | 14.4 | 14.2 | 16.3 | 16.1 | 11.8 |
| Both | 25.8 | 25 | 27.7 | 26.4 | 20.4 |

Source: Campuzano et al (2005)² and authors' analysis of the National Addictions Survey (ENA) 2008

* In Mexico City a total of 1,106 individuals were surveyed and the non-response rate was 26.8%. The 95% confidence interval for the overall estimate ranges from 22.8% to 28.0%.

Youth Smoking

An important factor bearing on the future health of Mexico's population is the alarmingly high smoking rates among adolescents. Tobacco consumption starts at early ages in Mexico, usually before 15 years. The Global Youth Tobacco Survey (GYTS) shows that between 8% and 15% of students have tried cigarettes before the age of 13.⁵ Early smoking has a strong relationship with illegal drug use — Mexicans who start smoking before 15 years old also report a higher rate of experimentation with illegal drugs.⁶

The GYTS specifically measures smoking in adolescents aged 13 to 15, with a representative sample for 32 geographic localities in Mexico.⁷ Results of the most recent rounds are summarized in Table 2.2. The survey finds that more than half of adolescents between 13 to 15 in urban areas have smoked at least once in their lives. In Mexico City, as many as 28% of adolescents reported smoking in the last 30 days. The percentage of students who had never smoked, but thought they would within the next year varied from

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20 to 31% across the regions covered by the GYTS.⁸ In rural areas, a different survey reported that the overall smoking prevalence is lower, and found that there was little relationship between prevalence and education.*

Socioeconomic Dimensions to Tobacco Use

Studies of tobacco consumption in Mexico indicate that while households in poorer quintiles have a lower prevalence of cigarette expenditure and lower monthly average consumption levels than do households in wealthier quintiles. Low-income households also spend a larger percentage of their total expenditures on cigarettes than higher income households.^{3,9}

Table 2.2: Prevalence of smoking in the last 30 days for adolescents ages 13 to 15, estimates from GYTS rounds

| City or Region | 2003-2004 Round | | 2006-2007 Round | |
|----------------|--------------------|-------------------------|--------------------|-------------------------|
| | Point estimate (%) | 95% confidence interval | Point estimate (%) | 95% confidence interval |
| Mexico City | 20.2 | 16.3 – 24.1 | 27.8 | 24.0 - 31.9 |
| Juarez | 22.6 | 18.7 – 26.5 | 17.7 | 15.8 - 19.9 |
| Nuevo Laredo | 16.5 | 13.3 – 19.7 | 14.2 | 11.9 - 17.0 |
| Tijuana | 11.5 | 9.3 – 13.7 | 13.0 | 11.2 - 15.2 |
| Cuernavaca | 20.8 | 18.1 – 23.5 | 21.7 | 18.9 - 24.8 |
| Guadalajara | 19.9 | 15.2 – 24.6 | 17.3 | 14.8 - 20.2 |
| Puebla | 25.4 | 20.0 – 30.8 | 27.5 | 24.9 - 30.2 |
| Chetumal | 17.9 | 14.9 – 20.9 | 14.6 | 12.1 - 17.6 |
| Tapachula | 13.8 | 11.2 – 16.4 | 16.3 | 14.3 - 18.6 |

Source: Authors' estimates from the GYTS (Global Youth Tobacco Survey)

* ENSANut 2006. This survey defined a smoker as an individual who had smoked at least 100 cigarettes in her life and smoked at the time of the survey. Urban areas were those with 2500 inhabitants or more.

Analysis of the National Survey of Household Income and Expenditures (*Encuesta Nacional de Ingresos y Gastos de los Hogares* —ENIGH) confirms this pattern.*³ Households in the fifth (richest) quintile of the population are more than twice as likely as households in the first (poorest) quintile to have at least one smoker (Table 2.3).

Household expenditures on tobacco products can have serious welfare implications. Particularly for low-income households, limited resources that are spent on tobacco compete directly with spending on health, food, education, and other necessities. Our analysis of the ENIGH shows that smoking households in the first (poorest) quintile of the population devoted between 3.5% and 4.1% of their total expenditures to tobacco products in 2006 and 2008, respectively. These percentages are higher than for any other quintile. The ENIGH data also show that the smoking households in all quintiles spent relatively less on food, health and education in 2008 compared to non-smoking households. Diverting household resources to tobacco — instead of food, health, and education — has important negative health and distributional effects, and increases disparities between the rich and the poor in access to basic needs and human capital.

Another socioeconomic aspect of tobacco use is the extent of smoking among members of particular professions. Estimates based on the 2006 Tobacco Survey of Students of the Health Professions — which

is based on a sample of third-year students of medicine and dentistry from public universities, and is statistically representative at the national level — show that smoking prevalence is as high as 33.3% among medical students and 43.6% among dentistry students.¹⁰ More than 80% of the students responding to this survey were between the ages of 19 and 24 — the age group that has the highest prevalence of smoking in the country. These findings suggest a failure of the medical education system to effectively communicate the dangers of tobacco use.

Tobacco Consumption: Levels and Trends

Tobacco Use Habits

Nearly 30% of smokers in 2006 smoked more than 5 cigarettes a day (Table 2.4). Per capita consumption, though, tends to be low, with the average for all smokers being 5.4 cigarettes per day. The 2008 National Addictions Survey included younger individuals (those ages 12 through 65 were surveyed). As might be expected to be the case with a survey including adolescent smokers, the average for all smokers was lower, at about 3.3 cigarettes per day in 2008 (Table 2.5), though nearly 20% of adolescent smokers smoked more than 5 cigarettes a day.

Aggregate Consumption

Studies on tobacco consumption have found that cigarette consumption in Mexico remained stable in

Table 2.3: Percentage of households with at least one smoker

| Year | Quintile of household per-capita expenditures | | | | | |
|------|---|-----|-----|-----|--------------|----------------|
| | Q1 (poorest) | Q2 | Q3 | Q4 | Q1 (richest) | All households |
| 2006 | 4.6 | 7.2 | 8.2 | 9.8 | 14.1 | 8.8 |
| 2008 | 3.4 | 5.1 | 6.3 | 8.7 | 11.3 | 7.0 |

Source: Authors' analysis of the ENIGH Survey

* ENIGH data shows relatively low rates of prevalence, partly because this survey only measures smoking behavior at the household level. The survey is, however consistent with patterns observed in other data sources, with overall prevalence (at least one smoker in the household) declining from 11.3% in 1994 to 7.0% in 2008.

Table 2.4: Number of cigarettes consumed by smokers ages 20 and older, 2006, National Health and Nutrition Survey

| Cigarettes smoked daily | National Health and Nutrition Survey 2006 | | |
|-------------------------|---|------------------|----------------------------|
| | Number of smokers | % of all smokers | Average cigarettes per day |
| Less than 1 | 3,050,046 | 26.9% | 0.2 |
| From 1 to 5 | 4,816,444 | 42.4% | 2.8 |
| From 6 to 10 | 1,953,524 | 17.2% | 8.3 |
| From 11 to 20 | 1,330,947 | 11.7% | 17.7 |
| More than 20 | 199,930 | 1.8% | 37.3 |
| Total | 11,350,891 | 100.0% | 5.4 |

Source: Authors' analysis of the 2006 National Health and Nutrition Survey

Notes: The 2006 National Health and Nutrition Survey was based on a sample (n=7662) of the population aged 20 years and older. It considered as smokers those respondents who had smoked at least 100 cigarettes in their lives and were current smokers at the time of the survey.

Table 2.5: Number of cigarettes consumed by smokers ages 12-65, 2008, National Addictions Survey

| Cigarettes smoked daily | National Addictions Survey 2008 | | |
|-------------------------|---------------------------------|------------------|----------------------------|
| | Number of smokers | % of all smokers | Average cigarettes per day |
| Less than 1 | 6,905,123 | 50.5% | 0.2 |
| From 1 to 5 | 4,147,407 | 30.4% | 2.8 |
| From 6 to 10 | 1,520,917 | 11.1% | 8.1 |
| From 11 to 20 | 930,337 | 6.8% | 16.9 |
| More than 20 | 157,602 | 1.2% | 29.9 |
| Total | 13,661,386 | 100.0% | 3.3 |

Source: Authors' analysis of the 2008 National Addictions Survey

Notes: The 2008 National Addictions Survey included a sample population (n=8195) between the ages of 12 and 65 years, and counted as smokers individuals who smoked at least one cigarette in the year before the survey.

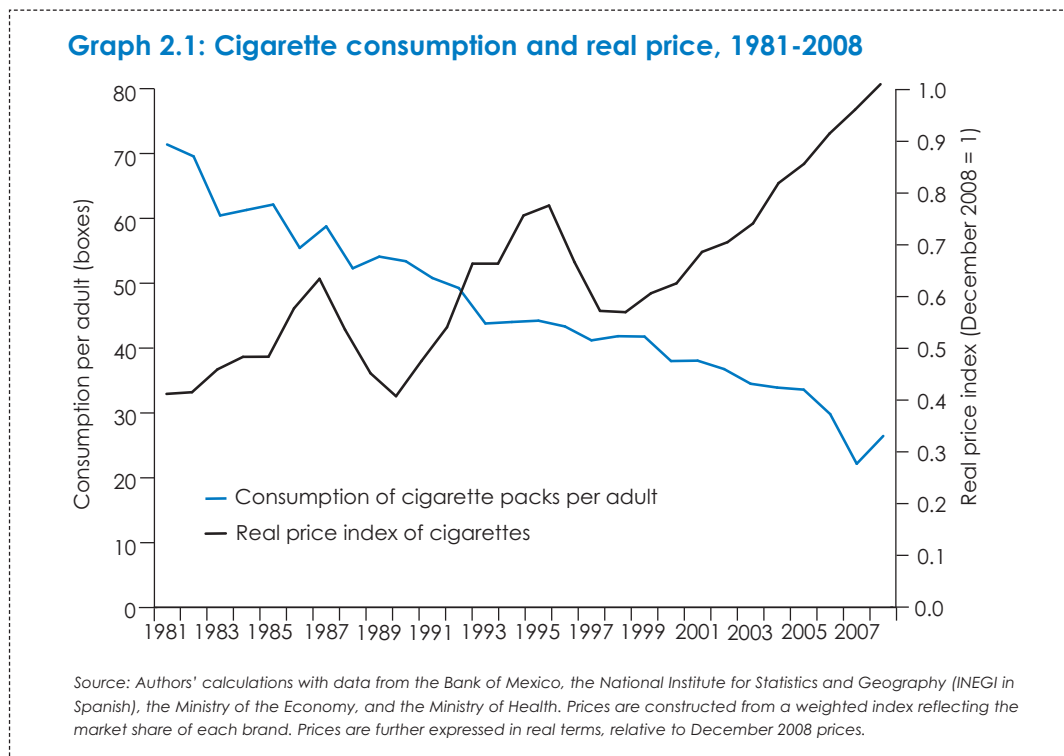
the 1980s and 1990s, with an average annual consumption of 2.6 billion packs.* Underreporting of national production led to a sharp drop in the statistics for total consumption between 2001 and 2004, as the National Institute for Statistics and Geography (INEGI in Spanish) stopped reporting production of unfiltered

cigarettes.† In 2005 and 2006 consumption increased again, to an average annual level of 2.4 billion packs.³

Nearly all tobacco consumption in Mexico is in the form of cigarettes, which accounted for 99.6% of the total value of tobacco products sold in 2004; cigars represented 0.3%; and loose tobacco just 0.01%.³ The

* Consumption is defined as national production plus net imports.

† Personal communication with INEGI's staff suggests that the production of unfiltered cigarettes was no longer reported, in order to protect the confidentiality of the information provided by producers, since their numbers had dropped considerably.



total size of the market in Mexico, including smuggled cigarettes, was estimated to be 52 billion cigarettes in 2006. This is equivalent to 468 cigarettes per capita — a 25.4% decrease from 1990 (Graph 2.1) that accompanied a largely upward trend in real prices.

Total sales in 2007 (50.5 billion cigarettes) were 5.5% less than in 1990 (53.2 billion).¹¹ Consumption,

however, is forecast within the industry to increase again by 12.9%, to a total of 56.8 billion cigarettes by 2016. Per capita consumption is predicted to rise by 1.3% during this time period, to 474 cigarettes annually.¹² The possibility of a reversal of the earlier decline in per capita tobacco consumption suggests that policy measures to counter tobacco use will continue to be relevant.

Endnotes for Chapter II

- ¹ Olaíz G, Rojas R, Barquera S, Shamah T, Aguilar C, Cravioto P, López P, Hernández M, Tapia R, Sepúlveda J. Encuesta Nacional de Salud 2000. Tomo 2. La salud de los adultos. Cuernavaca: Instituto Nacional de Salud Pública 2003.
- ² Campuzano JC, Hernández M, Samef JM, Méndez I, Tapia R, Sepúlveda J. Comportamiento de los fumadores en México según las Encuestas Nacionales de Adicciones 1988 a 1998. In: Valdés R, Lazcano EC, Hernández M, eds. Primer informe sobre combate al tabaquismo. México ante el Convenio Marco para el Control del Tabaco. Cuernavaca: Instituto Nacional de Salud Pública, 2005. [Smoking Behaviour in Mexico according to the National Addiction Surveys 1988 to 1998. In: The first report on tobacco control: Mexico and the Framework Convention for Tobacco Control.].
- ³ Sáenz de Miera-Juárez B, Jiménez-Ruiz JA, and Reynales -Shigematsu LM. The Economics of Tobacco in Mexico. National Institute of Public Health. Funded by the American Cancer Society. July, 2007. ISBN: 978-1-60443-000-4.
- ⁴ Llanes JL, Ramos A, Reynales LM, Sáenz de Miera B, Waters H. Proposals to Increase Cigarettes Taxes. Mexico City, Mexico Report of

a Working Group, August 10-12, 2009.

- ⁵ Reynales-Shigematsu LM, Valdés-Salgado R, Rodríguez-Bolaños R, Lazcano-Ponce E, Hernández-Ávila M. Encuesta de Tabaquismo en Jóvenes en México. Análisis descriptivo 2003, 2005, 2006, 2008. Cuernavaca, México: Instituto Nacional de Salud Pública, 2009.
- ⁶ Medina-Mora ME, Peña-Corona MP, Cravioto P, Villatoro J, Kuri P (2002). From tobacco use to other drugs use: does the early use of tobacco increase the probability of use of other drugs. *Salud Publica Mex.* 44 Suppl 1:S109-15.
- ⁷ Valdés-Salgado R, Reynales-Shigematsu LM, Lazcano-Ponce EC, Hernández-Avila M; Susceptibility to smoking among adolescents and its implications for Mexico's tobacco control programs. Analysis of the global youth tobacco survey 2003-2004 and 2006-2007; *Int. J. Environ. Res. Public Health* 2009, 6, 1254-1267.
- ⁸ Llanes JL, Ramos A, Reynales LM, Sáenz de Miera B, Waters H. Proposals to Increase Cigarettes Taxes. Mexico City, Mexico Report of a Working Group, August 10-12, 2009.
- ⁹ Sáenz de Miera B, Jiménez JA, Reynales LM, Lazcano EC, Hernández M. El consumo de tabaco en los hogares mexicanos, 1994-2005, *Salud Publica Mez* 2007; 49, suppl. 2: 263-269.
- ¹⁰ Reynales LM, Vázquez JH, Lazcano EC. "Encuesta Mundial de Tabaquismo en Estudiantes de la Salud, México 2006", *Salud Pública de México*, 2007, 49, 194-204.
- ¹¹ ERC Group (2007). *World Cigarettes 1. The 2007 Survey: Americas*. Suffolk, UK: ERC Group Ltd.

III. The Health Burden of Tobacco in Mexico

The World Health Organization (WHO) estimates that more than five million people die globally each year from tobacco-related illnesses and that 500 million people alive today will eventually die from these illnesses if current trends continue.¹²

Mortality Associated with Tobacco

Research has clearly demonstrated that smoking and other forms of tobacco use damage physical health and lower life expectancy.¹³ About one-half of smokers die due to their addiction, and approximately half of these deaths occur during the economically productive period of life before retirement (ages 35 to 69), resulting in at least 10 to 15 years of life lost.^{14,15}

...tobacco consumption is responsible for 25,000 to 60,000 deaths each year in Mexico.

Estimates of premature mortality related to smoking show that tobacco consumption is responsible for 25,000 to 60,000 deaths each year in Mexico.^{16–18} One estimate shows that 5.2% of all deaths in Mexico in 2004 were attributable to smoking.¹⁹ Further, wealthier regions showed higher smoking-attributable mortality — in the northern region of Mexico, smoking was responsible for 9% of deaths. Premature mortality due to tobacco consumption reduces labor productivity and potential economic growth. For households, premature deaths cause a loss of earnings, and decreased household savings and investments. The early death of a parent is likely to have long-term effects on the education and living standards of children.

Exposure to Secondhand Smoke

The 2008 National Addictions Survey found that nearly 11 million Mexicans who never smoked — 25.5% of adult men and 22% of adult women — were exposed to secondhand smoke (SHS). The 2005, 2006, and 2008 Global Youth Tobacco Surveys estimated the percentage of students between 13 and 15 years old who are exposed to SHS in public and private places, and found that this exposure is higher in cities with higher smoking prevalence. These include Mexico City (59.4% exposure in public places; 46.9% in homes), Guadalajara (59.1% in public places; 45.4% in homes), Aguascalientes (59% public places; 39.4% in homes), and Saltillo (58.2% public places; 39.0% in homes).^{* 5}

Exposure to secondhand smoke in bars and clubs is a serious problem for both non-smokers and workers. A study of non-smokers who visit nightclubs in Mexico reports that following an average exposure of six hours, non-smokers have substantially elevated nicotine concentrations — 13 times higher than baseline measurements for women, and 40 times higher than the baseline for men.²⁰ In 2005, a study was conducted to quantify the levels of SHS exposure in homes, simultaneously assessing environmental concentrations and nicotine levels in the hair of children and non-smoking women. This study found a direct correlation between the number of smokers in the household and hair nicotine concentrations; particularly high exposure levels in children were attributable to the presence of cigarette smoke in the home.^{21,22}

Tobacco and Healthcare Costs

In Mexico, as in most countries, there is only limited data available about the costs associated with tobacco use. Existing studies provide an incomplete picture of the total costs of smoking, but it is possible

* The cities with the lowest exposures were Tapachula (41.5% public places; 26.7% in homes), Campeche (46.3% public places; 23.3% in homes), and Oaxaca (39.6% public places; 22.3% in homes).

to assess the magnitude of costs by analyzing data from individual healthcare systems in the country.

A 2006 study estimated costs of smoking-attributable medical care provided by the Mexican Institute of Social Security (IMSS) health system (Table 3.1, below).^{*} IMSS covers nearly 46% of the population, or 49 million people. Even though only four conditions were included in the estimate (acute myocardial infarction, cerebrovascular disease, chronic obstructive pulmonary disease, and lung cancer), the estimated costs of treating and managing these conditions were at least 7.1 billion pesos (US\$

541 million),[†] or 4.3% of the IMSS operating expenses in 2004.[‡]

Smoking-related costs are less well documented among the other main healthcare providers in Mexico including the Social Security Institute for Estate Workers (ISSSTE), the Ministry of Health, *Petróleos Mexicanos* (PEMEX),[§] and the Ministry of National Defense (SEDENA). Cost estimates for these providers include just two conditions – acute myocardial infarction and cerebrovascular disease. ISSSTE and the Ministry of Health spent approximately 6% and 11% of their 2004 budgets on smoking-attributable

Table 3.1: IMSS healthcare costs attributable to tobacco consumption, 2004

| Disease or condition | Average cost per case (Pesos) ^a | Cases attributable to tobacco | Costs attributable to tobacco consumption (millions of Pesos) |
|---|--|-------------------------------|---|
| Acute myocardial infarction SAF: 0.61 | 178,266 | 24,323 | 4,336 |
| Cerebrovascular disease SAF: 0.49 | 162,561 | 10,263 | 1,668 |
| Chronic obstructive pulmonary disease SAF: 0.69 | 99,669 | 10,152 | 1,012 |
| Lung cancer SAF: 0.66 | 148,837 | 449 | 67 |
| Total costs | | | 7,083 |

Source: Reynales et al. 2006²³

Notes:

^a Figures are in constant 2004 Mexican Pesos

^b SAF: Smoking Attributable Fraction, or the fraction of cases attributable to tobacco consumption among IMSS beneficiaries. The weights account for the composition of smokers, former smokers and non-smokers in the study, and the differences in the likelihood of each of these groups contracting a particular disease. The SAF is calculated by first using logistic regression to estimate odds ratios and then applying the following formula:

$$\frac{p_0 + p_1 * (OR_1 - 1) + p_2 * (OR_2 - 1)}{\{[p_0 + p_1 * (OR_1 - 1) + p_2 * (OR_2 - 1)] + 1\}}$$

where:

p_0 = prevalence of non-smokers in the study

p_1 = prevalence of smokers in the study

p_2 = prevalence of former smokers in the study

OR_1 = odds ratio associated with smoker vs. non-smokers

OR_2 = odds ratio associated with former smokers vs. non-smokers

* The IMSS provides social security services to salaried workers in the private sector and to their families. It also offers services to the self-employed for a fee. IMSS is funded with both public and private resources.

† An exchange rate of US\$ 1 = 13.13 pesos in early 2010 is used throughout this paper.

§ *Petróleos Mexicanos*, or PEMEX, is a state-owned oil company.

cases of these two diseases, respectively.³ The costs attributable to tobacco in PEMEX and in SEDENA represented 3% of their total expenditures in 2004, or roughly seven and two billion pesos (US\$ 152 million and US\$ 533 million) respectively.³ These estimates are conservative, given that only a limited number of diseases were considered. The estimates of smoking-related health care costs from other countries with more complete data range from 6% to 15% of total healthcare costs.^{24–28}

The total healthcare expenditures associated with smoking in Mexico were estimated at 75.2 billion pesos (US\$ 5.7 billion) in 2008.

The total healthcare expenditures associated with smoking in Mexico were estimated at 75.2 billion pesos (US\$ 5.7 billion) in 2008.⁴ This estimate is based on total health expenditures, which equal 6.2% of Mexico's Gross Domestic Product (GDP),²⁹ and an assumption that smoking-related treatment costs represent 10% of all healthcare costs (the range across countries for this figure is from 6% to 15%; in Argentina, for example, it is 14.5% of costs in the public healthcare system).^{30,31}

Ongoing research points to increasing demand for smoking-related healthcare services, which will likely pose great financial and management challenges for the Mexican health system in the future.³² Since the government is the main source of healthcare services in Mexico, these smoking-related healthcare costs drain enormous resources from the state budget. Private employers in higher-income economies are beginning to recognize the economic harm imposed by smoking, and are increasingly encouraging their employees to quit smoking in order to improve productivity, lower healthcare costs, and reduce maintenance costs and the risk of fires in workplaces.³³

While the estimates of healthcare costs above place a monetary value on expenditures directly attributable to healthcare conditions associated with tobacco use in Mexico, there are several other costs often missed, including diminished labor productivity, economic losses resulting from premature death, reduced economic growth, and insufficient investments in human capital due to reduced spending on health and education.* The non-health costs of smoking — including losses in human capital and productivity — are likely to be even higher than the direct health costs. International studies have shown that these may be as much as three times higher than the healthcare costs.³⁴

Endnotes for Chapter III

¹² WHO Report on the Global Tobacco Epidemic, 2008: The MPOWER package. Geneva.; World Health Organization, 2008. ISBN: 978 92 4 159628 2. http://www.who.int/tobacco/mpower/gtcr_download/en/index.html.

¹³ US Department of Health and Human Services. The health consequences of smoking: A report of the Surgeon General. US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2004

¹⁴ Morbidity and Mortality Weekly Reports (MMWRs). Annual smoking-attributable mortality, years of potential life lost, and productivity losses – United States. 1997-2001, July 1, 2005; Vol. 54 / No. 25.

¹⁵ Bo-Qi L, Peto R, Chen ZM, Boreham J, Wu YP, Li JY, et al. Emerging tobacco hazards in China. 1. Retrospective proportional mortality study of one million deaths. *BMJ* 1998; 317(7170):1411-22.

* The link between health and economic prosperity and growth is developed in Bloom and Canning (2000) and Bloom, Canning and Jamison (2004). Healthier people work longer and fall sick less often, implying increased productivity; their longer life expectancies result in higher lifetime labor productivity, higher levels of savings, and a higher proportion of working age population to dependents.

- ¹⁶ Valdés R. Las cifras de la epidemia: daños a la salud y mortalidad atribuible. In: Valdés R, Lazcano E, Hernández M, (eds.), Primer informe sobre el combate al tabaquismo. Cuernavaca: National Public Health Institute, 2005: 29-41. [Figures from the epidemic: health effects and attributable mortality. In: The first report on tobacco control: Mexico and the Framework Convention for Tobacco Control.]
- ¹⁷ Roberto Tapia-Conyer R, Kuri-Morales pR, Hoy-Gutiérrez JM. Panorama epidemiológico del tabaquismo en México. *Salud Publica Mex* 2001; Vol. 43(5):478-484
- ¹⁸ Kuri-Morales PA, González-Roldán JF, Hoy MJ, Cortés-Ramírez M. Epidemiología del tabaquismo en México. *Salud Publica Mex* 2006; 48 supl I:S91-S98.
- ¹⁹ Stevens G, Dias RH, Thomas KJA, Rivera JA, Carvalho N, Barquera S, Kenneth Hill K, Ezzat M. Characterizing the Epidemiological Transition in Mexico: National and Subnational Burden of Diseases, Injuries, and Risk Factors. *PLoS Medicine* June 2008, Volume 5, Issue 6, p. e125
- ²⁰ Lazcano-Ponce E, Benowitz N, Sanchez-Zamorano LM, Barbosa-Sanchez L, Valdes-Salgado R, Jacob P 3rd, Diaz R, Hernandez-Avila M (2007). Secondhand smoke exposure in Mexican discotheques. *Nicotine Tob Res.* Oct;9(10):1021-6
- ²¹ Barrientos-Gutiérrez T, Reynales-Shigematsu LM, Ávila-Tang E, Wipfli H, Lazcano-Ponce E (2007 b). Exposición al humo de tabaco en hogares de la Ciudad de México: análisis de nicotina ambiental y en cabello de niños y mujeres *Salud publica Mex* 49 Supl 2: S224 S232.
- ²² Barrientos-Gutiérrez T, Amick BC, Reynales-Shigematsu LM, Gimeno D, Delclos GL, Harist RB, Kelder SH, Lazcano-Ponce E, Hernandez-Avila M. Ventilation, air extraction or smoking ban? Environmental tobacco smoke exposure in Mexican restaurants and bars. In press.
- ²³ Reynales, L.M., R.A. Rodríguez, J.A. Jiménez, S.A. Juárez, A. Castro, M. Hernández (2006). "Costos de la atención médica atribuibles al consumo de tabaco en el Instituto Mexicano del Seguro Social", *Salud Publica de México*, vol. 48, supl. I, págs. 48 a 64.
- ²⁴ Stanley K. Control of tobacco production and use. In: Jamison DT, Mosley WH, Measham AR, Bobadilla JL, eds. *Disease control priorities in developing countries*. Oxford University Press 1993:703-23.
- ²⁵ Max W. The financial impact of smoking on health-related costs: A review of the literature. *American Journal of Health Promotion* 2001;15:321-31, 2001.
- ²⁶ U.S. Centers for Disease Control & Prevention (CDC). Annual smoking-attributable mortality, years of potential life lost, and economic costs, United States, 1995-1999. *Morbidity and Mortality Weekly Review (MMWR)* 2002;51(14): 300-03.
- ²⁷ Miller LS, Zhang X, Max W. State estimates of total medical expenditures attributable to smoking. 1993 *Public Health Reports*, September/October 1998.
- ²⁸ Warner KE, Hodgson TA, Carroll CE Medical costs of smoking in the United States: Estimates, their validity, and their implications. *Tobacco Control* 1999; 8(3): 290-300.
- ²⁹ World Bank (2009). *World Development Indicators*. Washington DC: World Bank.
- ³⁰ Jha P, Chaloupka F. *Curbing the epidemic. Governments and the Economics of Tobacco Control*, Washington: The World Bank, 1999.
- ³¹ Bruni, José María. *Costos Directos de la Atención Médica de las Enfermedades Atribuibles al Tabaquismo en los Hospitales Públicos del Ministerio de Salud del Gcaba*. Working Paper. Argentina.
- ³² Armando Arredondo, Carlos Carrillo, Alexis Zuñiga. Economic burden of expected epidemiological changes in diseases related to tobacco, Mexico. *Rev Saúde Pública* 2007;41(4):523-9
- ³³ Bunn WB 3rd, Stave GM, Downs KE, Alvir JM, Dirani R. Effect of smoking status on productivity loss. *Journal of Occupational and Environmental Medicine* 2006;48(10):1099-108; Halpern MT, Shikar R, Rentz AM, Khan ZM. Impact of smoking status on workplace absenteeism and productivity. *Tobacco Control* 2001;10(3):233-238.
- ³⁴ Warner K, Hodgson TA, Carroll C. Medical cost of smoking in the United States: Estimates, their validity and their implications", *Tobacco Control*, 1999;8:290-300.

IV. Industry Structure and Employment

Structure of the Industry

The Mexican cigarette industry is controlled by two companies, *Cigarros La Tabacalera Mexicana* (Cigatam) associated with Philip Morris (PM) and British American Tobacco Mexico (BAT). Philip Morris currently owns 79.9% of Cigatam — Cigatam is responsible for manufacturing, while PM is responsible for marketing and distribution. The year 1997 was crucial for the current conformation of the cigarette industry — in that year BAT International bought *Cigarrera La Moderna* (CLM), a public company established in 1936, and Philip Morris increased its share in Cigatam to 49.9%.

Together, these two companies control 95% of the market by volume (Table 4.1). Most of the domestic production of cigarettes is consumed within the country. Imports of cigarettes represent just 2% of national production, and accounted for only 0.6% of consumption in 2006. In that year, the main sources of imports were the United States (65 million cigarettes — 23.3% of imports), Lithuania (58 million cigarettes — 20.8%), and Switzerland (57 million — 20.4%).¹¹

Between 2000 and 2006 Philip Morris increased its share of cigarette sales volumes by eight percentage points, from 55.7% to 63.7%. BAT, on the other hand,

has lost nearly 11 percentage points of market share. This is related to the increase in market share of a third company, Japan Tobacco International (JTI). In the same time period, JTI more than doubled its market share to reach 5.0%.

There are several cigarette brands available in Mexico, but a single one — Philip Morris' Marlboro — is dominant. Between 2000 and 2006, Marlboro increased its market share from 39.1% to 47.7% (Table 4.2). The second best positioned brand is BAT's Boots, the leading national brand with a market share of 8.8% in 2005. Delicados and Alas, the most popular unfiltered cigarettes brands, hold market shares of 8.3% and 5%, respectively.

Unfiltered cigarettes have been traditionally cheaper than filtered cigarettes. In the past, this was exacerbated by the tax structure since the tax rate for unfiltered cigarettes was lower than the rate for filtered cigarettes. Since 2005, unfiltered cigarettes are taxed at the same rate as filtered cigarettes.

Tobacco Farming and Manufacturing

Since the cultivation of tobacco represents only a small share of jobs, the impact of changes in taxes and prices on tobacco farming can likewise be expected to be modest. In 2005, Mexico contributed 0.25% of global leaf production and ranked 38th internationally in terms of volumes produced. Production of tobacco has declined substantially in recent years. A

Table 4.1: Companies' cigarette market share by volume, 2000-2006

| Company | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|--|------|------|------------|------|------|------|------|
| Philip Morris Mexico (PM) | 55.7 | 58.3 | 59.4 | 59.4 | 60.2 | 62.1 | 63.7 |
| British American Tobacco Mexico (BAT) ^a | 42.2 | 39.3 | 37.8 | 37.2 | 35.4 | 33.2 | 31.3 |
| Japan Tobacco International (JTI) | 1.9 | 2.2 | 2.8 | 3.4 | 4.4 | 4.7 | 5.0 |
| Others | 0.2 | 0.2 | negligible | | | | |
| Totals | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

Source: ERC Group (2007)¹¹

Notes:

^a BAT's market share excluding JTI's Camel brand that it produces under license. Camel is included here under JTI.

Table 4.2: Market shares of cigarette brands (% of volume), 2000-2006

| Brand | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---------------------------------|-------|-------|-------|-------|-------|-------|-------|
| Marlboro (Philip Morris) | 39.1 | 42.2 | 43.1 | 44.2 | 45.2 | 46.3 | 47.7 |
| Boots (BAT) | 10.9 | 10.3 | 9.6 | 9.3 | 8.7 | 8.8 | ** |
| Delicados (Philip Morris) | 7.1 | 7.1 | ** | ** | 6.5 | 7.9 | 8.3 |
| Raleigh (BAT) | 11.8 | 11.8 | 10.4 | 9.8 | 9.0 | 7.8 | ** |
| Montana (BAT) | 3.8 | 3.4 | ** | ** | 7.3 | 7.7 | ** |
| Camel (JTI)* | ** | 2.0 | 2.5 | 3.0 | 4.0 | 4.3 | ** |
| Benson & Hedges (Philip Morris) | 2.4 | 2.4 | 2.8 | 3.3 | 3.6 | 3.9 | ** |
| Alas (BAT) | 4.5 | 2.0 | 4.4 | 4.3 | 4.0 | 3.9 | 5.0 |
| Faros (PM) | 3.8 | 3.4 | ** | ** | 2.6 | 2.1 | ** |
| Fiesta (BAT) | ** | ** | ** | ** | 1.8 | 1.6 | ** |
| Salem (JTI) | ** | ** | ** | ** | 0.4 | 0.4 | ** |
| Others | 16.6 | 16.1 | 27.2 | 26.1 | 6.9 | 5.3 | 39.0 |
| Totals | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

* BAT Mexico has a license to manufacture and market this brand

** Included in "Others". In 2006, available data only allow for identifying the shares of three brands.

Source: ERC Group (2007)¹

considerable percentage of locally-produced tobacco leaf is exported. Domestic production has been on the decline since 2000, with exports varying between 5256 and 9432 tons over that period (Table 4.3).

As little as 0.05% of total cultivated area in Mexico was used for tobacco leaf production in 2007. This number reflects a striking decline from previous levels. In 1982, the total area cultivated for tobacco reached a peak of 36% of total cultivated area.* Consequently, the production of tobacco leaf has also decreased substantially, particularly in the last decade (Table 4.4 and Graph 4.1). The value of tobacco leaf production represents as little as 0.07% of the total production value of the primary sector and 0.1% of the total agricultural production value.† Currently, most tobacco leaf production is concentrated in the states of Nayarit and Veracruz. In 2007, 92.8% of the total volume

produced came from these two states and 92.2% of the tobacco cultivated area was located there.‡

Employment in tobacco leaf production is mainly seasonal. Tobacco leaf cultivation in Mexico requires 150 to 238 labor days per hectare in the growing cycle. Both the total cultivated area and total production have decreased in recent years, and tobacco leaf production accounted for between 3,830 and 6,077 full-time jobs in Mexico in 2007, down from 19,977 full-time jobs related to tobacco leaf cultivation in 1993.³⁷⁻³⁸ This accounted for 0.07% to 0.1% of total employment in the primary economic sector that year.[#]

Most of the leaf used to produce domestic tobacco products is imported. The net value of trade in tobacco leaf has been negative since 2000, and imports of tobacco leaf are now equivalent to more than twice the

* Authors' estimates based on data from the Ministry of Agriculture.

† According to data from the National Institute of Geography and Statistics (INEGI), the total production value of the primary sector and the total agricultural production value was 395,963 and 249,141 million pesos in 2007, respectively. The total value of tobacco leaf production was 260 million pesos in the same year (Farming Information System — SIACON).

‡ Authors' estimates based on data from the Ministry of Agriculture.

According to data from the Ministry of Labor and Social Welfare, some 5.8 million individuals were employed in the primary sector in 2007.

Table 4.3: Tobacco leaf production, imports, and exports, 1994-2008

| Year | Domestic production (Tons) | Exports (Tons) | Imports (Tons) | Net export value (US\$ in thousands) | Value of tobacco exports as % of value of total exports |
|------|----------------------------|----------------|----------------|--------------------------------------|---|
| 1994 | 59,570 | 6,759 | 7,728 | \$5,371 | 0.04% |
| 1995 | 27,401 | 6,805 | 2,378 | \$11,804 | 0.03% |
| 1996 | 42,631 | 15,206 | 4,257 | \$25,293 | 0.05% |
| 1997 | 32,204 | 11,955 | 7,870 | \$7,806 | 0.04% |
| 1998 | 48,763 | 12,946 | 10,350 | \$1,948 | 0.04% |
| 1999 | 50,567 | 10,518 | 8,623 | \$2,550 | 0.03% |
| 2000 | 45,164 | 8,817 | 12,124 | -\$2,386 | 0.02% |
| 2001 | 40,560 | 7,499 | 10,210 | -\$1,959 | 0.02% |
| 2002 | 21,936 | 9,437 | 17,348 | -\$9,641 | 0.02% |
| 2003 | 22,437 | 9,032 | 22,287 | -\$23,271 | 0.02% |
| 2004 | 21,763 | 8,712 | 20,981 | -\$33,019 | 0.01% |
| 2005 | 16,122 | 5,254 | 16,408 | -\$30,277 | 0.01% |
| 2006 | 19,381 | 6,636 | 13,749 | -\$36,325 | 0.01% |
| 2007 | 13,008 | 7,845 | 27,326 | -\$114,096 | 0.01% |
| 2008 | 11,142 | 8,270 | 28,239 | -\$123,046 | 0.01% |

Source: Authors' analysis of data from the Ministry of Agriculture and the Ministry of the Economy^{35,36}

level of national production. Three-quarters of the leaf imports come from countries for which exemptions from duty taxes apply, including the United States (47.5%), Canada (13.6%), Greece (7.8%) and Italy (7.1%).*

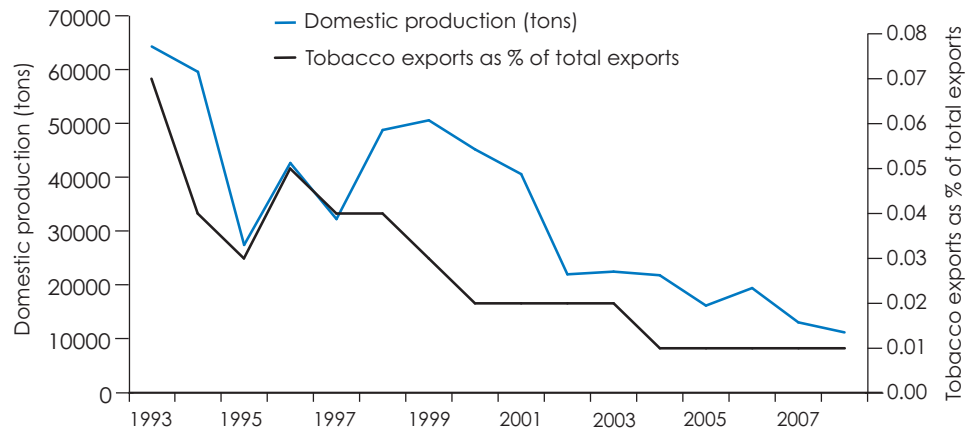
Most tobacco leaf growers in Mexico are small farmers who farm an average of two to three hectares.³⁹ The majority of growers belong to the Rural Collective Interest Association of Tobacco Producers (*Asociación Rural de Interés Colectivo de Productores de Tabaco* – ARIC). Tobacco farmers deliver their production directly to the multinational companies that control the leaf market – British American Tobacco (BAT) through *Agroindustrias La Moderna*, *Cigarros La Tabacalera Mexicana* (Cigatam) through *Tabacos*

Desvenados (Tadesa), Universal Leaf Tobacco through *Tabacos del Pacífico Norte*, and Dimon. These companies provide technical assistance to the producers as well as funding to cover salaries, inputs, machinery and equipment.⁴⁰ Each year, the multinationals and ARIC set tobacco leaf prices according to type and quality. The multinational companies control these negotiations, however, given farmers' dispersion and low bargaining power.⁴¹

Cigarette Manufacturing

The domestic production of cigarettes has been relatively stable in recent years. An annual average of 2.7 billions of packs was produced between 1994 and 2008 (Table 4.4). 89.1% of cigarettes manufactured in Mexico

* Authors' estimates based on data from the Ministry of the Economy.

Graph 4.1: Production and export of tobacco leaf, 1994-2008


Source: Authors' calculations using data from the Ministry of Agriculture.

Table 4.4: Cigarette production, imports, and exports, 1994-2008

| Year | Domestic production (thousands of packs) production | Imports as % of domestic production | Exports as % of domestic production | Share of total export value ^a |
|------|---|-------------------------------------|-------------------------------------|--|
| 1994 | 2,670,099 | 0.10% | 6.2% | 0.05% |
| 1995 | 2,841,030 | 0.10% | 9.3% | 0.04% |
| 1996 | 2,995,359 | 0.02% | 13.7% | 0.05% |
| 1997 | 2,880,886 | 0.16% | 13.0% | 0.04% |
| 1998 | 3,020,334 | 0.08% | 13.8% | 0.05% |
| 1999 | 2,974,595 | 0.16% | 10.9% | 0.03% |
| 2000 | 2,819,130 | 0.22% | 12.8% | 0.03% |
| 2001 | 2,759,945 | 0.33% | 9.1% | 0.02% |
| 2002 | 2,659,957 | 0.38% | 7.1% | 0.01% |
| 2003 | 2,508,018 | 0.60% | 6.0% | 0.01% |
| 2004 | 2,411,825 | 0.51% | 1.9% | 0.00% |
| 2005 | 2,407,442 | 0.52% | 0.9% | 0.00% |
| 2006 | 2,484,417 | 0.45% | 13.2% | 0.06% |
| 2007 | 2,180,016 | 0.75% | 25.5% | 0.11% |
| 2008 | 2,420,446 | 1.62% | 19.3% | 0.10% |

Source: Authors' analysis of data from INEGI and the Ministry of the Economy ^{34,42}
 a Value of cigarette exports as a fraction of value of all exports

are filtered.¹¹ Most of the production is consumed within the country, although there was an increase in the share exported in the past two years. In 2008, exports accounted for 19.3% of domestic production. Nearly 94% of the exported cigarettes went to Canada that year.* The contribution of cigarette exports to the value of total exports is, however, negligible.

The contribution of the cigarette manufacturing industry to all employment in the manufacturing sector is very low, at 0.4%. In 1994, the cigarette industry accounted for 0.6% of total employment — this fraction has decreased since then at an annual average rate of 5.8%, and the number of workers has

fallen from 8,100 that year to 4,700 in 2008. Most of the workers in the cigarette industry are employed in secondary processing or cigarette production.[†] Primary production, on the other hand, accounts for 26% of the employment in the cigarette industry. Primary production includes leaf drying, fermenting and curing, and employment in this sector displays the cyclical behavior of tobacco leaf cultivation.

This survey of industry structure suggests that the impact of tobacco tax increases on employment in Mexico is likely to be modest, with employment related to tobacco production representing just 0.4% of all manufacturing jobs.

Endnotes for Chapter IV

³⁵ Ministry of Agriculture, Farming Information System (SIACON).

³⁶ Ministry of the Economy, Sistema de Información Arancelaria Vía Internet: <http://www.economia-snci.gob.mx:8080/siaviWeb/siaviMain.jsp> - checked in September 2009.

³⁷ Grupo Interinstitucional sobre Estudios en Tabaco, 2003.

³⁸ Ministry of Agriculture. Reconversión del cultivo de tabaco en México. Presented at the XIII Congress of Research on Public Health, National Institute of Public Health, Cuernavaca, Mexico; April 2009.

³⁹ Mackinlay H. ¿Aliados o antagonistas? La relación entre jornaleros agrícolas y pequeños productores en la rama del tabaco en México durante la década de los noventa, ponencia presentada en la Mesa de Trabajo: Trabajo Rural del V Congreso Nacional AMET, Morelos, 17-19 mayo de 2005.

⁴⁰ Coordinadora Nacional de las Fundaciones Produce – Cofupro (2003). Caracterización de las Cadenas Prioritarias e Identificación de las Demandas Tecnológicas. Cadena Tabaco.

⁴¹ Mackinlay H (1999). "Nuevas tendencias de la agricultura del contrato: los productores de tabaco en Nayarit después de la privatización de Tabamex (1990-1997)". En: Carton de Grammont H (ed.) Empresas, reestructuración productiva y empleo en la agricultura mexicana, México: IIS UNAM-Plaza y Valdés, págs. 145-204.

⁴² National Institute of Geography and Statistics (INEGI). Encuesta Industrial Mensual. Available in: <http://www.inegi.org.mx> – checked in September 2009.

* Authors' estimates based on data from the Ministry of the Economy.

† Authors' estimates based on data from the National Institute of Geography and Statistics (INEGI).

V. The Tobacco Control Environment in Mexico

Mexico has implemented stronger tobacco control laws over the years. Health warnings on cigarette packs were first introduced in 1973; since 1993 all tobacco advertisements in public have been required to carry health warnings. Mexico ratified the World Health Organization Framework Convention on Tobacco Control (FCTC) in 2004 and tobacco control efforts today are framed within the context of this convention. FCTC ratification was accompanied by bans on TV and radio advertising for tobacco products.

Mexico ratified the World Health Organization Framework Convention on Tobacco Control (FCTC) in 2004.

Until recently, most legislation for tobacco control in Mexico — with the notable exception of taxation — was contained in the General Health Law (*Ley General de Salud* — GHL). In August 2008, however, the General Law for Tobacco Control (*Ley General para el Control del Tabaco* — GLTC) came into force, replacing the corresponding provisions of the GHL.* The regulations enforcing the GLTC were published in May 2009.

- Articles 7 to 13 of the GLTC state the Authority’s attributions, including regulation of the country’s tobacco control program.
- Articles 14 to 17 contain regulations on trade, distribution and selling of tobacco products. These articles prohibit the distribution of single cigarettes and packs with less than 14 cigarettes or more than 25, or rolling tobacco packs with less than 10 grams. Also prohibited are the sale of

tobacco products to minors and the sale of cigarettes at basic and middle education schools.

- Articles 18 to 22 contain regulations on packaging and labeling. These articles require that all packaging for tobacco products carry clear and visible warnings that are alternated over time. The graphic warnings must cover a minimum of 30% of the front side of the pack. Other warnings must cover 100% of the back side and 100% of one of the sides of the pack. Also, packs are required to display information of the contents, emissions and risks. Selling cigarettes marked deceptively with labels such as “light” or “ultra light” is prohibited.
- Articles 23 to 25 contain regulations on advertisement, promotion and sponsorship. These articles establish that ads may be placed in adult magazines, mail or inside adult-only establishments. All forms of sponsorship and the distribution of promotional items are prohibited. Internal communication distributed among industry employees is not considered publicity or promotion.
- Articles 26 to 29 contain regulations for the protection of non-smokers. These articles ban smoking in public and private school of basic and middle education. Places with public access or indoor workplaces, private and public, including higher education institutions, are also required to designate specific areas to smoke according to current regulations.
- Articles 30 to 34 contain regulations to combat the illicit production and trade of tobacco products. These articles require sanitary permits to import tobacco products and states the Ministry of Health’s attributions related to this matter.

* With the introduction of the GLTC, articles 188, 189, 190, 275, 276, 277, 277bis, 308bis and 309bis of the GHL, related to tobacco control, were eliminated, and articles 286, 301, 308, 309 y 421 of the GHL, also related to tobacco control, were modified.

Mexico City's Smoke-Free Workplace Act (*Ley de Protección de la Salud de los No Fumadores del Distrito Federal*) came into force in April 2008. This legislation effectively banned indoor smoking in all public and private workplaces — including bars and restaurants — in the Federal District. In August 2008, the nationwide law (GLTC) followed, banning smoking in indoor workplaces and enclosed public spaces —

including offices, schools, hospitals, and in public transportation. Despite initial concerns about the economic impact of the smoke-free laws, a recent study by the National Institute for Public Health (INSP) concludes that these laws have not had a negative impact on restaurants' income, employees' wages, and levels of employment.⁴³

Endnotes for Chapter V

⁴³ Guerrero López CM, Jorge Alberto Jiménez JA, Reynales Shigematsu LM, Waters H. 2009. Evaluación del impacto económico de la Ley de Protección a la Salud de los No Fumadores en el Distrito Federal Preparado por: Departamento de Investigación sobre Tabaco. Instituto Nacional de Salud Pública.

VI. Price and Demand for Cigarettes in Mexico

Price Elasticity of Demand

The price elasticity of demand — the percentage change in quantity demanded associated with a percentage change in price — is a key concept used to measure the impact of price and tax changes on consumption. Price elasticities are nearly always negative — when prices go up, the quantity demanded of a good generally goes down.*

Estimates of the price elasticity of demand for cigarettes internationally tend to be in the range of -0.25 to -0.50 in high-income countries, and close to -0.8 for low and middle-income countries.^{39,44} This means that a 10% increase in prices is expected to bring about a 2.5% to 8.0% decrease in consumption, depending on the country and the setting. In Latin American countries other than Mexico (including Argentina,⁴⁵ Brazil,⁴⁶ Chile,⁴⁷ and Uruguay⁴⁸), estimates of the price elasticity of demand for cigarettes range from -0.27 to -0.55 .

Several studies have estimated the price elasticity of demand for cigarettes in Mexico. Olivera et al. used aggregated national time series data for the period 1994 to 2005; they calculated a price elasticity of -0.25 and an income elasticity of 0.54.⁴⁹ They calculated cigarette consumption as the sum of national production and net imports, and estimated a Dynamic Ordinary Least

Squares regression model with cigarette consumption per capita (dependent variable) regressed on cigarette prices and quarterly per capita Gross National Product (explanatory variables). Assuming that factory prices and intermediary mark-ups remain constant, this study calculated that a 10% increase in taxes could increase government revenue by 16.1%.

The most comprehensive study to date of the price elasticity of demand for cigarettes in Mexico is that carried out by Jiménez et al.⁵⁰ The study used the National Household Income and Expenditure Survey (*Encuesta Nacional de Ingresos y Gastos de los Hogares* — ENIGH) for the years 1994, 1996, 1998, 2000, 2002, 2004, and 2005, with a total sample size of 109,089 households and calculated a price elasticity of -0.52 . Simulations based on this estimate showed that a 10% increase in the cigarette tax in Mexico — as calculated as a percentage of the price — would yield a 12.4% increase in the price to the consumer, a 6.4% decrease in consumption of cigarettes, and a 15.7% increase in the revenue yielded by the tax.[†]

Our working group recalculated the elasticity estimates in this study, using new data from the ENIGH — specifically the 2006 and 2008 rounds of the survey. The estimated elasticity for per capita demand is -0.55 in 2006, and -0.70 in 2008. The 2008 estimate is very likely to have been affected by the economic crisis in Mexico at that time, which would have made smokers more price-sensitive on average.

* If the price elasticity is between 0 and -1 , demand is considered to be inelastic — a given increase in price reduces demand, but by a smaller proportion. If the price elasticity is lower than -1 , demand is termed elastic.

† There are at two principal methodological challenges involved in estimating the price elasticity of demand using household surveys. Because these surveys generally do not include price data, price is estimated as household expenditure divided by the quantity of cigarettes consumed. In economic terminology, this estimate of price is endogenous — meaning that it is influenced by the household's consumption behavior — and it is therefore difficult to disentangle the actual effect of a price change from quality effects, income effects, and different household preferences. The second problem is that of censored observations — only smokers are observed to make decisions when prices change, while non-smokers are observed to have the same response (zero cigarettes smoked), irrespective of price. One approach to correct for censoring is to use a two part model — first estimating a household's probability of having a smoker, and then estimating the elasticity of consumption for households with at least one smoker. For further details see: Jiménez, Jorge Alberto, Belén Saenz de Miera, Luz Myriam Reynales, Hugh Waters, and Mauricio Hernández Ávila (2008). The Impact of Taxation on Tobacco Consumption in Mexico. *Tobacco Control*, Vol. 17, No. 1, pp. 105-110.

International Comparisons of Affordability

Cross-country comparisons of the real price and affordability of tobacco products provide a useful way to evaluate a country's existing tax structure and price levels. Existing tax rates might often appear reasonable at first pass, but if post-tax cigarette prices are low in comparison with other countries, it suggests that there is room to increase tobacco excises and potentially save more lives.

A 2009 study found that cigarettes in Mexico were the fourth most affordable (as measured by the percentage of per capita GDP needed to purchase 100 packs in 2006) among 16 middle-income countries.⁵¹ The amount of time a person needs to work to

The amount of time a person needs to work to purchase a pack of cigarettes is considerably lower in Mexico (22 minutes) than in other countries.

purchase a pack of cigarettes was calculated to be considerably lower in Mexico (22 minutes) than in other countries including the United Kingdom (35 minutes) and China (42 minutes). As the next chapter describes in more detail, cigarette taxes in Mexico are also low in comparison with high-income countries, where tax rates equivalent to 75% of the price to consumers are common.^{52,53}

Endnotes for Chapter VI

- ⁴⁴ Jha P, Chaloupka FJ, Moore J, Gajalakshmi V, Gupta PC, Peck R, Asma S, Zatonski W. "Tobacco Addiction." Chapter 46 in *Disease Control Priorities in Developing Countries* (2nd Edition), pp. 869-886. New York: Oxford University Press, 2006.
- ⁴⁵ González, M. (2006). *Economía del Control del Tabaco en los países del MERCOSUR y Estados Asociados: Argentina*. Washington: Organización Panamericana de la Salud.
- ⁴⁶ Iglesias, D. (2006). *Economía del Control del Tabaco en los países del MERCOSUR y Estados Asociados: Brasil*. Washington: Organización Panamericana de la Salud.
- ⁴⁷ Debrott, D. (2006). *Economía del Control del Tabaco en los países del MERCOSUR y Estados Asociados: Chile*. Washington: Organización Panamericana de la Salud.
- ⁴⁸ Ramos, A. (2006). *Economía del Control del Tabaco en los países del MERCOSUR y Estados Asociados: Uruguay*. Washington: Organización Panamericana de la Salud.
- ⁴⁹ Olivera-Chávez RI, Cermeño-Bazán R, Sáenz de Miera B, Jiménez-Ruiz JA, Reynales-Shigematsu LM (2009). *La demanda de tabaco en México: una aplicación de series de tiempo*. Unpublished.
- ⁵⁰ Jiménez, JA, Saenz de Miera B, Reynales LM, Waters H, and Hernández Ávila M (2008). The Impact of Taxation on Tobacco Consumption in Mexico. *Tobacco Control*, Vol. 17, No. 1, pp. 105-110.
- ⁵¹ Blecher EH, Van Walbeek CP. Cigarette affordability trends: an update and some methodological comments. *Tobacco Control* 2009; 18: 167-175.
- ⁵² Debrott D. (2006). *Economía del Control del Tabaco en los países del MERCOSUR y Estados Asociados: Chile*. Washington: Organización Panamericana de la Salud.
- ⁵³ Chaloupka F, Hu T, Warner K, Jacobs R, Yurekli A. The Taxation of Tobacco Products. In: Jha P, Chaloupka F, eds. *Tobacco Control in Developing Countries*. Oxford: Oxford University Press, 2000: 237-272.

VII. Tobacco Tax and Price Structure in Mexico

This chapter documents the current tax structure in Mexico, and discusses the design and administration of tobacco taxes. There are two main taxes levied on tobacco products — the Special Tax on Production and Services (STPS) or *Impuesto Especial sobre Producción y Servicios*, and the value added tax (VAT), which is levied at a uniform rate on nearly all goods and services in Mexico.

Economic Rationale for Tobacco Taxation: Market Failures

The economic principle of consumer sovereignty suggests that consumers make the best decisions about what to consume in order to maximize their utility under a given budget constraint. This principle rests in turn on two additional assumptions: (1) that consumers are fully informed about the costs and benefits of their choices; and (2) that they bear all the costs associated with their choices without imposing costs on others. Tobacco use typically violates both of these principles.

Information Failures and Addiction — Adolescent Smoking

The first principle of being fully informed of the costs and benefits of consumption choices rarely holds in the case of adolescents; indeed it is during adolescence that the decision to start smoking is

usually made. Smokers in Mexico do in fact begin smoking early; the average age of smoking initiation has declined, from 20.6 years among those born in 1930 to 16.6 years among those born in 1975-1978.² The legal age to purchase cigarettes in Mexico is 18, but enforcement of this provision is weak. A 1997 survey found that 79% of 561 cigarette outlets visited in Mexico City sold cigarettes to customers less than 18 years of age. Age-of-sale warning signs were displayed in only 12% of stores, and the presence of these signs was not associated with lower sales rates. Out of the 561 retailers tested, only four (0.7%) asked the minor's age and only one (0.2%) asked for proof of age.⁵⁴ The survey in Mexico City was repeated in 2002 and detected very little improvement — 73% of 577 surveyed stores sold cigarettes to minors.⁵⁵

The majority of 11-17 year old smokers born in the late 1980s and early 1990s began to smoke before the age of 10.* Additionally, the Global Youth Tobacco Survey (GYTS) shows that most young smokers in Mexico do not have accurate information about the risks associated with smoking, and lack the capacity to evaluate the power of this addiction. About 40% of the students responding to the survey from the years 2003 to 2008 reported not having information about the health risks associated with smoking at school, and between 15% and 25% of these students thought that it is safe to smoke for one or two years and then later quit smoking.⁵

More than 90% of young smokers ages 11 to 17 believe that they would be able to stop smoking if they wanted, but more than half (59%) failed when they tried. Of particular concern are the estimates from the GYTS that suggest that between 5% and 7.6% of the youth — based on reports of craving a cigarette the first thing in the morning, or on the consumption of more than six cigarettes per day — might be already addicted to nicotine.

Smokers in Mexico begin smoking early; the average age of smoking initiation has declined, from 20.6 years among those born in 1930 to 16.6 years among those born in 1975-1978.

* Estimates in this and the following paragraph are authors' calculations based on publicly available GYTS (Global Youth Tobacco Survey) data for 2003.

Information Failures and Cigarette Variants

Even though the GLTC prohibits selling cigarettes marked deceptively with labels such as “light” or “ultra light” (Article 20), the level of tar and nicotine is still printed on cigarette packages. This is despite evidence that such measurements are based on discredited testing approaches and have been inappropriately used to market some cigarettes as “healthier.”⁵⁶ This misleading information may have contributed to the growing popularity of “light” cigarettes in Mexico. In 1997, these cigarettes represented an estimated 12.5% of the market; by the end of 2006 their market share rose to 15.9%. The industry projects further increases in the “light” cigarettes market share through 2016.¹¹

Market Failures and External Costs

The second principle underlying consumer sovereignty is that the consumer alone bears the risks and costs of consumption decisions. Smoking, however, imposes physical and financial harm on other individuals and on society as a whole. These costs are primarily related to exposure to secondhand smoke (SHS), the loss of labor productivity due to smoking-related mortality, and the cost of healthcare attributable to treatment of smoking-related diseases.

Categories of Tobacco Taxes in Mexico

Several aspects of the tax system are important to analyzing the impact of tobacco taxes on prices and consumption. First, the overall level of tobacco taxes is important, since it fundamentally drives the price of tobacco products. Second, how this tax splits between excise taxes and other taxes is of interest, since the excise component of total tax is typically what distinguishes the price of tobacco products relative to other commodity prices. Third, how a country’s tobacco excise tax splits between specific taxes (taxes levied as nominal values, e.g. pesos per pack) and *ad valorem* taxes (levied as a percent of price) is of

relevance. Finally, whether taxes are adjusted for inflation is important, since it fundamentally affects the affordability of tobacco products over time

Specific taxes are easier to administer, yield predictable tax revenues, and discourage substitution towards cheaper cigarettes when prices increase.

Specific taxes are often preferred from the perspective of reducing tobacco consumption — they tend to be easier to administer, yield predictable tax revenues, and discourage substitution towards cheaper cigarettes when prices increase. To be effective, specific taxes need to be indexed for inflation, a feature that is built into *ad valorem* taxes, to the extent that tobacco prices follow overall inflation. Several countries rely on a mix of specific and *ad valorem* taxes. Mexico’s primary excise tax on cigarettes, by contrast, has been an *ad valorem* tax. A first step towards having a mix of specific and *ad valorem* taxes occurred in November 2009, when a tax denominated in pesos per pack was added to the existing *ad valorem* tax.

The Special Tax on Production and Services

Ad-valorem STPS

Implemented in 1981, the STPS is an *ad valorem* excise tax. Until 2001, the STPS was differentiated by product. Unfiltered cigarettes and other tobacco products such as cigars paid a lower rate than filtered cigarettes (20.9% of the price to the retailer before tax vs. 139.3%). This differential in tax rates was based on a belief that taxing products consumed disproportionately by the poor — which is particularly the case for unfiltered cigarettes — would be regressive. By the end of 2001, however, gradual increments of the tax rate for unfiltered cigarettes were approved to make it equal to the rate for filtered cigarettes over time.

The STPS is calculated on the price from the wholesaler to the retailer, including the factory price and the wholesaler's profit and overhead (but not STPS or VAT).^{*} Based on information collected from wholesalers and retailers, the average amount wholesalers add on in terms of profit and overhead is 1.14% of the price to the wholesaler. On average, the price to the retailer was 8.01 pesos in 2009, which we use as an approximation of the base amount for calculation of cigarette taxes. The true taxable base is confidential information, held by the Ministry of Finance.

The level of the STPS for filtered cigarettes has changed several times in recent years. It was 139.3% from 1981 to 1985, 180% from 1986 to 1988, 160% from 1989 to 1990, and 139.3% from 1991-1994. From

1995 to 2000, it decreased to 85%. Since 2000, the rate has steadily increased, to the current level of 160% (Table 7.1). The increases in 2007, 2008, and 2009 are all part of a phased-in increase passed in 2006.

The tax rate for unfiltered cigarettes was increased from 20.9% to 60% in 2002, and then to 80%, 100% and 110% in the three following years. Since 2005 the same rate has been applied to all types of cigarettes, excluding those entirely hand-made. The current STPS for manufactured tobacco products is 160% of the price to the retailer, and for entirely hand-made tobacco products it is 30.4%. The argument usually made to justify lower tax rates for hand-rolled tobacco products is the protection of employment, since the manufacture of these products is considerably more labor-intensive than for machine-rolled cigarettes.[†]

Table 7.1: Taxes and prices for filtered cigarettes, Mexico, 2000-2009

| Year | STPS (as % of price to the retailer) | STPS (as % of price to the consumer) | STPS + VAT (as % of price to the consumer) | Average real price of a pack of cigarettes (2009 Pesos) ^a |
|------|--------------------------------------|--------------------------------------|--|--|
| 2000 | 100% | 39.3% | 52.3% | 10.5 |
| 2001 | 100% | 39.3% | 52.3% | 11.6 |
| 2002 | 105% | 40.2% | 53.3% | 13.3 |
| 2003 | 107% | 40.6% | 53.6% | 14.3 |
| 2004 | 110% | 41.1% | 54.2% | 15.8 |
| 2005 | 110% | 41.1% | 54.2% | 18.1 |
| 2006 | 110% | 41.1% | 54.2% | 19.6 |
| 2007 | 140% | 45.8% | 58.9% | 21.8 |
| 2008 | 150% | 47.1% | 60.2% | 24.0 |
| 2009 | 160% | 48.3% | 61.4% | 26.5 |

Source: Authors' estimates using a 15% VAT rate and a retailer margin of 10.72% of the price to the retailer after STPS^b.

Notes:

^a The average price to the consumer for 2009 is based on total consumption and revenue figures

^b The STPS as a percentage of the price to the consumer is calculated as:
$$\frac{STPS}{(1 + 0.15)(1 + 0.1072)(1 + STPS)}$$

where 0.15 is the VAT rate, 0.1072 is the retailer margin and STPS denotes the STPS rate.

^{*} For the tax system to work, the manufacturer (or importer) of cigarettes must set the price to the retailer, which constitutes the taxable base for the STPS. During the first month of each year, the manufacturer presents to the tax authority a list of prices for all their products classified by brand and presentation. This list includes the factory price or price to the wholesaler, the price to the retailer, and the suggested price to the consumer. If these prices are modified before January of the following year, the manufacturer (or importer) must present the new list of prices within the five days after the changes are implemented (Article 19 of the STPS Law).

[†] 90% of large cigars, 80% of standard cigars, 50% of small cigars, and 10% of cigarettes are hand-rolled (Euromonitor, 2009).

Despite the increases in the STPS in recent years, the tax as a percentage of the final price — 61.4% in 2009 and 62.8% in 2010 — is considerably less than in countries like Uruguay and Chile, where the equivalent figures are 68% and 76%, respectively. The STPS would have to increase to 350% (*ad valorem* tax) or 17 year 2009 pesos (specific tax) to reach a similar tax incidence to that of Chile. Simulations in the next chapter indicate how this tax increase can be implemented, and quantify the gains in revenue and the lives saved.

The November 2009 legislation phases in a small specific tax of 0.80, 1.20, 1.60, and 2.00 pesos per pack in 2010, 2011, 2012, and 2013.

Specific Tax Component of STPS

While the STPS has been levied as an *ad valorem* tax so far, the legislature approved an increase in the tax, in the form of a specific tax of two pesos per packet in 2009. The November 2009 legislation phases in a small specific tax of 0.80, 1.20, 1.60, and 2.00 pesos per pack in 2010, 2011, 2012, and 2013, respectively. On a per-cigarette basis, this translates into increases of 0.04, 0.06, 0.08, and 0.10 pesos per cigarette, respectively. However, without automatic upward adjustments for inflation, the effectiveness of the newly introduced specific tax will erode over time.

Without automatic upward adjustments for inflation, the effectiveness of the newly introduced specific tax will erode over time.

The Value Added Tax (VAT)

The taxable base for the VAT is the price to the consumer, which includes the price to the retailer, the STPS and the retailer's profit and overhead but not VAT. The VAT rate till recently was 15% of the price to the consumer, except for cities on the U.S.–Mexico border, where the VAT is 10%.^{*} The rate has now been increased to 16% (11% for U.S. border cities) This tax is included in all transaction prices. For example, the producer of cigarettes includes the VAT in the price to the wholesaler, the wholesaler in the price to the retailer and the retailer in the price to the consumer. However, since wholesalers and retailers can deduct the amount of VAT they paid when purchasing the products from their taxes, it is sufficient to count the VAT paid by consumers to arrive at the government's VAT revenue collections.

Import Taxes

In addition to the STPS and the VAT, imported tobacco products from certain countries are subject to an additional *ad valorem* tax. The current rate for imported cigarettes is 67% of the price to the importer while the rate for imported cigars and small cigars is 45%. The price to the importer includes the cost of packages, packaging expenditures (salaries and materials), transportation costs and insurance. In this case, the price to the retailer used to calculate the STPS consists of the price to the importer, the import duty, the importer mark-up and the wholesaler mark-up.

Tobacco products imported from some commercial partners, including Canada, the U.S., the European Union, Japan, Bolivia, Chile, and Nicaragua, are exempt from import taxes. Several other countries have preferential duty rates.^{† 16}

^{*} In Mexico, the STPS becomes part of the taxable base for the VAT. The STPS is first added to the price to the retailer. The retailer then adds profit and overhead, and finally the VAT is added to the final sale price to the public. In most countries that use *ad valorem* excises the base is either the ex-factory price (the producer's price to the wholesaler), or the retail price.

[†] Countries with preferential duty rates include Argentina, Brazil, Colombia, Cuba, Ecuador, El Salvador, Guatemala, Honduras, Iceland, Israel, Liechtenstein, Norway, Paraguay, Peru, Switzerland, Uruguay, and Venezuela.

In practice, imported cigarettes represent a small fraction of domestically produced cigarettes. Imports are equivalent to 1.62% of the total volumes produced domestically in 2008, and much of these imports came from two countries that have import duty exemptions – Canada and the US (46.35% and 5.35%, respectively, of the total volume imported in 2008). Similarly, approximately half of imported cigars come from countries where exemptions apply – particularly the United States, the Netherlands, and Spain, which accounted for 33.4%, 10.3% and 5.9% of the total volume imported in 2008, respectively. All tobacco exports, including tobacco leaf exports, are exempted from taxes.

Tobacco Tax Structure and Retail Prices

After the STPS is added to the price to the retailer, the retailer adds on profit and overhead – together

these equal approximately 10.72% of the price to the retailer after STPS. For the most common brand, Marlboro, profit and overhead are equal to 10.89% of the price to the retailer. Mexico's Value-Added Tax (VAT) is charged after this stage, equalling 15% of the price to the consumer in 2009, and 16% from the year 2010. When expressed as a percentage of the final price, the 15% VAT is equivalent to 13.04% of final price.* We estimate the average final price (including VAT) of a pack of cigarettes in Mexico to be 26.52 Mexican pesos (US\$ 2.02) in 2009. For Marlboro, the most commonly-purchased brand, the average final price was 28.0 pesos (US\$ 2.13) per pack (Table 7.2) that year.

Based on information collected from wholesalers and retailers, the average amounts that these intermediaries add on in terms of profit and overhead are 1.14% of the price to the wholesaler and 10.72% of the price to the retailer (plus STPS), respectively.

Table 7.2: Tax structure per pack of cigarettes, 2009

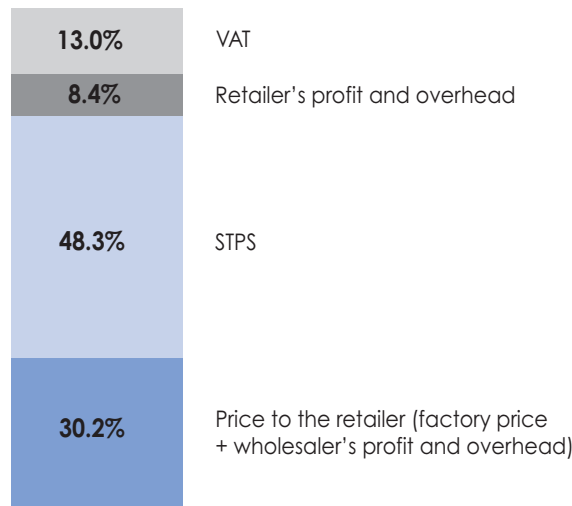
| Values | Premium Marlboro (Pack of 20) | Mid-Priced L&M (Pack of 20) | Economy Faros Light (Pack of 15) | Average price |
|--|-------------------------------|-----------------------------|----------------------------------|---------------|
| Price to retailer per pack: before STPS | 8.46 | 6.65 | 4.83 | 8.01 |
| STPS per pack (160%) | 13.53 | 10.63 | 7.73 | 12.82 |
| Price to retailer per pack: after STPS of 160% | 21.99 | 17.28 | 12.57 | 20.83 |
| Retailer's profit margin | 2.36 | 1.85 | 1.35 | 2.23 |
| Final price per pack: with retailer's margin but without VAT | 24.35 | 19.13 | 13.91 | 23.06 |
| VAT per pack | 3.65 | 2.87 | 2.09 | 3.46 |
| Final nominal price per pack to public: with VAT of 15% | 28.00 | 22.00 | 16.00 | 26.52 |
| Taxes as percentage of final retail price: | | | | |
| VAT | 13.04% | 13.04% | 13.04% | 13.04% |
| STPS | 48.33% | 48.33% | 48.33% | 48.33% |
| Total tax (VAT + STPS) | 61.37% | 61.37% | 61.37% | 61.37% |

Notes: The figures are authors' estimates based on information of final prices to the public by brand from Euromonitor (2009),²² and retailer margin of 10.72% of the price to the retailer after STPS (based on interviews with wholesalers and retailers). Average final price is obtained as a weighted average of brand-specific prices, weights being market share by brand, see Table 4.2.

* For example, if the price to the consumer before VAT is 10 pesos, the VAT is 1.5 pesos, and the actual retail price is 11.5 pesos. VAT as a percent of this retail price is (1.5/11.5) or 13.04%.

Expressed as a percentage of the price to the consumer, the STPS levied on cigarettes represents 48.3% in 2009, while the VAT represents 13.04% (Graph 7.1). The total tax incidence was therefore 61.3% of the final

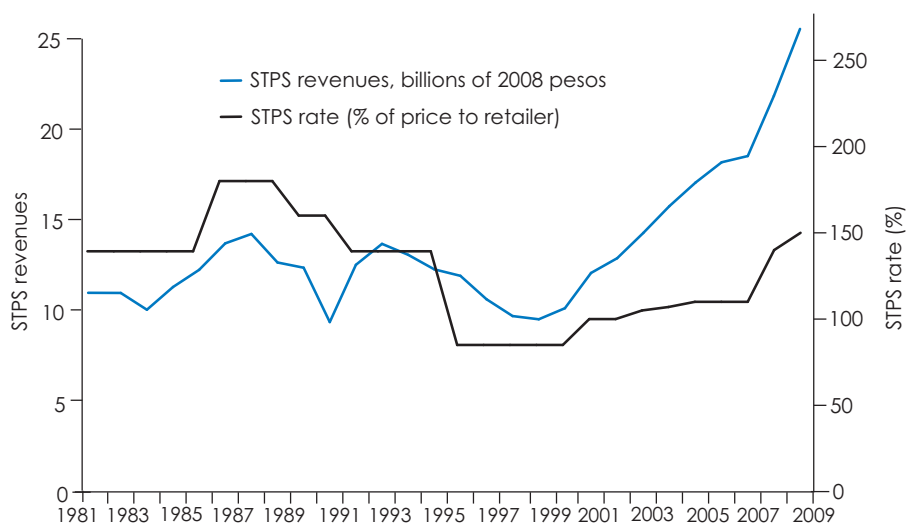
Graph 7.1: Cigarette tax structure and retail sales price, 2009



Source: Authors' calculations using data from the Bank of Mexico, the National Institute for Statistics and Geography (INEGI), the Ministry of the Economy, and the Ministry of Health.

Notes: The graph illustrates the split of final pack price by type of tax, see also Table 7.1. The 15% VAT rate implies that VAT is 13.04% of the final price (0.15/1.15). Prices are constructed from a weighted index reflecting the market share of each brand.

Graph 7.2: Tax revenue from the STPS and the STPS rate, 1981-2008



Source: Authors' analysis of data from the Ministry of Finance⁵⁸

price, while the retailer mark-up represents 8.4%, and the wholesale price (price to the retailer) equals 30.2% (Table 7.1 and Graph 7.1). If the final price of a pack of cigarettes were 28 pesos (as is currently the case for Marlboro 20-cigarette packs in most convenience stores in Mexico City), the STPS revenue would be 13.53 pesos per pack and the VAT revenue would be 3.65 pesos. The price to the retailer and the retailer mark-up would be 8.46 and 2.36 pesos, respectively.* We estimate the average final price (including VAT) of a pack of cigarettes in Mexico to be 26.52 Mexican pesos (US\$ 2.01).

Tobacco Tax Revenues

Revenue from taxes levied on tobacco in 2008 was approximately 32.4 billion pesos (US\$ 2.5 billion). This is calculated as 25.5 billion pesos (US\$ 1.9 billion) from the Special Tax on Production and Services, or STPS (the actual value in 2008), and 6.9 billion pesos (US\$ 525 million) from the Value Added Tax (VAT).⁵ Revenues from tobacco taxes have increased considerably over time in real terms (Graph 7.2) with periods of declining revenues tending to correspond to years in which lower STPS tax rates applied.

Endnotes for Chapter VII

⁵⁴ Kuri P, Cravioto P, Hoy M, et al. Illegal sales of cigarettes to minors. *Morb Mortal Wkly Rep* 1997;46(20):440-444.

⁵⁵ Kuri P, Cortés M, Cravioto P. Prevalencia y factores asociados de la venta de cigarros a menores de edad en el Distrito Federal. *Salud Publica Mex* 2005;47(6):402-412.

⁵⁶ World Health Organization. *Advancing knowledge on regulating tobacco products*. Geneva, 2000.

⁵⁷ Euromonitor International. *Tobacco in Mexico, 2009*.

⁵⁸ Sistema de Finanzas Públicas. Dirección General Adjunta de Estadística de la Hacienda Pública (UPEHP).

* Calculated from STPS and VAT Laws and interviews with wholesalers and retailers.

VIII. Simulations of the Effects of a Tax Increase

The November 2009 modification to the STPS motivates the analysis of alternative scenarios in this chapter and the estimates and calculations of the impact of policy options for future cigarette tax increases in Mexico on government revenues, consumption, and premature mortality from tobacco consumption.

An earlier study co-authored by several members of our team, published in the peer-reviewed journal *Tobacco Control*,⁵⁰ found that a 10% increase in cigarette prices would lead to a decrease of 5.2% in the quantity of cigarettes smoked (in other words a price elasticity of demand of -0.52). Further, relative to the year 2006 baseline, a 10% increase in the cigarette tax as a percentage of the price was predicted to lead to:

- An increase of 12.3% in the price to the consumer;
- A 6.4% decrease in the consumption of cigarettes; and
- An increase of 15.6% the revenue yielded by the tax.

These simulations were based on the National Household Income and Expenditure Survey (*Encuesta Nacional de Ingresos y Gastos de los Hogares* — ENIGH) for the time period 1994 to 2005.

In the simulations below, we have updated the analysis, including the ENIGH surveys for 2006 and 2008. Our working group recalculated the elasticity estimates in this study, using new data from the ENIGH — specifically the 2006 and 2008 rounds of the survey. The estimated elasticity is -0.55 in 2006, and -0.70 in 2008. For the simulations presented here, however, we use the -0.52 value since it is based on several years of data. The 2008 figure is likely to be less reliable given the economic turmoil present in Mexico at that time.

Alternative Tax Policy Options

Nearly all of the tobacco tax increases recommended in Mexico focus on the Special Production and Services Tax (STPS) since increasing this excise tax is the primary way to have an impact on tobacco prices relative to other prices. As documented in Chapter VII, the STPS is currently set at 160% of the price to the retailer for cigarettes. Excise tax as a percent of final price in Mexico amounts to 48.3%, while total tax (excise plus VAT) amounts to 61.4% of final price, lower than in many countries with successful tobacco control policies. The tax increase scenarios modeled in this paper are based on proposed alternatives in Mexico as well as the experience of countries with successful tobacco control policies. Four scenarios are considered for the time period 2010-2013:

- (1) **The law as approved in November 2009.** The STPS specific tax of 0.80 pesos per pack introduced in 2010 increasing to 1.20, 1.60, and 2.00 pesos per pack in the years 2011, 2012, and 2013, respectively. On a per-cigarette basis, this translates into increases of 0.04, 0.06, 0.08, and 0.10 pesos per cigarette, respectively.
- (2) **Immediate, inflation-adjusted implementation.** The law as approved in November 2009 — but implementing the 2.00 pesos specific tax per pack tax in 2010, and additional upward adjustments for inflation in the subsequent years.

Excise tax as a percent of final price in Mexico amounts to 48.3%, while total tax (excise plus VAT) amounts to 61.4% of final price, lower than in many countries with successful tobacco control policies.

- (3) **Ad valorem tax increase.** Preserving the existing legislation of a specific tax of 0.80, 1.20, 1.60, and 2.00 pesos per pack in the years 2010, 2011, 2012, and 2013, respectively but with two changes: first, adjusting the specific tax upward for inflation, and second, increasing the ad valorem rate so that total tax (excise tax plus VAT) equals 75% of total price by 2013 — similar to the levels currently applicable in Chile.
- (4) **Specific tax increase with subsequent inflation indexation.** While the *ad valorem* tax is maintained at 160%, the STPS specific tax on cigarettes would increase so that total tax is equal to 75% of total price by 2013, and would be indexed for inflation thereafter. International experience indicates countries with successful tobacco control policies tend to have total tax in the range of 75-80% of final price.

Modeling Parameters and Assumptions

The modeling exercise is based on the following data and assumptions:

- The consumption and revenue effects are calculated based on an average base price, reflecting the proportional share of each brand in total consumption.
- The STPS *ad valorem* value per pack is derived as the total government revenues from STPS divided by the total packs consumed per year. The total number of packs consumed is in turn calculated from national cigarette production figures from the National Institute of Statistics and Geography (INEGI) and import figures from the Ministry of the Economy, while total government revenues from STPS are as reported by the Ministry of Finance.
- Several of the figures for the base year 2009 are in fact from 2008 since 2009 data are not yet available. Specifically, total consumption and revenue generation figures are from 2008, obtained from the Ministry of the Economy, the Ministry of Finance, and the National Institute of Statistics and Geography.
- As described earlier, we use an average price elasticity of demand for cigarettes of -0.52 . Income elasticity is estimated at 0.49, and real per capita income is assumed to increase at a rate of 1.7% annually.⁵⁰
- Each cigarette is assumed to weigh 0.75 grams — the standard weight in a pack of 20 cigarettes, and also the value used by the Ministry of Finance.
- Annual inflation is assumed to average 4.3% over the time period covered by the simulations. The following parameters are adjusted for inflation — the wholesaler's price to retailer per pack; the STPS specific amount per pack (in Scenarios 2, 3, and 4); and the retailer's profit per pack. Tax revenues generated by the taxes are reported in both nominal and real (inflation-adjusted) pesos.
- The real price to the retailer before STPS, i.e., the factory price and the wholesaler's margin, is assumed to remain constant.
- Following the 2009 legislative initiative introducing the specific tax component, specific taxes are not included in the taxable base of the *ad valorem* STPS, but are included in the taxable base of the VAT.
- The modeling assumes that tax increases will not have an impact on illicit trade. If increased taxes have the effect of increasing smuggling, the decrease in taxable consumption would be greater than the decrease in actual consumption.
- An average retail margin of 10.72% of the price to the retailer after STPS was considered for all the time period covered. This figure is based on information collected through informal interviews with retailers.

- Price is calculated as follows:
 - (1) Wholesaler's real price per pack to retailer before STPS — the average for this is 8.01 pesos, based on the STPS *ad valorem* value per pack calculated as indicated above. Call this W_1 .
 - (2) Wholesaler's real price to retailer per pack — including STPS (W_2). The fixed STPS is added directly to W_1 (for example, $W_1 + 2.00$, where 2.00 is the fixed STPS under Scenario 2); *ad valorem* is calculated based on W_1 (for example, $W_1 \times 160\%$, where 160% is the *ad valorem* STPS).
 - (3) Real price per pack (R_1) — with retailer's profit but without VAT = $W_2 \times 1.107$ (10.7% retailer profit).
 - (4) Real price per pack to public (R_2) — with VAT of 15% = $R_1 \times 1.15$ for the base year 2009, and VAT of 16% for the following years, $R_1 \times 1.16$
 - (5) Final nominal price per pack to public (R_3) — adding in inflation of 4.3% per annum = $R_2 \times 1.043$.
- The number of cigarettes consumed changes over the baseline on account of the following factors:
 - (1) Population growth over the 2009 base, assuming the percentage of smokers is unchanged;*
 - (2) Real income growth over the 2009 base: the percentage change in cigarette sales due to real income growth of 1.7% per annum with an income elasticity of 0.49 is 0.83% (the product of real income growth and the income elasticity); and
 - (3) Real price change, applying the price elasticity (of -0.52) to the price change to arrive at the predicted quantity change in cigarette consumption.

Data Sources for Modeling

The simulations use data from the following household surveys:

- The National Household Income and Expenditure Survey (*Encuesta Nacional de Ingresos y Gastos de los Hogares* — ENIGH).
- The National Addictions Survey (*Encuesta Nacional de Adicciones* — ENA), conducted five times over the years 1988 to 2008.
- The National Health Survey (*Encuesta Nacional de Salud* — ENSA), carried out in 1994, 2000, and 2006.
- The Global Youth Tobacco Survey (GYTS), conducted in Mexico in 2000, 2003, 2005, 2006, and 2008.

Modeling Results

The year-by-year projections of prices, cigarette consumption, excise tax revenues and total tax revenues across the four scenarios are presented in Tables 8.1 through 8.4. The focus of the tables is on the 2010-2013 time window, to parallel the recently passed law which envisions a sequence of specific tax changes over the four years.

After a discussion of each scenario, a comparison of the cumulative effect of each of the four scenarios over the four-year period on tax revenues is presented in Table 8.6. Table 8.6 also motivates the discussion of the effect of each scenario on smoking prevalence and mortality averted due to quits in the cohort of smokers in Mexico in 2013.

Impact on Price, Consumption, and Government Revenue

The results discussed here pertain to price and revenues denominated in real terms, taking into

* Accounting for population growth yields the following estimates: Base year (2009): 107,550,697, year 2010: 108,350,965; year 2011: 109,151,234; year 2012: 109,951,502 and year 2013: 110,751,770

Table 8.1: Results of Scenario 1 — Law as approved in November 2009

The law as approved in November 2009 – an increase in the STPS specific tax of two pesos per packet, without adjustments for inflation. The specific tax would increase by 0.80, 1.20, 1.60, and 2.00 pesos per pack in the years 2010, 2011, 2012, and 2013, respectively.

| Values | 2009 (Base year) | 2010 | 2011 | 2012 | 2013 |
|--|---------------------|--------------|--------------|--------------|--------------|
| Parameters: | | | | | |
| Real GDP per capita growth | ----- | 1.7% | 1.7% | 1.7% | 1.7% |
| Estimated income elasticity | ----- | 0.49 | 0.49 | 0.49 | 0.49 |
| STPS – <i>ad valorem</i> value per pack (%) | 160% | 160% | 160% | 160% | 160% |
| STPS – <i>ad valorem</i> value per pack (real pesos) | 12.82 | 12.82 | 12.82 | 12.82 | 12.82 |
| STPS – specific tax component per pack (real pesos) ^a | ----- | 0.767 | 1.103 | 1.410 | 1.689 |
| Projected prices: | | | | | |
| Wholesaler's real price to retailer per pack – before tax | 8.01 | 8.01 | 8.01 | 8.01 | 8.01 |
| Wholesaler's real price to retailer per pack – including STPS | 20.83 | 21.59 | 21.93 | 22.24 | 22.52 |
| Real price per pack – with profit but without VAT | 23.06 | 23.91 | 24.28 | 24.62 | 24.93 |
| Real price per pack to public, inclusive of VAT | 26.52 | 27.73 | 28.16 | 28.56 | 28.92 |
| Percent increase in real price over 2009 level | ----- | 4.6% | 6.2% | 7.7% | 9.1% |
| Nominal price per pack to public – with VAT and inflation | 26.52 | 28.93 | 30.65 | 32.41 | 34.24 |
| Tax calculation: | | | | | |
| VAT per pack (real pesos) | 3.46 | 3.83 | 3.88 | 3.94 | 3.99 |
| VAT per pack as a % of final price | 13% | 13.8% | 13.8% | 13.8% | 13.8% |
| STPS – specific amount per pack as % of final price | ----- | 2.8% | 3.9% | 4.9% | 5.8% |
| STPS – <i>ad valorem</i> value per pack as % of final price | 48.3% | 46.2% | 45.5% | 44.9% | 44.3% |
| Excise Tax (specific + <i>ad valorem</i>) as % of final price | 48.3% | 49.0% | 49.4% | 49.8% | 50.2% |
| Total tax (VAT + <i>ad valorem</i> + fixed) as % of final price | 61.4% | 62.8% | 63.2% | 63.6% | 64.0% |
| Outcomes: | | | | | |
| Per-capita consumption (packs) | 18.5 | 18.2 | 18.1 | 17.9 | 17.8 |
| STPS excise tax revenues (millions of real pesos) | 25,542 | 26,849 | 27,478 | 28,065 | 28,615 |
| Change in real STPS excise tax revenues from base year (%) | ----- | 5.1% | 7.6% | 9.9% | 12.0% |
| Total tax revenues VAT (millions of real pesos) | 6,893 | 7,561 | 7,669 | 7,771 | 7,869 |
| Total tax revenues STPS (millions of nominal pesos) | 25,542 | 28,006 | 29,899 | 31,855 | 33,880 |
| Total tax revenues STPS + VAT (millions of nominal pesos) | 32,436 | 35,894 | 38,243 | 40,676 | 43,197 |
| Total tax revenues STPS + VAT (millions of real pesos) | 32,436 | 34,410 | 35,147 | 35,837 | 36,484 |
| Change in total real tax revenues from base year (%) | ----- | 6.1% | 8.4% | 10.5% | 12.5% |

^a STPS amounts in real pesos correspond to nominal values of 0.80, 1.20, 1.60 and 2.00 pesos in 2010, 2011, 2012 and 2013.

account predicted inflation over the years 2010 through 2013. Additional rows in Tables 8.1 through 8.4 present estimates of price and revenues in nominal terms.

Over the four years considered, Scenarios 1 and 2 result in price increasing only modestly in comparison to

2009 levels – by about 10% in real terms – and consequently have a relatively small impact on consumption and tax revenues (Table 8.1 and Table 8.2).

Under Scenario 1 (the law as approved in November 2009) real price increases from 26.52 pesos

Table 8.2: Results of Scenario 2 — Immediate implementation of two pesos per pack, and with adjustments for inflation

The law as approved in November 2009 – but implementing the 2.00 pesos per pack tax in 2010, and with subsequent adjustments for inflation.

| Values | 2009 (Base year) | 2010 | 2011 | 2012 | 2013 |
|--|---------------------|--------------|--------------|--------------|--------------|
| Parameters: | | | | | |
| Real GDP per capita growth | ----- | 1.7% | 1.7% | 1.7% | 1.7% |
| Estimated income elasticity | ----- | 0.49 | 0.49 | 0.49 | 0.49 |
| STPS – <i>ad valorem</i> value per pack (%) | 160% | 160% | 160% | 160% | 160% |
| STPS – <i>ad valorem</i> value per pack (real pesos) | 12.82 | 12.82 | 12.82 | 12.82 | 12.82 |
| STPS – specific tax component per pack (real pesos) ^a | ----- | 2.00 | 2.00 | 2.00 | 2.00 |
| Projected prices: | | | | | |
| Wholesaler's real price to retailer per pack – before STPS | 8.01 | 8.01 | 8.01 | 8.01 | 8.01 |
| Wholesaler's real price to retailer per pack – including STPS | 20.83 | 22.83 | 22.83 | 22.83 | 22.83 |
| Real price per pack – with profit but without VAT | 23.06 | 25.27 | 25.27 | 25.27 | 25.27 |
| Real price per pack to public, inclusive of VAT | 26.52 | 29.32 | 29.32 | 29.32 | 29.32 |
| Percent increase in real price over 2009 level | ----- | 10.6% | 10.6% | 10.6% | 10.6% |
| Nominal price per pack to public – with VAT and inflation | 26.52 | 30.58 | 31.90 | 33.28 | 34.71 |
| Tax calculation: | | | | | |
| VAT per pack (real pesos) | 3.46 | 4.04 | 4.04 | 4.04 | 4.04 |
| VAT per pack as a % of final price | 13.0% | 13.8% | 13.8% | 13.8% | 13.8% |
| STPS – specific amount per pack as % of final price | ----- | 6.8% | 6.8% | 6.8% | 6.8% |
| STPS – <i>ad valorem</i> value per pack as % of final price | 48.3% | 43.7% | 43.7% | 43.7% | 43.7% |
| Excise Tax (specific + <i>ad valorem</i>) as % of final price | 48.3% | 50.5% | 50.5% | 50.5% | 50.5% |
| Total tax (VAT + <i>ad valorem</i> + fixed) as % of final price | 61.4% | 64.3% | 64.3% | 64.3% | 64.3% |
| Outcomes: | | | | | |
| Per-capita consumption (packs) | 18.5 | 17.7 | 17.7 | 17.7 | 17.7 |
| STPS excise tax revenues (millions of real pesos) | 25,542 | 28,362 | 28,572 | 28,781 | 28,990 |
| Change in real STPS excise tax revenues from base year (%) | ----- | 11.0% | 11.9% | 12.7% | 13.5% |
| Total tax revenues VAT (millions of real pesos) | 6,893 | 7,741 | 7,798 | 7,855 | 7,912 |
| Total tax revenues STPS (millions of nominal pesos) | 25,542 | 29,585 | 31,089 | 32,667 | 34,324 |
| Total tax revenues STPS + VAT (millions of nominal pesos) | 32,436 | 37,660 | 39,574 | 41,583 | 43,692 |
| Total tax revenues STPS + VAT (millions of real pesos) | 32,436 | 36,103 | 36,370 | 36,636 | 36,903 |
| Change in total real tax revenues from base year (%) | ----- | 11.3% | 12.1% | 12.9% | 13.8% |

^a STPS specific tax amounts in real pesos correspond to nominal values of 2.09, 2.18, 2.27 and 2.37 in 2010, 2011, 2012 and 2013, respectively.

to 28.92 pesos by 2013, an increase of 9.1%. Excise taxes reach 50.2% of the final price, while total taxes (excise plus VAT) reach 64% of final price. The decline in per capita consumption (from 18.5 packs per capita

in 2009) is gradual, with increased income balancing some of the price-induced fall in consumption. Real STPS excise tax revenues in 2013 are likely to reach 28.6 billion pesos, 12% higher than the baseline.

Table 8.3: Results of Scenario 3 — Ad valorem tax increase in addition to existing legislation; excise tax 75% of final price by 2013

An increase in the STPS specific tax of two pesos per packet. The specific tax would increase by 0.80, 1.20, 1.60, and 2.00 pesos per pack in the years 2010, 2011, 2012, and 2013, respectively, with adjustments for inflation. The ad valorem rate would increase so that total tax was equal to 75% of total price by 2013.

| Values | 2009 (Base year) | 2010 | 2011 | 2012 | 2013 |
|--|---------------------|--------------|--------------|--------------|--------------|
| Parameters: | | | | | |
| Real GDP per capita growth | ----- | 1.7% | 1.7% | 1.7% | 1.7% |
| Estimated income elasticity | ----- | 0.49 | 0.49 | 0.49 | 0.49 |
| STPS – ad valorem value per pack (%) | 160% | 210% | 260% | 310% | 350% |
| STPS – ad valorem value per pack (real pesos) | 12.82 | 16.82 | 20.83 | 24.83 | 28.03 |
| STPS – specific tax component per pack (real pesos) ^a | ----- | 0.80 | 1.20 | 1.60 | 2.00 |
| Projected prices: | | | | | |
| Wholesaler's real price to retailer per pack – before STPS | 8.01 | 8.01 | 8.01 | 8.01 | 8.01 |
| Wholesaler's real price to retailer per pack – including STPS | 20.83 | 25.63 | 30.04 | 34.44 | 38.05 |
| Real price per pack – with profit but without VAT | 23.06 | 28.38 | 33.26 | 38.13 | 42.12 |
| Real price per pack to public, inclusive of VAT | 26.52 | 32.92 | 38.58 | 44.23 | 48.86 |
| Percent increase in real price over 2009 level | ----- | 24.1% | 45.5% | 66.8% | 84.3% |
| Nominal price per pack to public – with VAT and inflation | 26.52 | 34.34 | 41.98 | 50.21 | 57.85 |
| Tax calculation: | | | | | |
| VAT per pack (real pesos) | 3.46 | 4.54 | 5.32 | 6.10 | 6.74 |
| VAT per pack as a % of final price | 13.0% | 13.8% | 13.8% | 13.8% | 13.8% |
| STPS – specific amount per pack as % of final price | ----- | 2.4% | 3.1% | 3.6% | 4.1% |
| STPS – ad valorem value per pack as % of final price | 48.3% | 51.1% | 54.0% | 56.1% | 57.4% |
| Excise Tax (specific + ad valorem) as % of final price | 48.3% | 53.5% | 57.1% | 59.8% | 61.5% |
| Total tax (VAT + STPS + fixed) as % of final price | 61.4% | 67.3% | 70.9% | 73.5% | 75.3% |
| Outcomes: | | | | | |
| Per-capita consumption (packs) | 18.5 | 16.4 | 14.3 | 12.2 | 10.6 |
| STPS excise tax revenues (millions of real pesos) | 25,542 | 31,232 | 34,385 | 35,590 | 35,141 |
| Change in real STPS excise tax revenues from base year (%) | ----- | 22.3% | 34.6% | 39.3% | 37.6% |
| Total tax revenues VAT (millions of real pesos) | 6,893 | 8,048 | 8,307 | 8,216 | 7,886 |
| Total tax revenues STPS (millions of nominal pesos) | 25,542 | 32,579 | 37,415 | 40,395 | 41,607 |
| Total tax revenues STPS + VAT (millions of nominal pesos) | 32,436 | 40,974 | 46,453 | 49,720 | 50,943 |
| Total tax revenues STPS + VAT (millions of real pesos) | 32,436 | 39,280 | 42,692 | 43,805 | 43,027 |
| Change in total real tax revenues from base year (%) | ----- | 21.1% | 31.6% | 35.1% | 32.7% |

^a STPS specific tax amounts in real pesos correspond to nominal values of 0.83, 1.31, 1.82 and 2.37 in 2010, 2011, 2012 and 2013, respectively. These values differ from Scenario 1 since they account for inflation over and above the excises phased in through the November 2009 legislation.

Real total tax revenues (STPS excise plus VAT) are predicted to rise to 36.4 billion real pesos in 2013, 12.6% higher than in the base year.

If the STPS specific tax is implemented immediately (Scenario 2, Table 8.2) rather than in a staggered manner, and further, is adjusted for

Table 8.4: Specific tax increase with subsequent inflation indexation; excise taxes 75% of final price by 2013

Maintain the STPS *ad valorem* percentage at 160%. The STPS fixed tax on cigarettes would be indexed for inflation and would increase so that total tax is equal to 75% of total price by 2013.

| Values | 2009 (Base year) | 2010 | 2011 | 2012 | 2013 |
|--|---------------------|--------------|--------------|--------------|--------------|
| Parameters: | | | | | |
| Real GDP per capita growth | ----- | 1.70% | 1.70% | 1.70% | 1.7% |
| Estimated income elasticity | ----- | 0.49 | 0.49 | 0.49 | 0.49 |
| STPS – <i>ad valorem</i> value per pack (%) | 160% | 160% | 160% | 160% | 160% |
| STPS – <i>ad valorem</i> value per pack (real pesos) | 12.82 | 12.82 | 12.82 | 12.82 | 12.82 |
| STPS – specific tax component per pack (real pesos) ^a | ----- | 8.50 | 10.00 | 13.00 | 17.00 |
| Projected prices: | | | | | |
| Wholesaler's real price to retailer per pack – before STPS | 8.01 | 8.01 | 8.01 | 8.01 | 8.01 |
| Wholesaler's real price to retailer per pack – including STPS | 20.83 | 29.33 | 30.83 | 33.83 | 37.83 |
| Real price per pack – with profit but without VAT | 23.06 | 32.47 | 34.13 | 37.45 | 41.88 |
| Real price per pack to public, inclusive of VAT | 26.52 | 37.66 | 39.59 | 43.44 | 48.58 |
| Percent increase in real price over 2009 level | ----- | 42.0% | 49.3% | 63.8% | 83.2% |
| Nominal price per pack to public – with VAT and inflation | 26.52 | 39.29 | 43.08 | 49.31 | 57.52 |
| Tax calculation: | | | | | |
| VAT per pack (real pesos) | 3.46 | 5.20 | 5.46 | 5.99 | 6.70 |
| VAT per pack as a % of final price | 13.0% | 13.8% | 13.8% | 13.8% | 13.8% |
| STPS – specific amount per pack as % of final price | ----- | 22.6% | 25.3% | 29.9% | 35.0% |
| STPS – <i>ad valorem</i> value per pack as % of final price | 48.3% | 34.0% | 32.4% | 29.5% | 26.4% |
| Excise Tax (specific + <i>ad valorem</i>) as % of final price | 48.3% | 56.6% | 57.6% | 59.4% | 61.4% |
| Total tax (VAT + STPS) per pack as % of final price | 61.4% | 70.4% | 71.4% | 73.2% | 75.2% |
| Outcomes: | | | | | |
| Per-capita consumption (packs) | 18.5 | 14.6 | 13.9 | 12.5 | 10.7 |
| STPS excise tax revenues (millions of real pesos) | 25,542 | 33,798 | 34,700 | 35,577 | 35,223 |
| Change in real STPS excise tax revenues from base year (%) | ----- | 32.3% | 35.9% | 39.3% | 37.9% |
| Total tax revenues VAT (millions of real pesos) | 6,893 | 8,237 | 8,305 | 8,258 | 7,916 |
| Total tax revenues STPS (millions of nominal pesos) | 25,542 | 35,256 | 37,758 | 40,381 | 41,703 |
| Total tax revenues STPS + VAT (millions of nominal pesos) | 32,436 | 43,849 | 46,795 | 49,754 | 51,076 |
| Total tax revenues STPS + VAT (millions of real pesos) | 32,436 | 42,036 | 43,006 | 43,835 | 43,139 |
| Change in total real tax revenues from base year (%) | ----- | 29.6% | 32.6% | 35.1% | 33.0% |

^a STPS amounts in real pesos correspond to nominal values of 8.87, 10.88, 14.76 and 20.13 pesos in 2010, 2011, 2012 and 2013, respectively.

inflation, real price increases from 26.52 pesos in 2009 to 29.32 pesos for the years 2010-2013, an increase of 10.6%. Excise taxes reach their 2013 level of 50.5% of retail price in 2010 rather than the more gradual

increase in Scenario 1, and total tax (excise plus VAT) similarly rises to 64.3% in 2010. Per capita cigarette consumption declines considerably more in 2010 than under Scenario 1 (to 17.7 packs per person compared to

If the STPS 2 peso specific tax is implemented immediately and adjusted for inflation...real STPS excise tax revenues rise to 28.9 billion pesos by 2013, 13.5% higher than 2009 levels.

18.2 packs per person), and then levels off, as inflation and income growth offset one another. Real STPS excise tax revenues rise to 28.9 billion pesos by 2013, 13.5% higher than 2009 levels; while total tax revenues rise in real terms to 36.9 billion pesos in 2013, 13.8% higher than 2009 levels. While the 2013 situation for Scenarios 1 and 2 are similar, Scenario 2 illustrates the additional gains from a policy that implements a tax increase sooner rather than later.

Taxes increase price in Scenario 3 (Table 8.3) as compared to Scenario 1 in two ways: one, the specific tax is adjusted upwards for inflation, and second, the *ad valorem* STPS increases considerably from the present rate of 160% to 350% of the price from the wholesaler to the retailer in 2013.

Under Scenario 3, per pack final price rises to 48.86 pesos in 2013 — an increase approximately equal to one peso per cigarette, adjusting for inflation, resulting in the 2013 real price being 84.3% higher than the 2009 level. Excise taxes (STPS *ad valorem* plus specific) reach 61.5% of retail price, and total tax (inclusive of VAT) reaches 75.3% of retail price. The decline in per capita cigarette consumption is much larger than in either Scenarios 1 or 2, to 10.6 per capita in 2013. While consumption declines, revenues increase considerably due to the inelastic nature of the demand for cigarettes. Real excise tax revenues exceed 35 billion pesos in 2013, a 37.9% increase over the 2009 baseline, while real total tax revenues (STPS plus VAT) rise to 43 billion pesos, 32.7% higher than the baseline levels.

Revenue increases are the largest in Scenario 4 (Table 8.4), where the same total tax burden of slightly more than 75% of final price by 2013 is arrived at without changing the *ad valorem* rate (which stays at 160%), but by instead changing the specific tax. Scenario 4 illustrates the potential revenue gains possible by bringing tobacco taxation in line with those of other countries around the world with successful tobacco control policies.

The real price per pack under Scenario 4 reaches 48.58 pesos in 2013, 83.2% higher than the 2009 baseline level. The increased specific tax results in higher prices in comparison to Scenario 4 throughout. Consumption per capita in 2013 is 10.7 packs, similar to that in Scenario 3, though it is also lower over the preceding years 2010–2012, reflecting higher prices induced by the high specific tax. Real excise tax revenues (STPS *ad valorem* plus the new specific tax) amount to 35.2 billion pesos in 2013, 37.9% higher than in the base year. Real total taxes (STPS excise plus VAT) reach 43.2 billion pesos in real terms in 2013, 32.7% higher than the base year.

Scenarios 3 and 4 create a total tax level (inclusive of VAT) equivalent to 75% of final price — through an *ad valorem* tax and a specific tax, respectively. By reaching this level of taxation, by the year 2013 Mexicans would see an 82–83% increase in the real price of cigarettes, a 29–31% decrease in consumption of cigarettes, and an increase in real excise tax revenues in 2013 higher by more than 37%. The scenarios however use different approaches to arriving at a total tax of 75%, and the implications of the different approaches are discussed here.

Comparing Specific and Ad Valorem Taxes

Tobacco excises have the effect of increasing the relative prices of cigarettes and other tobacco products in comparison to non-tobacco consumption. In addition to this, tobacco tax policy often needs to be

By reducing the variation in prices and the probability of brand switching ... the specific tax will ultimately have a greater impact.

sensitive to the extent to which substitution might occur between tobacco products and brands when taxes are increased. As discussed earlier, Mexico's current tobacco excise tax regime is primarily an *ad valorem* one. While this has the advantage of automatically increasing taxes in response to inflation, it has the disadvantage of increasing the difference in prices across brands, a phenomenon that can make it more difficult to bring about declines in tobacco use.

The dispersion of prices across different brands is one dimension of taxation that is not captured in the simulations above, but that can have an additional bearing on how well alternative policies affect consumption and lives saved. In comparing Scenarios 3 and 4, the increase in the specific tax (Scenario 4) would likely have an even greater impact than the increase in the *ad valorem* tax (Scenario 3). Because the *ad valorem* tax is a proportional increase, it increases the price of the most expensive cigarettes the most, and creates a wider range of final prices between cheap and expensive cigarettes. A specific tax increase, on the other hand, would increase all cigarette prices

by the same absolute amount, and reduce the relative difference across brands. Table 8.5 shows a clear difference in the range of final prices in these two scenarios. For this reason, the specific tax is usually preferable to the proportional *ad valorem* tax — by reducing the variation in prices and the probability of brand switching in the face of a tax increase, the specific tax will ultimately have a greater impact.

Assuming the same total tax as a percentage of price, switching to cheaper brands would be more likely under a proportional increase — and levels of quitting would be higher under a fixed increase. Estimating the precise amounts of these consumption reductions, however, requires further research on cross-price elasticities to assess the extent to which consumers are likely to switch from a particular brand of cigarettes to another, based on a given increase in the difference between the prices of the two brands.

Impact on Smokers and Deaths Caused by Smoking

Table 8.6 summarizes the results of the four tax expansion scenarios compared to the pre-November 2009 tax rates (baseline) in terms of the final price, four-year totals of government excise tax revenues, reductions in the numbers of smokers and in the number of deaths due to smoking.

Table 8.5: Price differences by brand across tobacco tax policy scenarios

| Scenario | Premium Marlboro (Pack of 20) | Mid-Priced L&M Light (Pack of 20) | Economy Faros (Pack of 15) | Total tax as % of price |
|------------|----------------------------------|--------------------------------------|-------------------------------|----------------------------|
| Baseline | 33.16 | 26.07 | 18.93 | 61% |
| Scenario 1 | 35.71 | 28.61 | 21.48 | 64% |
| Scenario 2 | 36.17 | 29.08 | 21.95 | 64% |
| Scenario 3 | 60.41 | 48.13 | 35.78 | 75% |
| Scenario 4 | 57.02 | 51.69 | 44.56 | 75% |

Notes: The table compares the dispersion of prices under different tax regimes. Total tax as a fraction of price is the same in Scenarios 3 and 4, but lower priced brand prices are higher in Scenario 4 since a specific tax increases all brand prices by the same amount.

Table 8.6: Summary of simulation results

| Results for years 2010 to 2013 | Baseline | Scenario 1 | Scenario 2 | Scenario 3 | Scenario 4 |
|--|----------|------------|------------|------------|------------|
| Real price per pack in 2013^a | | | | | |
| Real price in 2013 (2009 pesos) | 26.52 | 28.92 | 29.32 | 48.86 | 48.58 |
| Increase, 2013 real price over 2009 baseline | ----- | 9.1% | 10.6% | 84.3% | 83.2% |
| Tax rates in 2013 | | | | | |
| STPS excise (<i>ad valorem</i> + specific) as % of final price | 47.9% | 50.2% | 50.2% | 61.5% | 61.4% |
| Total tax (STPS + VAT) as % of final price | 61.7% | 64.0% | 64.3% | 75.3% | 75.2% |
| Real Excise Tax revenues, cumulative, 2010 through 2013 | | | | | |
| STPS revenues (millions of real pesos), 2010 to 2013 ^b | 104,463 | 111,007 | 114,705 | 136,348 | 139,298 |
| Additional tax revenues over baseline (millions real pesos) | ----- | 6,543 | 10,242 | 31,885 | 34,835 |
| Percentage increase in real excise tax revenues, 2010 to 2013 | | 6.3% | 9.8% | 30.5% | 33.3% |
| Nominal Excise Tax revenues, cumulative, 2010 through 2013 | | | | | |
| STPS revenues (millions nominal pesos), 2010 to 2013 ^c | 116,267 | 123,640 | 127,666 | 151,996 | 155,098 |
| Additional tax revenues over baseline (millions nominal pesos) | ----- | 7,373 | 11,399 | 35,729 | 38,831 |
| Percentage increase in nominal excise tax revenues, 2010–2013 | | 6.3% | 9.8% | 30.7% | 33.4% |
| Reduction in number of smokers | | | | | |
| Baseline estimate of number of smokers in 2013: 18,285,117 ^d | | | | | |
| Reduction in number of smokers due to higher taxes ^e | ----- | 285,598 | 458,806 | 2,580,845 | 2,787,479 |
| Percentage reduction in number of smokers | | 1.6% | 2.5% | 14.1% | 15.2% |
| Reduction in mortality | | | | | |
| Baseline estimate of deaths due to smoking in 2013 cohort: 9,142,559 ^f | | | | | |
| Reduction in smoking-attributable deaths due to higher taxes ^g | ----- | 99,959 | 160,582 | 903,296 | 975,618 |
| Percentage reduction in smoking-attributable deaths | | 1.1% | 1.8% | 9.9% | 10.7% |

Notes

a Real price per pack derived from the 2013 estimates in Tables 8.1 through 8.4 under alternative scenarios

b STPS excise revenues are the total of the excise revenues over 4 years for each scenario in Tables 8.1 through 8.4. The baseline figure of 104,463 is the real peso value of excise revenues over the four years if no change in law had been implemented, i.e. if the 160% *ad valorem* excise and 15% VAT continued without change

c STPS excise revenues in nominal terms are identical to the real revenues with an upward adjustment for anticipated inflation over the four year period of 2010 to 2013

d Baseline estimate of number of smokers in 2013 includes an adjustment for population growth and for income growth, assumptions in the text

e The percentage reduction in the number of smokers is calculated as one-half of the total percentage in cigarette consumption — assuming that one-half of the effect of a price increase affects decisions to smoke or not to smoke, and one-half affects the amount smoked for those who do smoke⁹

f One-half of smokers are assumed to eventually die of tobacco-related illness (a review of global evidence estimates this figure to be between 50% and 70%)^{14,15,44}

g The number of deaths averted is calculated based on the assumption that one-half of smokers who quit are likely to die of tobacco-related illnesses, and that approximately 70% of this expected number of deaths can be averted by smokers quitting¹ — the number of deaths averted is calculated as the change in the number of smokers * 0.5 * 0.7. The smoking attributable mortality pertains to the 2013 cohort of smokers.

The revenue estimates in Table 8.6 enable an assessment of the impact of the four alternative tax policy scenarios over and above the year-by-year

changes reflected in Tables 8.1 through 8.4. The results suggest that Scenarios 1, 2, 3 and 4 result in real excise tax revenues over the four-year period that are

respectively 6.3%, 9.8%, 30.5% and 33.3% higher than the cumulative excise taxes over the four years if tobacco taxes stayed at their 2009 level. While Tables 8.3 and 8.4 suggest that 2013 price levels are similar for Scenarios 3 and 4, the additional revenues from the specific tax changes in Scenario 4 comes about on account of larger increases in per-pack price in the earlier years.

The effect of the price increases under the different scenarios on smoking behavior is calculated applying the estimate of price elasticity of demand (-0.52) to the estimate of the number of smokers in the population. In line with other studies, one half of the effect of price on consumption is assumed to be on smokers quitting (reductions in prevalence), while the rest is assumed to be reductions in the number of cigarettes individuals smoke (reductions in conditional demand).⁴⁶ With an estimated population of 18.3 million smokers, the effects of the four scenarios are, respectively, reductions of 0.29 million, 0.46 million, 2.58 million and 2.79 million smokers relative to a baseline where no increase in taxes occurs over pre-November 2009 levels.

To translate the reduction in the number of smokers into estimates of mortality averted, additional assumptions from the literature are used. One half of smokers are likely to die from tobacco-related diseases, and quitting is attributed to result in a 70% reduction in premature mortality in those likely to die of tobacco-

related illnesses. By this estimate, Scenario 1, the November 2009 tax increase, is likely to prevent nearly a hundred thousand premature deaths from smoking. A more immediate price increase — to 2 pesos in 2010 with inflation adjustments in the coming years — would result in more than 160 thousand premature deaths averted. Scenario 3, which calls for an increase in *ad valorem* STPS tax rate to 350 % by 2013 is likely to result in 0.9 million deaths being averted. Under Scenario 4, with a specific tax of more than 20 pesos and total tax at 75% of final price, 0.98 million premature deaths are likely to be averted. This figure is nearly 10 times the premature deaths averted due to the November 2009 tax increases. Further, unlike an *ad valorem* tax, the specific tax would reduce the variation in prices across brands in the market, and would reduce the probability of brand switching in the face of a tax increase.

Impact on Smuggling

Following the implementation of the North America Free Trade Agreement (NAFTA) in 1994, there has been a sequence of changes in the ownership of tobacco companies, levels of legal imports and exports, and smuggling. These trends are due to changes related to the implementation of NAFTA, and to the differences in the levels of excise taxes in the three countries that are partners to the agreement. The tobacco industry has argued that increased excise taxes on cigarettes have led to increased smuggling, negative effects on employment, and the presence of a black market for tobacco products.

Quantifying smuggling remains a complex task. Since Philip Morris and British American Tobacco (BAT) import cigarettes into Mexico from the United States and Canada, there is an overlap between legitimate and illegal sources of tobacco importation into Mexico. A sound analysis of smuggling in Mexico requires an understanding of the patterns of consumption in the country, prevailing business

...with a specific tax of 20 pesos and total tax at 75% of final price by 2013, 0.98 million premature deaths could be averted, nearly 10 times the premature deaths averted due to the November 2009 tax increases.

practices, the structure of the tax system, and regional variations in each of these factors.⁶⁰

The most recent estimates (from Euromonitor) show that illicit trade accounted for 5.9% of tobacco consumption in Mexico in 2008.⁵⁹ This represents 2.2 billion cigarettes, a number which has gradually increased since 2003. Compared to other countries, contraband in Mexico seems to be below the global average (11.6% of global consumption)⁶¹ and also below other countries in South America (10% in Argentina and 12% of total consumption in Uruguay).⁶²

While it has been argued that higher tobacco taxes will lead to increased smuggling and related criminal activity, several studies have shown that countries can significantly increase tobacco taxes without experiencing dramatic increases in smuggling. In several countries, sharp price increases have not led to a significant rise in smuggling.⁶³ To reduce tobacco smuggling, the World Health Organization and the Framework Convention on Tobacco Control (FCTC) recommend several key steps, including mandatory licensing and the inclusion of tax-paid and country-of-origin markings on tobacco products for tracking and identification.

Earmarking Tobacco Taxes

Several countries have successfully harnessed tobacco excise taxes to fund specific health programs.

Earmarking tobacco taxes can take several forms. A part of tobacco tax receipts might fund tobacco control efforts including the strengthening of mechanisms to curb smuggling or, more broadly, to support efforts to reduce tobacco use under the ambit of the MPOWER package and in line with a country's ratification of the FCTC. Some countries have used revenues to fund health insurance schemes — Egypt, for instance, uses funds from tobacco tax receipts to finance medical insurance coverage for students — or to fund specific programs to improve public health.

In Mexico's instance, the direct costs imposed by tobacco use are not small: Health expenditures of about 75.2 billion pesos in 2008 are estimated to have been directed towards tobacco-related illnesses. Part of the additional revenue resulting from the tax increase under the alternative scenarios can conceivably be earmarked to fund public health efforts to reduce tobacco consumption. Scenario 4, for example, projects a likely increase of nearly 35 billion in real excise tax revenue over a four year period, suggesting that the impact of a tax increase on reduced consumption can be considerably enhanced if some of the revenues are directed towards additional efforts to reduce tobacco use. Some of the newly generated tax revenues could also be used to enhance existing health services — including the Seguro Popular health insurance program — and to strengthen mechanisms to combat illicit trade.

Endnotes for Chapter VIII

⁵⁹ Barber S, Adioetomo SM, Ahsan A, Setyonaluri D. Tobacco Economics in Indonesia. Paris: International Union Against Tuberculosis and Lung Disease; 2008.

⁶⁰ Merriman D. Comprender, medir y combatir el contrabando de tabaco, Washington, D.C., OPS-WB, 2005.

⁶¹ Shafey O, Eriksen M, Ross H, Mackay J. The Tobacco Atlas. Atlanta: American Cancer Society, 2009.

⁶² Ramos A. Illegal trade in tobacco in the Mercosur countries. FCA, 2009.

⁶³ Blecher E. Illicit Trade in South Africa: Has it Undermined Tobacco Control? FCA, 2009.

Conclusion and Recommendations

Taxation of tobacco products is the most effective strategy available to governments to reduce smoking levels, diminish the negative health effects caused by smoking, and recoup costs related to both healthcare and lost productivity. In Mexico, there is still considerable room to raise taxes on cigarettes and other tobacco products. Doing so will raise revenues, prevent smoking-related illness and related treatment costs, and save lives.

This paper has presented detailed arguments for tobacco taxation, as well as four scenarios documenting the likely effects of tobacco tax increases in Mexico on smoking levels, government revenues and mortality. The last scenario, in particular, suggests that there is considerable avenue to obtain additional public health gains and revenue if specific taxes similar to the November 2009 legislation are scaled up — raising the specific tax component to 20 pesos per pack by 2013 would increase total tax (excise plus VAT) to 75% of retail price, prevent 0.98 million smokers dying prematurely and result in real STPS excise revenues of over 41 billion pesos in 2013.

Based on the analysis of this report, we recommend the following:

1. **Increase tobacco excise taxes substantially**, so total taxes reach a level of 75% of retail price compatible with international best practices and characteristic of countries with successful tobacco control policies. This is likely to prevent nearly 1 million premature deaths from smoking-related illness in Mexico's 2013 population.
2. **Increase reliance on specific tobacco taxes over *ad valorem* taxes.** Specific taxes are typically easier to administer since they discourage the manipulating of prices. Further, they tend to reduce the dispersion in prices among brands, discouraging the tendency to substitute towards cheaper cigarettes when taxes are increased.
3. **Adjust specific taxes for inflation**, as the superior outcomes in Scenario 2 over Scenario 1 demonstrate. By the year 2013, the specific tax for Scenario 2, indexed for inflation, is 2.27 pesos, compared to 2.00 pesos for Scenario 1. It is also important that inflation adjustments be automatic, by administrative order. This is actually a common practice for other taxes in Mexico. The fixed component of the Income Tax (Impuesto Sobre la Renta — ISR), for example, is adjusted each month.
4. **Strengthen tobacco tax administration.** Regardless of the tax strategy chosen, successful tobacco tax administration will depend on comprehensive registration and licensing of all commercial producers, importers, and wholesale retailers. Licensing should include background checks to confirm the absence of a criminal background or prior involvement with smuggling. Effective administration also requires that tobacco products are systematically accounted for as they move in and out of tobacco production and shipment warehouses. Accountability requires audits, including inspections and counting of inventory. To increase reliability, auditors should go through frequent turnover, and auditing managers should make unannounced visits.⁶⁴ The GLTC, Mexico's 2008 General Law for Tobacco Control currently contains some, but not all, of these provisions.
5. **Consider earmarking part of the additional revenue resulting from a tobacco tax increase** to fund public health efforts to reduce tobacco consumption. Some of the newly generated tax revenues could also be used for health services, including the Seguro Popular.

Mexico's 2004 ratification of the FCTC suggests a willingness to engage in addressing the multiple challenges of tobacco control. In this regard, a systematic effort to reduce tobacco consumption

achieved through fiscal policy would create a win-win situation for the country by increasing tobacco tax revenues while also countering smoking and its negative health and economic effects.

Endnotes

- ⁶⁴ Sunley, Emil M., Ayda Yurekli, and Frank J. Chaloupka. The design, administration, and potential revenue of tobacco excises. Chapter 17 in In: Jha P, Chaloupka FJ, eds. Tobacco Control in Developing Countries. Edited Volume. Section I, Chapter 9. Oxford, Oxford University Press, 2000.

Acknowledgements

The authors of this report gratefully acknowledge the cooperation of the National Institute of Public Health (INSP) and the Ministry of Health of Mexico. In particular, Dr. Mauricio Hernández-Ávila, Vice Minister of Disease Prevention and Health Promotion (Subsecretario de Prevención y Promoción de la Salud) has provided oversight and guidance in the preparation of the report. The authors are also grateful for input and comments from Dr. Emil Sunley, who reviewed the paper. Any errors or omissions remain the sole responsibility of the authors. The report was funded by Bloomberg Philanthropies and the Bill and Melinda Gates Foundation as part of the Bloomberg Initiative to Reduce Tobacco Use. Kelly Henning and Neena Prasad of Bloomberg Philanthropies and Rajeev Cherukupalli of the Johns Hopkins Bloomberg School of Public Health provided inputs for the development of the report.

Bibliography

- Armando Arredondo, Carlos Carrillo, Alexis Zuñiga. Economic burden of expected epidemiological changes in diseases related to tobacco, Mexico. *Rev Saúde Pública* 2007;41 (4):523-9
- Barber S, Adioetomo SM, Ahsan A, Setyonaluri D. Tobacco Economics in Indonesia. Paris: International Union Against Tuberculosis and Lung Disease; 2008.
- Barrientos-Gutiérrez T, Amick BC, Reynales-Shigematsu LM, Gimeno D, Delclos GL, Harrist RB, Kelder SH, Lazcano-Ponce E, Hernandez-Avila M. Ventilation, air extraction or smoking ban? Environmental tobacco smoke exposure in Mexican restaurants and bars. In press.
- Barrientos-Gutiérrez T, Reynales-Shigematsu LM, Ávila-Tang E, Wipfli H, Lazcano-Ponce E (2007 b). Exposición al humo de tabaco en hogares de la Ciudad de México: análisis de nicotina ambiental y en cabello de niños y mujeres *Salud publica Mex* 49 Supl 2: S224 S232.
- Blecher E. Illicit Trade in South Africa: Has it Undermined Tobacco Control? FCA, 2009.
- Blecher EH, Van Walbeek CP. Cigarette affordability trends: an update and some methodological comments. *Tobacco Control* 2009; 18: 167-175.
- Bo-Qi L, Peto R, Chen ZM, Boreham J, Wu YP, Li JY, et al. Emerging tobacco hazards in China. 1. Retrospective proportional mortality study of one million deaths. *BMJ* 1998; 317(7170):1411-22.
- Bruni, José María. Costos Directos de la Atención Médica de las Enfermedades Atribuibles al Tabaquismo en los Hospitales Públicos del Ministerio de Salud del Gcaba. Working Paper. Argentina.
- Bunn WB 3rd, Stave GM, Downs KE, Alvir JM, Dirani R. Effect of smoking status on productivity loss. *Journal of Occupational and Environmental Medicine* 2006;48(10):1099-108; Halpern MT, Shikar R, Rentz AM, Khan ZM. Impact of smoking status on workplace absenteeism and productivity. *Tobacco Control* 2001;10(3):233-238.
- Campuzano JC, Hernández M, Samet JM, Méndez I, Tapia R, Sepúlveda J. Comportamiento de los fumadores en México según las Encuestas Nacionales de Adicciones 1988 a 1998. In: Valdés R, Lazcano EC, Hernández M, eds. Primer informe sobre combate al tabaquismo. México ante el Convenio Marco para el Control del Tabaco. Cuernavaca: Instituto Nacional de Salud Pública, 2005. [Smoking Behaviour in Mexico according to the National Addiction Surveys 1988 to 1998. In: The first report on tobacco control: Mexico and the Framework Convention for Tobacco Control.].
- Chaloupka F, Hu T, Warner K, Jacobs R, Yurekli A. The Taxation of Tobacco Products. In: Jha P, Chaloupka F, eds. *Tobacco Control in Developing Countries*. Oxford: Oxford University Press, 2000: 237-272.
- Coordinadora Nacional de las Fundaciones Produce – Cofupro (2003). Caracterización de las Cadenas Prioritarias e Identificación de las Demandas Tecnológicas. Cadena Tabaco.
- Debrott D. (2006). Economía del Control del Tabaco en los países del MERCOSUR y Estados Asociados: Chile. Washington: Organización Panamericana de la Salud.
- Debrott, D. (2006). Economía del Control del Tabaco en los países del MERCOSUR y Estados Asociados: Chile. Washington: Organización Panamericana de la Salud.
- ERC Group (2007). World Cigarettes 1. The 2007 Survey: Americas. Suffolk, UK: ERC Group Ltd. WHO Report on the Global Tobacco Epidemic, 2008: The MPOWER package. Geneva.: World Health Organization, 2008. ISBN: 978 92 4 159628 2. http://www.who.int/tobacco/mpower/gtcr_download/en/index.html.
- Euromonitor International. Tobacco in Mexico, 2009.
- González, M. (2006). Economía del Control del Tabaco en los países del MERCOSUR y Estados Asociados: Argentina. Washington: Organización Panamericana de la Salud.
- Grupo Interinstitucional sobre Estudios en Tabaco, 2003.
- Guerrero López CM, Jorge Alberto Jiménez JA, Reynales Shigematsu LM, Waters H. 2009. Evaluación del impacto económico de la Ley de Protección a la Salud de los No Fumadores en el Distrito Federal Preparado por: Departamento de Investigación sobre Tabaco. Instituto Nacional de Salud Pública.
- Iglesias, D. (2006). Economía del Control del Tabaco en los países del MERCOSUR y Estados Asociados: Brasil. Washington: Organización Panamericana de la Salud.
- Jha P, Chaloupka F. Curbing the epidemic. Governments and the Economics of Tobacco Control, Washington: The World Bank, 1999.
- Jha P, Chaloupka FJ, Moore J, Gajalakshmi V, Gupta PC, Peck R, Asma S, Zatonski W. "Tobacco Addiction." Chapter 46 in *Disease Control Priorities in Developing Countries (2nd Edition)*, pp. 869-886. New York: Oxford University Press, 2006.
- Jiménez, JA, Saenz de Miera B, Reynales LM, Waters H, and Hernández Ávila M (2008). The Impact of Taxation on Tobacco Consumption

in Mexico. *Tobacco Control*, Vol. 17, No. 1, pp. 105-110.

Kuri P, Cortés M, Cravioto P. Prevalencia y factores asociados de la venta de cigarros a menores de edad en el Distrito Federal. *Salud Publica Mex* 2005;47(6):402-412.

Kuri P, Cravioto P, Hoy M, et al. Illegal sales of cigarettes to minors. *Morb Mortal Wkly Rep* 1997;46(20):440-444.

Kuri-Morales PA, González-Roldán JF, Hoy MJ, Cortés-Ramírez M. Epidemiología del tabaquismo en México. *Salud Publica Mex* 2006; 48 supl 1:S91-S98.

Lazcano-Ponce E, Benowitz N, Sanchez-Zamorano LM, Barbosa-Sanchez L, Valdes-Salgado R, Jacob P 3rd, Diaz R, Hernandez-Avila M (2007). Secondhand smoke exposure in Mexican discotheques. *Nicotine Tob Res*. Oct;9(10):1021-6

Llanes JL, Ramos A, Reynales LM, Sáenz de Miera B, Waters H. Proposals to Increase Cigarettes Taxes. Mexico City, Mexico Report of a Working Group, August 10-12, 2009.

Mackinlay H (1999). "Nuevas tendencias de la agricultura del contrato: los productores de tabaco en Nayarit después de la privatización de Tabamex (1990-1997)". En: Carton de Grammont H (ed.) *Empresas, reestructuración productiva y empleo en la agricultura mexicana*, México: IIS UNAM-Plaza y Valdés, págs. 145-204.

Mackinlay H. ¿Aliados o antagonistas? La relación entre jornaleros agrícolas y pequeños productores en la rama del tabaco en México durante la década de los noventa, ponencia presentada en la Mesa de Trabajo: Trabajo Rural del V Congreso Nacional AMET, Morelos, 17-19 mayo de 2005.

Max W. The financial impact of smoking on health-related costs: A review of the literature. *American Journal of Health Promotion* 2001;15:321-31, 2001.

Medina-Mora ME, Peña-Corona MP, Cravioto P, Villatoro J, Kuri P (2002). From tobacco use to other drugs use: does the early use of tobacco increase the probability of use of other drugs. *Salud Publica Mex*. 44 Suppl 1:S109-15.

Merriman D. *Comprender, medir y combatir el contrabando de tabaco*, Washington, D.C., OPS-WB, 2005.

Miller LS, Zhang X, Max W. State estimates of total medical expenditures attributable to smoking. 1993 Public Health Reports, September/October 1998.

Ministry of Agriculture, Farming Information System (SIACON).

Ministry of Agriculture. Reconversión del cultivo de tabaco en México. Presented at the XIII Congress of Research on Public Health, National Institute of Public Health, Cuernavaca, Mexico; April 2009.

Ministry of the Economy, Sistema de Información Arancelaria Vía Internet: <http://www.economia-snci.gob.mx:8080/siaviWeb/siaviMain.jsp> - checked in September 2009.

Morbidity and Mortality Weekly Reports (MMWRs). Annual smoking-attributable mortality, years of potential life lost, and productivity losses - United States. 1997-2001, July 1, 2005; Vol. 54 / No. 25.

National Institute of Geography and Statistics (INEGI). Encuesta Industrial Mensual. Available in: <http://www.inegi.org.mx> - checked in September 2009.

Olaíz G, Rojas R, Barquera S, Shamah T, Aguilar C, Cravioto P, López P, Hernández M, Tapia R, Sepúlveda J. Encuesta Nacional de Salud 2000. Tomo 2. La salud de los adultos. Cuernavaca: Instituto Nacional de Salud Pública 2003.

Olivera-Chávez RI, Cermeño-Bazán R, Sáenz de Miera B, Jiménez-Ruiz JA, Reynales-Shigematsu LM (2009). La demanda de tabaco en México: una aplicación de series de tiempo. Unpublished.

Ramos A. Illegal trade in tobacco in the Mercosur countries. FCA, 2009.

Ramos, A. (2006). *Economía del Control del Tabaco en los países del MERCOSUR y Estados Asociados: Uruguay*. Washington: Organización Panamericana de la Salud.

Reynales LM, Vázquez JH, Lazcano EC. "Encuesta Mundial de Tabaquismo en Estudiantes de la Salud, México 2006", *Salud Pública de México*, 2007, 49, 194-204.

Reynales-Shigematsu LM, Valdés-Salgado R, Rodríguez-Bolaños R, Lazcano-Ponce E, Hernández-Ávila M. Encuesta de Tabaquismo en Jóvenes en México. Análisis descriptivo 2003, 2005, 2006, 2008. Cuernavaca, México: Instituto Nacional de Salud Pública, 2009.

Reynales, L.M., R.A. Rodríguez, J.A. Jiménez, S.A. Juárez, A. Castro, M. Hernández (2006). "Costos de la atención médica atribuibles al consumo de tabaco en el Instituto Mexicano del Seguro Social", *Salud Publica de México*, vol. 48, suppl. 1, págs. 48 a 64.

Roberto Tapia-Conyer R, Kuri-Morales pR, Hoy-Gutiérrez JM. Panorama epidemiológico del tabaquismo en México. *Salud Publica Mex* 2001; Vol. 43(5):478-484

Sáenz de Miera B, Jiménez JA, Reynales LM, Lazcano EC, Hernández M. El consumo de tabaco en los hogares mexicanos, 1994-2005, *Salud Publica Mex* 2007; 49, suppl. 2: 263-269.

Sáenz de Miera-Juárez B, Jiménez-Ruíz JA, and Reynales -Shigematsu LM. The Economics of Tobacco in Mexico. National Institute of Public Health. Funded by the American Cancer Society. July, 2007. ISBN: 978-1-60443-000-4.

Shafey O, Eriksen M, Ross H, Mackay J. The Tobacco Atlas. Atlanta: American Cancer Society, 2009.

Sistema de Finanzas Públicas. Dirección General Adjunta de Estadística de la Hacienda Pública (UPEHP).

Stanley K. Control of tobacco production and use. In: Jamison DT, Mosley WH, Measham AR, Bobadilla JL, eds. Disease control priorities in developing countries. Oxford University Press 1993:703-23.

Stevens G, Dias RH, Thomas KJA, Rivera JA, Carvalho N, Barquera S, Kenneth Hill K, Ezzat M. Characterizing the Epidemiological Transition in Mexico: National and Subnational Burden of Diseases, Injuries, and Risk Factors. PLoS Medicine June 2008, Volume 5, Issue 6, p. e125

Sunley, Emil M., Ayda Yurekli, and Frank J. Chaloupka. The design, administration, and potential revenue of tobacco excises. Chapter 17 in In: Jha P, Chaloupka FJ, eds. Tobacco Control in Developing Countries. Edited Volume. Section I, Chapter 9. Oxford, Oxford University Press, 2000.

U.S. Centers for Disease Control & Prevention (CDC). Annual smoking-attributable mortality, years of potential life lost, and economic costs, United States, 1995-1999. Morbidity and Mortality Weekly Review (MMWR) 2002;51(14): 300-03.

US Department of Health and Human Services. The health consequences of smoking: A report of the Surgeon General. US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2004

Valdés R. Las cifras de la epidemia: daños a la salud y mortalidad atribuible. In: Valdés R, Lazcano E, Hernández M, (eds.), Primer informe sobre el combate al tabaquismo. Cuernavaca: National Public Health Institute, 2005: 29-41. [Figures from the epidemic: health effects and attributable mortality. In: The first report on tobacco control: Mexico and the Framework Convention for Tobacco Control.]

Valdés-Salgado R, Reynales-Shigematsu LM, Lazcano-Ponce EC, Hernández-Avila M; Susceptibility to smoking among adolescents and its implications for Mexico's tobacco control programs. Analysis of the global youth tobacco survey 2003-2004 and 2006-2007; Int. J. Environ. Res. Public Health 2009, 6, 1254-1267.

Warner K, Hodgson TA, Carroll C. Medical cost of smoking in the United States: Estimates, their validity and their implications", Tobacco Control, 1999;8:290-300.

Warner KE, Hodgson TA, Carroll CE Medical costs of smoking in the United States: Estimates, their validity, and their implications. Tobacco Control 1999; 8(3): 290-300.

World Bank (2009). World Development Indicators. Washington DC: World Bank.

World Health Organization. Advancing knowledge on regulating tobacco products. Geneva 2000.

April 2010

ISBN: 978-2-914365-73-4