

How Eliminating the Global Illicit Cigarette Trade Would Increase Tax Revenue and Save Lives

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“If the global illicit trade were eliminated, governments would gain at least \$31 billion, and from 2030 onwards would save over 160,000 lives a year.”



- 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

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Executive Summary

The purpose of this report is to update existing global estimates of the illicit cigarette trade, based on recent data, and estimate how many lives could be saved worldwide by eliminating it. Our results highlight the enormous scale of the global illicit cigarette trade, the huge sums of money that governments are losing because of it, and the significant number of lives that could be saved in the future if the illicit trade were eliminated. This report has four key elements:

1. Updated country level estimates of the illicit cigarette market around the world, using 2007 data or as close to 2007 as available;
2. Evidence that higher income countries, where cigarettes are more expensive, have lower levels of cigarette smuggling than lower income countries, contrary to the tobacco industry claim that the overall level of smuggling is dependent on cigarette price;

If this illicit trade were eliminated, governments would immediately gain at least \$31 billion, and from 2030 onwards save over 160,000 lives a year.

3. Evidence that the burden of cigarette smuggling falls disproportionately on low and middle income countries, where the majority of the world's tobacco users live;
4. Estimates of the number of lives saved and revenue gained globally, in the future, if smuggling were eliminated.

Key Points

- 11.6% of the global cigarette market is illicit, equivalent to 657 billion cigarettes a year and \$40.5 billion in lost revenue.
- If the global illicit trade were eliminated, governments would gain at least \$31 billion, and from 2030 onwards would save over 160,000 lives a year. Cigarette price would increase 3.9%, with a consequent fall in consumption of 2.0%. In just six years, over a million lives would be saved, the vast majority of which would be in middle and low income countries.

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- The burden of illicit trade falls mainly on lower income countries. The total illicit cigarette market is lower in high income countries: 9.8% in high income countries compared with 16.8% in low income countries (Table E.1). It is under 15% in nine of the 14 high income countries for which we have data. Yet, in many low and middle income countries however it reaches extremely high levels, e.g., 50% in Georgia, 40% or more in Uzbekistan, Bosnia and Herzegovina, Albania and Bolivia, and over 20% in 15 more countries.
- If the illicit cigarette trade were eliminated, the revenue gained would be \$13 billion in high income countries and \$18.3 billion in middle and low income countries; from 2030 onwards, just over 32,000 lives a year would be saved in high income countries and almost 132,000 a year in middle and low income countries (Table E.2).

Table E.1: Relation Between Legal Price and Illicit Trade in 2007

World Bank Income Group	Average Legal Price (US\$)	Average Percent of Consumption That Is Illicit
Low Income	1.13	16.8%
Middle Income	1.89	11.8%
High Income	4.91	9.8%

Note: Country specific illicit consumption shares and prices are weighted by consumption. For the technical details of the methods used to arrive at these numbers see the methods section and Appendix 3.

- Higher income countries, where cigarettes are more expensive, have lower levels of cigarette smuggling than lower income countries. Other factors, including the presence of informal distribution networks, organized crime, industry participation, and corruption, probably contribute more to cigarette smuggling than price levels. And because

illicit trade levels are higher in lower income countries (see Table E.2), it is important that governments in low and middle income countries are aware of the evidence, and thus of the value of increasing prices, which will improve the health of their populations and increase tax revenue.

Table E.2: Revenue Generated and Lives Saved with Elimination of Global Illicit Trade

	Global	High Income Countries	Low and Middle Income Countries
Current Situation			
Total illicit cigarette market (% of consumption)	11.6%	9.8%	12.1%
Total illicit cigarette market (cigarettes per year)	657 billion	124 billion	533 billion
Total revenue lost to governments	\$40.5 billion	\$17.6 billion	\$22.9 billion
Estimated deaths in 2030	8.3 million	1.5 million	6.8 million
If This Illicit Trade Were Eliminated			
Immediate gain in revenue	\$31.3 billion	\$13 billion	\$18.3 billion
Lives saved in 2030 and annually thereafter	164,000	32,000	132,000

I. Background

The illicit cigarette trade robs governments of tax revenue and increases tobacco-related deaths. Cigarettes are a particularly attractive product to smugglers because tax is a high proportion of price, and evading tax by diverting tobacco products into the illicit market (where sales are largely tax free) generates a considerable profit margin for the smugglers. The availability of cheap cigarettes increases consumption and thus tobacco-related deaths in the future. Eliminating or reducing the illicit cigarette trade will reduce consumption (by increasing price), save lives, and increase tax revenue to governments. Governments are currently losing approximately \$40.5 billion annually worldwide.

A 2000 report commissioned by the World Bank,¹ based on 1995 data, estimated that between 6% and 8.5% of global cigarette consumption was smuggled. The 6% estimate was based on import and export statistics and was mainly an estimate for large-scale smuggling (see definitions in Appendix). The 8.5% estimate was based on estimates of smuggling using different sources and included large-scale smuggling and bootlegging.

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The purpose of this report is to update existing estimates of cigarette smuggling and illicit trade, based on recent data, and estimate how many lives could be saved by eliminating it. This report contains four key elements:

1. Updated country level estimates of the illicit cigarette market around the world, using 2007 data or as close to 2007 as available;
2. Evidence that higher income countries, where cigarettes are more expensive, have lower levels of cigarette smuggling than lower income countries, contrary to the tobacco industry claim that the overall level of smuggling is dependent on cigarette price;
3. Evidence that the burden of cigarette smuggling falls disproportionately on low and middle income countries, where the majority of the world's tobacco users live;
4. Estimates of the number of lives saved and revenue gained globally in the future if smuggling were eliminated.

If governments act together, especially to produce a strong protocol on illicit tobacco trade through the Framework Convention on Tobacco Control, tobacco smuggling and illicit trade can be significantly reduced, tax revenue will consequently be increased, and millions of lives will be saved.

A recently published article reporting substantial reductions in smuggling in Italy, Spain and the UK, shows that smuggling can be successfully tackled,² and in our discussion we list the measures, proposed by the Framework Convention Alliance, which we believe would significantly reduce the illicit trade. If governments act together, especially to produce a strong protocol on illicit tobacco trade through the Framework Convention on Tobacco Control (FCTC),³ tobacco smuggling and illicit trade can be significantly reduced, tax revenue will consequently be increased, and millions of lives will be saved.

Endnotes for Chapter I

- ¹ Merriman D, Yurekli A, Chaloupka FJ. How Big is the Worldwide Cigarette-Smuggling Problem. In Jha P & Chaloupka FJ. Tobacco Control in Developing Countries. Oxford, Oxford University Press, 2000.
- ² Joossens L, Raw M. Progress in combating cigarette smuggling: controlling the supply chain. Tobacco Control 2008;17:399-404.
- ³ World Health Organization. WHO Framework Convention on Tobacco Control. Geneva, World Health Organization, 2003.

II. Definitions

Illicit Trade, Smuggling and Illicit Manufacturing

- **Illicit trade** is defined in Article 1 of the World Health Organization (WHO) FCTC⁴ as any practice or conduct prohibited by law and which relates to production, shipment, receipt, possession, distribution, sale or purchase including any practice or conduct intended to facilitate such activity.
- **Smuggling** refers to products illegally traded across borders.
- **Illicit manufacturing** refers to illegally manufactured products.

Different Forms of Smuggling

- **Large-scale organized smuggling** involves the illegal transportation, distribution and sale of large consignments of cigarettes and other tobacco products. Large-scale smugglers generally avoid all taxes on tobacco products either by diverting them from the legal market while they are in the wholesale distribution chain (where they are transported untaxed), in transit between their country of origin and their official destination, or by smuggling counterfeit products.
- **Small-scale smuggling or bootlegging** involves the purchase, by individuals or small groups, of tobacco products in low tax jurisdictions in amounts that exceed the limits set by customs regulations, for resale in high tax jurisdictions.
- **Ant smuggling** refers to the organised and frequent crossing of borders by a large number of individuals with relatively small amounts of low taxed or untaxed tobacco products.

Illicit Manufacturing and Counterfeit

- **Illicit manufacturing** refers to the production of tobacco products contrary to law. The laws in question may be taxation laws or other laws (such as licensing or monopoly related laws) that restrict the manufacture of tobacco products.
- **Counterfeit** tobacco production is a form of illegal manufacturing in which the manufactured products bear a trademark without the consent of the owner of the trademark. Illegally manufactured products can be sold on the domestic market or smuggled into an other jurisdiction.

Tax Avoidance and Tax Evasion

- **Tax avoidance** refers to legal methods of circumventing tobacco taxes, and includes tax-free purchases and the purchase of tobacco products in other jurisdictions in amounts allowable under customs regulations.
- **Tax evasion** refers to illegal methods of circumventing tobacco taxes and includes the purchase of smuggled and illicit manufactured tobacco products.

Terms Used to Describe the Illicit Trade

Estimates of illicit trade do not always refer to illicit trade using standard terminology. Some estimates refer to tax evasion or to large-scale smuggling alone, and some estimates refer to smuggling and domestic illicit manufacturing combined (illicit trade).

An additional problem is that the estimates of illicit cigarette trade are expressed with different metrics, sometimes as a percentage of cigarette sales based on tax records, sometimes as a percentage of cigarette consumption, or sometimes as a percentage of the cigarette market.

However, there is no standard way to define cigarette consumption or cigarette market and the terms have been used to refer to different data sets, including tax recorded sales, tax recorded sales plus illegal sales, tax recorded sales and legal cross border sales in neighbouring countries, tax recorded sales, illegal sales and legal cross border shopping sales. Finally global cigarette consumption often refers to global manufactured cigarettes, which do not include illegal manufactured cigarettes, but include legal manufactured cigarettes which are smuggled.

Report Terminology

For the purposes of this report, we use the following terminology and data sources:

- The market refers to sales of tobacco products in a country.
 - The total market refers to legal and illegal sales in a country.
 - The legal market refers to legal sales.
 - The illegal market refers to illegal (or illicit) sales.
- Sales data are based on sales to those who live in a country and to those who visit the country (tourist shopping).
- Consumption data are based on survey data among the population and reflect the use of all legal and illegal tobacco products by those who live in the country, but not by non-residents passing through the country.
 - Total consumption data for a country include in principle: the legal sales in the country + the illegal sales to its inhabitants + the legal sales to its inhabitants visiting other countries or duty free shops (in amounts allowable under customs regulations), minus legal sales to non-residents passing through the country.

Endnotes for Chapter II

⁴ World Health Organization. WHO Framework Convention on Tobacco Control. Geneva, World Health Organization, 2003.

III. Model Components

In previous studies of smuggling, the overall quantity of smuggled cigarettes was estimated by looking at the difference between legal exports and legal imports.^{5,6} Most of the difference was due to the cigarettes disappearing into the contraband market and the major part of this was large scale smuggling. However over the last ten or so years, probably partly in response to lawsuits against the tobacco industry, the market has changed significantly, and this method — the export-import difference — is no longer an accurate enough estimate of the total illicit trade. We

now rely more on country estimates, which include not just large-scale smuggling but other kinds of illicit trade, such as small-scale smuggling and illicit manufacturing, which includes counterfeit trade.

Our method for estimating the effect of eliminating the illicit trade on tobacco related deaths is based on that of West et al⁷ with some minor modifications. Here we describe the steps in the method for estimating the effect of eliminating the illicit trade on tobacco related deaths, through its effect on increasing price and reducing consumption. We also estimate revenue loss. Further details of these methods can be found in Appendix 2.

Model Component Description

What is the size of the illicit cigarette trade?

1. Best available country estimates of illicit market share and total cigarette consumption are used to arrive at an overall global estimate of total illicit trade;

What would be the effect of eliminating the illicit trade on the price of cigarettes and thus on consumption?

2. Country level data on the price of Marlboro (or an equivalent brand if Marlboro is not one of the common brands) and on tax rates (excise and other taxes) on legal cigarettes;
3. Assume that the price of illicit cigarettes equals the price of the price of legal cigarettes minus two thirds of the tax (see detailed explanation on pages 13–14);
4. When illicit trade is reduced or eliminated, the average price of cigarettes rises and, factoring in the price elasticity of cigarette demand, consumption goes down. We estimate the size of the price increase and the resulting fall in consumption if illicit trade is eliminated.

How much revenue are governments losing because of the illicit cigarette trade?

5. Current cigarette tax rates and the current market share of illicit cigarettes were used to estimate lost government revenue in each country, and in the world as a whole, and factor in the fall in consumption after eliminating illicit trade to estimate how much revenue would be gained if the illicit trade were eliminated;

How many lives would be saved by eliminating the illicit cigarette trade?

6. Mathers and Loncar's prediction of tobacco related deaths in 2030 resulting from cigarettes smoked in 2007;⁸
7. Assume that premature deaths will be avoided proportional to the reduced cigarette consumption, when illicit trade is eliminated.

Limitations of Methods

Measuring illicit tobacco trade is methodologically challenging for many reasons. First, smuggling is an illegal activity, and illegal traders are unlikely to record their activity. Similarly, for security reasons, data on illicit trade are usually difficult to collect, as law enforcement agencies often prefer not to publicize the scope of the activity. Second, all methods to estimate illicit trade have their limitations and not all studies clearly describe their methodology or their limitations. Third, the data source may bias the estimate. For example, tobacco industry experts may have an incentive to exaggerate the smuggling problem in order to lobby for reduced taxation of the product, while public health advocates may have an incentive to understate the size of the smuggling problem in order to argue for tax increases.

Our estimates of illicit market share are based on academic articles, official government publications, estimates from market research companies (whose clients might be the tobacco industry or governmental organisations, including the European Commission), tobacco trade journal articles, newspaper articles, and sometimes estimates from personal contacts in customs organisations. They vary greatly in their rigor. Some for example express the size of the illicit market as a percentage but without defining or even mentioning what it is a percentage of. Nor is there a clearly defined methodology for assessing if an estimate is accurate. It has to look reasonable in terms of the country's population, smoking prevalence, legal infrastructure and so on. Thus a combination of methods (including informed expert judgement) and when possible sources, is often necessary to validate estimates.

Endnotes for Chapter III

⁵ Joossens L, Raw M. Tobacco smuggling and cross border shopping in Europe. *BMJ* 1995;310:1393-97.

⁶ Joossens L, Raw M. Cigarette smuggling in Europe: who really benefits? *Tobacco Control* 1998;7:66-71.

⁷ West R, Townsend J, Joossens L, Arnott D, Lewis S. Why combating tobacco smuggling is a priority. *BMJ* 2008;337:1028-29.

⁸ Mathers CD, Loncar D. Projections of Global Mortality and Burden of Disease from 2002 to 2030. *PLoS Med* 2006;3(11): e442 doi:10.1371/journal.pmed.0030442.

IV. Findings

What is the Size of the Illicit Cigarette Trade?

Presented here are updated estimates of the illicit cigarette trade from 84 countries around the world, using the latest available data on illicit and legal market estimates from 2007 or as close to 2007 as possible. Only cigarettes are considered in this study. These 84 countries represent 85% of the world's population, including 92% of the population in high income countries and 83% of the population in upper middle, lower middle and low income countries.

Our analysis shows that 11.6% of cigarette consumption in these countries is illicit, 16.8% in low income countries, 11.8% in middle income countries, 12.1% in low and middle income countries combined, and 9.8% in high income countries. The total annual illicit consumption in these 84 countries is about 657 billion cigarettes a year, 533 billion in low and middle income countries and 124 billion in high income countries (Table 4.5). The detailed country data are presented in Appendix 1. Table 4.1 shows the country by country estimates of the illicit trade by market share and Table 4.2 shows the ten countries with the greatest number of illicit cigarettes, in absolute numbers.

A high tax margin can provide the initial incentive to smuggle; however the data show that it is not the most important factor.

In Table 4.3 we show the relationship between overall cigarette price and level of smuggling in high, middle and low income countries. The tobacco industry has sometimes successfully argued to governments that they should not increase tobacco tax because this will increase the level of smuggling. The argument is that smugglers will smuggle into a country where they can make the highest profit, and this should

be a country where tax is a high proportion of the price, leaving a large margin to reduce the price — by avoiding tax — and still retain a profit. As we stated in the introduction, a high tax margin can provide the initial incentive to smuggle; however the data show that it is not the most important factor. Other factors include the ease and cost of operating in a country, how well organised crime networks are, the likelihood of getting caught, the punishment if you are caught, and so on. In Norway, where in January 2008 a packet of Marlboro cost \$12 (the country with the highest cigarette prices in the world) only 6% of survey respondents had seen tobacco products during the last 12 months which they believed were smuggled. In Lithuania, where in January 2008 a packet of Marlboro cost \$2 (the country with the lowest cigarette prices in the EU), 36% of respondents had seen smuggled cigarettes.⁹ Table 4.3 shows that other factors are more important than price, that in fact the level of illicit trade is lower in regions where the price of cigarettes is higher.

What Would be the Effect of Eliminating the Illicit Trade on Price of Cigarettes and on Consumption?

Consumption would fall if illicit trade were eliminated because, in most countries, illicit cigarettes are much cheaper than their legal, fully taxed equivalent. As the illicit trade is reduced, the overall average price of cigarettes goes up, and consumption consequently goes down. To estimate the projected fall in consumption we need an estimate of the price difference between legal and illicit cigarettes. We use the average price of legal Marlboro, the average tax level on legal cigarettes, and we estimate that illicit cigarettes are sold with one third of the legal tax level (pages 13–14). We then project the reduction in consumption that will result from higher cigarette prices if illicit trade is reduced, taking into account the price elasticity of cigarette demand (the sensitivity of consumers to a cigarette price increase).

Table 4.1: Estimates of the Illicit Cigarette Market Around the World^{*, **}

Country	World Bank Income Group	% Illicit Market	Measure Used	Year	Reference
Hong Kong	High	42.2	Percentage of legal cigarette sales	2005	71
UAE	High	30.3	Percentage of legal cigarette sales	2005	71
Singapore	High	18.0	Percentage of legal cigarette sales	2005	71
Canada	High	15-20	Percentage of total cigarette market: estimate based on multiple sources and surveys	2007	–
USA	High	13–25	Percentage of consumers that purchased lower-priced cigarettes	1992–2002	66
UK	High	13.0	Percentage of total cigarette consumption (not including hand rolled tobacco)	2006–2007	40
Taiwan	High	11.2	Percentage of legal cigarette sales	2005	71
Australia	High	6.4	Percentage of legal cigarette sales	2007	84
Israel	High	5.1	Percentage of legal cigarette sales	2005	71
Saudi Arabia	High	3.6	Percentage of legal cigarette sales	2006	71
Italy	High	2.0	Percentage of total cigarette market	2006	45–47
Japan	High	1.7	Percentage of legal cigarette sales	2006	53
New Zealand	High	1.0	Percentage of legal cigarette sales	2005	71
Spain	High	1.0	Percentage of total cigarette market	2006	45, 46
Georgia	Low or middle	49.0	Percentage of total cigarette market	2005	57
Bolivia	Low or middle	46.2	Percentage of legal cigarette sales	2005	71
Albania	Low or middle	40–50	Not stated	Not specified	52
Bosnia & Herzegovina	Low or middle	35–45	Not stated	Not specified	52
Uzbekistan	Low or middle	40.0	Smuggling as a percentage of total cigarette consumption	2006	56
Ethiopia	Low or middle	38.0	Percentage of total cigarette market	2006	95
Brazil	Low or middle	35.0	Percentage of legal cigarette sales	2007	67
Laos	Low or middle	35.0	Not stated	2005	56
Iraq	Low or middle	34.5	Percentage of total cigarette market	2006	56
Macedonia	Low or middle	30–35	Not stated	Not specified	52
Cameroon	Low or middle	26.0	Percentage of legal cigarette sales	2005	71
Syria	Low or middle	25.5	Percentage of total cigarette market	2007	91
Estonia	Low or middle	19-32	Percentage of total cigarette market	2003	50
Sudan	Low or middle	25.0	Percentage of legal cigarette sales	Not specified	56
Zambia	Low or middle	25.0	Not stated	2003	56
Croatia	Low or middle	24.8	Percentage of legal cigarette sales	2005	71
Malaysia	Low or middle	24.0	Percentage of total cigarette market	2008	77

Notes:

* Please see Appendix 1 for additional information and notes on data sources; estimates contained in Table 1 use standardized terminology determined by the authors to facilitate cross-study comparison; verbatim study terminology are reported in Appendix 1.

** UAE = United Arab Emirates; the EU-25 wide average illicit market share is 8.5%. In this table we list only countries for which we have country-specific data. The EU-25 countries, which are included in the model calculations using 8.5% illicit market share, are: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Slovenia, Slovakia, Spain, Sweden, United Kingdom. EU27 is these 25 plus Bulgaria and Romania.

Table 4.1: *continued*

Country	World Bank Income Group	% Illicit Market	Measure Used	Year	Reference
Venezuela	Low or middle	23.2	Percentage of legal cigarette sales	2005	71
Russian Federation	Low or middle	23.0	Percentage of legal cigarette sales	2004	54
Peru	Low or middle	23.0	Percentage of total cigarette consumption	2006	71
Lebanon	Low or middle	22.5	Not stated	2000–2006	56
Morocco	Low or middle	22.5	Percentage of total cigarette market	2006	56
Algeria	Low or middle	20.0	Percentage of total cigarette market	2007	56
Philippines	Low or middle	19.4	Percentage of legal cigarette sales	2006	53
Nigeria	Low or middle	18.0	Percentage of total cigarette consumption	2006	56
Ghana	Low or middle	17.5	Percentage of legal cigarette sales	2005	56
Pakistan	Low or middle	17.0	Percentage of total cigarette market	2005	72
Armenia	Low or middle	15.6	Percentage of total cigarette consumption	2004	58
Ivory Coast	Low or middle	15.0	Percentage of legal cigarette sales	2005	56
India	Low or middle	14.0	Percentage of total cigarette consumption	2004	78
Columbia	Low or middle	14.0	Percentage of total cigarette consumption	2004	70
Iran	Low or middle	14.0	Percentage of total cigarette market	2007	85
Ecuador	Low or middle	12.0	Percentage of total cigarette consumption	2006	56
Uruguay	Low or middle	12.0	Percentage of total cigarette market	2007	69
Guatemala	Low or middle	12.0	Percentage of total cigarette market	2006	56
Jordan	Low or middle	10–12	Percentage of total cigarette market	2007	56
Poland	Low or middle	11.0	Percentage of total cigarette market	2007	42,43,44
Thailand	Low or middle	11.0	Not stated	Not specified	80
Yemen	Low or middle	11.0	Percentage of legal cigarette sales	Not specified	56
Turkey	Low or middle	10.5	Percentage of total cigarette market	2006–2007	59,71
Nicaragua	Low or middle	10.0	Not stated	2001–2002	56
Panama	Low or middle	10.0	Percentage of legal cigarette sales	2000	56
Tunisia	Low or middle	10.0	Percentage of total cigarette consumption	2007	90
El Salvador	Low or middle	10.0	Not stated		56
Argentina	Low or middle	10.0	Percentage of total cigarette market	2007	69
Vietnam	Low or middle	10.0	Smuggling as a percentage of total cigarette market	2004	74
China	Low or middle	8–10	Percentage of total cigarette market: sources extrapolation from multiple sources	Multiple	–
Kazakhstan	Low or middle	9.0	Smuggling as a percentage of total cigarette consumption	Early 2000s	56
South Africa	Low or middle	9.0	Percentage of total cigarette consumption	2007	94
Ukraine	Low or middle	9.0	Percentage of total cigarette market. Multiple sources	Multiple	–
Costa Rica	Low or middle	8.5	Percentage of legal cigarette sales	2006	71
Indonesia	Low or middle	5–6	Percentage of total cigarette market	2005	80
Mexico	Low or middle	3.3	Percentage of total cigarette sales	2006	71
Chile	Low or middle	3.0	Percentage of legal cigarette sales	2006	56

Table 4.2: Ten Countries with the Greatest Illicit Trade in 2007

Ranking	Country	Illicit Trade (billions of cigarettes)
1	China	214
2	Russian Federation	76
3	United States	62
4	EU	58
5	Brazil	38
6	Philippines	19
7	India	18
8	Indonesia	14
9	Pakistan	13
10	Turkey	12

The Average Price of Legal Cigarettes

Data on the price of Marlboro (or nearest international equivalent) are from The Tobacco Atlas.¹⁰ The prices are collected as a part of the World Cost-of-Living Survey in major cities by the Economist Intelligence Unit (EIU). The survey records the prices of a range of goods and services in cities, usually one city per country. Where multiple cities were surveyed, an average price is calculated for the country. The price of premium cigarettes is used because these are the cigarettes that are most often smuggled. All prices were converted to US dollars.

Average Cigarette Tax

Taxes on cigarettes can consist of excise duty, valued added tax (VAT), sales tax, and import duty. Not all countries apply the same type of taxes. VAT, for instance, is used in Europe, whereas sales tax is used in North America. Import duties are often difficult to calculate as they generally depend on the value of the imported products, which is not always known. The tax revenue per cigarette pack also varies according to brand. Marlboro is not only a premium brand but is the most sold cigarette brand globally: 455 billion cigarettes in 2007.¹¹ Taxes on Marlboro (excise duties

Table 4.3: Relation Between Legal Price and Illicit Trade in 2007

World Bank Income Group	Average Legal Price (US\$)	Average Percent of Consumption that is Illicit
Low Income	1.13	16.8%
Middle Income	1.89	11.8%
High Income	4.91	9.8%

Note: Country specific illicit consumption shares and prices are weighted by consumption. For the technical details of the methods used to arrive at these numbers see the methods section and Appendix 3.

and VAT or sales tax) can thus be considered a good approximation of all the tax revenue an average pack (not only Marlboro) can generate (excise duty, VAT or sales tax, and import duties). In the EU, the average combined excise duty and VAT for a pack of Marlboro was \$3.60 in 2007,¹² and the average combined total tax (excise duty, VAT, and import duty) for all brands was \$4 a pack,¹³ close to the \$3.60. Thus we use excise duties and VAT on Marlboro as a global indicator for the tax revenue an average cigarette pack generates (excise duty, VAT or sales tax, import duty). Our data on cigarette taxes as a proportion of price are also calculated from The Tobacco Atlas.¹⁰

The Average Price of Illicit Cigarettes

The price difference between legal and illicit cigarettes varies by country, location of the selling point, brand, and perception of the quality of the illicit cigarettes. Generally speaking the price of illicit cigarettes is much lower than the official price, although there are rare exceptions.¹⁴ As with data on the illicit market share, data on illicit price is not easy to acquire as much of it is, by its nature, unofficial. Our

main sources of data on illicit cigarette prices are similar to those on the illicit market share: published scientific articles, trade journals, government publications, newspapers, and occasionally information from personal contacts. However because of the difficulty of collecting these data we only have data from a few countries, which we present in Table 4.4.

Calculation of a Global Average Illicit Price

There is no standard price for illicit cigarettes: the price of illicit cigarettes can vary according to the sales point (for example in a shop, on the street, etc), brand, and perceived quality of the cigarettes. The price of illicit cigarettes needs to provide a profit to those who manufacture the cigarettes, a profit to those who organise the illicit transport and sell them, and an attractive discount to the smokers who buy the cigarettes. However since we have only scattered observations on the price of illicit cigarettes in various countries around the world, we needed a standardized method to estimate the global average price of illicit cigarettes. Illicit cigarettes are sold at half of the legal price in the UK and at three quarters of the legal price

Table 4.4: Price Difference Between Illicit and Legal Cigarettes in Selected Countries

Country	Product	% Cheaper
Canada ^{15, 16}	Cigarettes in loose bags of 200	90
Canada ^{15, 16}	Illicit native cigarettes	65
Australia ¹⁷	Domestically grown untaxed tobacco	65
Poland ¹⁸	Smuggled Prima cigarettes	65
Germany ¹⁹	Jin Ling cigarettes	60
UK ²⁰	Smuggled cigarettes on average	50
Brazil ²¹	Smuggled cigarettes on average	50
Argentina ²¹	Smuggled cigarettes on average	50
Uruguay ²¹	Smuggled cigarettes on average	40
Niger ²²	Smuggled Marlboro	40
Romania ²³	Smuggled Marlboro	40
China ²⁴	Smuggled cigarettes on average	25

in China. A possible explanation for this difference is the different level of taxation: in the UK, taxes represent around 75% of the retail price,²⁵ while taxes of the retail in China vary at around 32% to 40%²⁶ of the retail price. In both cases however, the price of the illicit cigarettes is approximately equal to the legal price minus two thirds of the taxes. Based on the available data, we conservatively assume that two thirds of the gain from tax avoidance are passed on to consumers and one third of the gain from tax avoidance represents the profit for those involved in the illicit trade. Thus based on the data from two very different markets, China and the UK, we estimate the average price of illicit cigarettes to be the price of legal cigarettes minus two-thirds of the tax.

Average Price Increase as a Result of Eliminating Illicit Trade

We estimate the average cigarette price increase in each country in our data set as a result of eliminating illicit trade as follows, using West et al's methodology:

- We assume that the average price of smuggled cigarettes is the price of legal cigarettes less two-thirds of the all taxes levied on the product, as described above;
- We assume that the elimination of the illicit cigarette trade would not affect the prices of legal cigarettes;
- The increase in the average cigarette price thus depends upon both the tax rate and the total amount of illicit cigarettes consumed.

Price Elasticity

Price elasticity is a measure of the decline in consumption for a given price increase. Chaloupka et al²⁷ summarized the evidence on cigarette price elasticity in a 2000 World Bank report and concluded that in high income countries the price elasticity of demand for cigarettes was about -0.4 , indicating that a 10% increase in price caused consumption to fall by

about 4%. In middle and low income countries the authors concluded that the price elasticity of demand was about -0.8 . Since this World Bank study was published, additional studies in middle and low income countries suggest that the price elasticity of demand is lower than -0.8 and often closer to -0.4 .^{26,28,29} We estimate the change in consumption (and subsequent decline in deaths) using an estimate of price elasticity of demand of -0.4 for all countries. Although -0.4 is likely a conservative estimate, we use it here to illustrate the minimum potential impact of reduced illicit trade.

Estimates of Reduced Consumption

- Following West et al⁷ we assume that the cigarette demand curve is a log-log function so that larger price increases do not result in proportionate reductions in consumption. The demand curve with a price elasticity of -0.4 predicts that a 100% increase in price would result in a 24% fall in consumption.
- The increase in average cigarette price depends upon the relative price of legal and illicit cigarettes and the share of the market that is illicit. When illicit trade is reduced or eliminated, the overall average price of cigarettes rises and, factoring in price elasticity, consumption goes down; we estimate the resulting fall in consumption due to increased price for each country and for the 84 countries as a whole.

As demonstrated by West et al, the illicit market for hand rolled tobacco and cigarettes in the UK was 21% of the total market. The price of smuggled products is about half of the duty paid equivalent. The elimination of smuggling would mean that the price of the smuggled products would double. The demand curve for an elasticity of -0.4 predicts that a 100% increase would result in a 24% fall in consumption. The reduction in consumption under this assumption would be expected to be about $21 \times 0.24 = 5\%$ in the UK.

Using this methodology, we estimate that if the illicit trade were eliminated there would be an overall global fall in cigarette consumption of 2.0%.

How Much Revenue Are Governments Losing Because of the Illicit Cigarette Trade?

To measure revenue loss we estimate the amount of additional revenue the government would get if illicit market were eliminated. In doing this we take into account the fact that eliminating the illicit market would increase the overall average price of cigarettes, and thus

We estimate that if illicit trade were eliminated there would be an overall global fall in cigarette consumption of 2.0%.

cause consumption to fall (as explained above). Thus we take account of the impact of the fall in consumption on tax revenues before estimating the resulting increase in revenue as a result of eliminating smuggling. This aspect of our methodology differs from West et al, who did not correct for the impact of the price increase and consequent decrease in consumption.

How Many Lives Would Be Saved by Eliminating the Illicit Cigarette Trade?

Following West et al we assume that the decline in tobacco related deaths is proportional to the decline in tobacco consumption. Mathers and Loncar⁸ estimate that in 2030 there will be 8.3 million tobacco related deaths: 6.8 million in low and middle income countries and 1.5 million in high income countries. We use the overall percentage decline in consumption as a result of eliminating the illicit trade to estimate the decline in tobacco related deaths in low and middle income countries, high income countries, and in both combined. The method is a simple arithmetic calculation. If the illicit trade were eliminated there would be an overall fall in global cigarette consumption of 2.0% which would result in a 2% reduction in deaths.

Impact of Elimination of Illicit Trade on Lives Saved and Government Revenues

In Table 4.5 we show the results for eliminating the illicit trade globally, and separately for low and middle income countries, and for high income countries.

Table 4.5: Revenue Generated and Lives Saved with Elimination of Global Illicit Trade

	Global	High Income Countries	Low and Middle Income Countries
Current Situation			
Total illicit cigarette market (% of consumption)	11.6%	9.8%	12.1%
Total illicit cigarette market (cigarettes per year)	657 billion	124 billion	533 billion
Total revenue lost to governments	\$40.5 billion	\$17.6 billion	\$22.9 billion
Estimated deaths in 2030	8.3 million	1.5 million	6.8 million
If This Illicit Trade Were Eliminated			
Immediate gain in revenue	\$31.3 billion	\$13 billion	\$18.3 billion
Lives saved in 2030 and annually thereafter	164,000	32,000	132,000

Endnotes for Chapter IV

- ⁹ European Commission, Survey on tobacco, Flash Eurobarometer, nr 253, Brussels, March 2009.
- ¹⁰ Shafey O, Eriksen M, Ross H, Mackay J. The Tobacco Atlas, third edition, American Cancer Society & World Lung Foundation,. The Tobacco Atlas, third edition,. Atlanta, 2009.
- ¹¹ Les plus importantes marques dans le monde. Revue des tabacs, June 2008 p. 8.
- ¹² Philip Morris International. Cigarette taxes worldwide. Total tax - July 2007, Lausanne, 2007.
- ¹³ According to the European Anti-Fraud Office (OLAF) the average revenue for a container of 10 million cigarettes (500,000 cigarette packs) in 27 EU countries is €1.5 million (excise duties 63%, VAT 22% and import duties 15%). At an exchange rate on 1 January 2007 of \$1.32= €1, €1.5 million is around \$2 million (\$US 4 a cigarette pack of 20 cigarettes: \$2.52 excise duties, \$0.88VAT and \$0.60 import duties).
- ¹⁴ Joossens L. Vietnam: smuggling ads value. Tobacco Control, 2003;12: 119-120.
- ¹⁵ Personal communication, François Dampousse. Non-Smokers' Rights Association, Canada, 9 January 2009.
- ¹⁶ Buist S. Contraband smokes costing government as much as \$4M a day in taxes. The Edmonton Sun, 8 August, 2008.
- ¹⁷ Geis G. *Chop-chop: the illegal cigarette market in Australia*. Canberra (Australia): Centre for Tax System Integrity, Australian National University; Working Paper 48, January 2005.
- ¹⁸ Andrusz K. Polish Cigarette Traders Bemoan Tougher Rules for EU? Frontier - Bloomberg, 5 January 2009.
- ¹⁹ Candea S, Campbell D, Lavrov V, Shleynov R. Made to be smuggled, Russian contraband cigarettes 'flooding' EU, Center for Public Integrity, Washington, 19 February 2009.
- ²⁰ West R, Townsend J, Joossens L, Arnott D, Lewis S. Why combating tobacco smuggling is a priority. BMJ 2008; 337: 1028-1029.
- ²¹ Ramos A. The illegal trade in tobacco in the Mercosur Countries, CIET, Montevideo, 2008.
- ²² Personal communication, Inoussa Saouna. Président SOS Tabagisme-Niger, 9 January 2009.
- ²³ Radu P, Candea S. The Eastern cigarettes underground, Organised crime and corruption project, Bucharest, 2008.
- ²⁴ Morgan Stanley, China. The final Frontier, Industry review, 26 July 2005, p.19.
- ²⁵ European Commission. Excise duty tables. Ref 1.024, Directorate General Taxation and Customs Union Tax Policy, Brussels, January 2007.
- ²⁶ Hu T-W, Mao Z, Shi J, Chen W. Tobacco Taxation and Its Potential Impact in China. Paris: International Union Against Tuberculosis and Lung Disease; 2008.
- ²⁷ Chaloupka F, Hu T-W, Warner KE, Jacobs R, Yurekli A. The Taxation of Tobacco Products. In Jha P & Chaloupka F, Tobacco Control in Developing Countries. Oxford, Oxford University Press, 2000.
- ²⁸ Ross H, Chaloupka FJ. Economic policies for tobacco control in developing countries. Salud Publica Mex 2006;48 suppl 1:S113-S120.
- ²⁹ Guidon E, Perucic A-M, Boisclair D. Higher tobacco prices and taxes in South-East Asia. An effective tool to reduce tobacco use, save lives and generate revenue. World Bank, Economics of Tobacco Control, Paper number 11, Health, Nutrition and Population (HNP) Discussion Papers, October 2003.

V. Discussion

These data highlight the enormous scale of the illicit cigarette trade, the huge sums of money that governments are losing because of it, and the significant number of lives that could be saved in the future if the illicit trade was eliminated.

The data show that 11.6% of the global cigarette market is illicit, equivalent to 657 billion cigarettes a year and \$40.5 billion in lost revenue. If this illicit trade were eliminated there would be an overall increase in cigarette price of 3.9% and a consequent fall in consumption of 2.0%. Although this fall in consumption would reduce the revenue gained by eliminating the illicit trade, governments would still gain at least \$31.3 billion by doing so, and from 2030 onwards would save over 164,000 lives a year. In just six years, over a million lives would be saved, the vast majority of them in middle and low income countries.

If the illicit cigarette trade were eliminated the revenue gained would be \$13 billion in high income countries and \$18.3 billion in middle and low income countries; from 2030 onwards 32,000 lives a year would be saved in high income countries and 132,000 a year in middle and low income countries.

Our results also show how the burden of this illicit trade falls mainly on lower income countries. The illicit proportion of the cigarette market is lower overall in high income countries: 9.8% compared with 16.8% in low income countries, and it is under 15% in nine of the 14 high income countries for which we have data. In many low and middle income countries however it reaches extremely high levels: 50% in Georgia, 40% or more in Uzbekistan, Bosnia and Herzegovina, Albania and Bolivia, and over 20% in 15 more countries.

If the illicit cigarette trade were eliminated the revenue gained would be \$13 billion in high income countries and \$18.3 billion in middle and low income countries; from 2030 onwards 32,000 lives a year would be saved in high income countries and 132,000 a year in middle and low income countries.

it is important that governments in low and middle income countries are aware of the evidence and of the real value of increasing prices, which will improve the health of their populations and increase tax revenue.

We also show that the overall level of smuggling is not dependent exclusively on cigarette price, as the tobacco industry claim; but on the contrary, higher income countries, where cigarettes are more expensive, have lower levels of cigarette smuggling than lower income countries. Other factors, including the presence of informal distribution networks, organized crime, industry participation, and corruption, probably contribute more to cigarette smuggling than price levels.³⁰ This is extremely important, because the argument that price increases inevitably lead to increases in smuggling and illicit trade has at times proved persuasive to governments. Furthermore, because illicit trade levels are higher in lower income countries, almost 17% in low income countries compared with 10% in high income countries (Table 4.3), it is important that governments in low and middle income countries are aware of the evidence and of the real value of increasing prices, which will improve the health of their populations and increase tax revenue.

These updated illicit cigarette trade estimates are considerably higher than the 2000 World Bank estimates for the year 1995, which may possibly be explained by an increase in counterfeit trade and illicit manufacturing over recent years.^{31,32} Our figure of \$40.5 billion in revenue currently lost to governments

through the illicit trade is close to the 2006 Framework Convention Alliance (FCA) estimate of \$39 billion for cigarettes, but lower than the estimate of \$40 to \$50 billion in total.³³ The reason for this is that the 2006 estimates included other products, including hand rolled tobacco, whereas this report only deals with cigarettes, and that the 2006 estimates did not allow for the effect of eliminating smuggling on price, and thus on reduced consumption.

The illicit tobacco trade can be successfully tackled.

We have cited evidence from three countries that shows that the illicit tobacco trade can be successfully tackled. Over the last decade illicit trade fell from about 21% to 13% in the UK, and from about 15% to 1–2% in Italy and Spain.³⁴ Successfully reducing tobacco smuggling in Italy and Spain had one key common factor: smuggling was reduced by interrupting the supply chain from the manufacturers to the illicit market. The evidence suggests that the supply chain is to a great extent controlled by the tobacco industry. International cooperation was crucial. Enforceable measures to control the supply chain and international cooperative measures including information sharing and cooperation in the investigation and prosecution of offences should be at the heart of the FCTC protocol on illicit tobacco trade. These measures should facilitate investigations into smuggling operations and make the

industry liable for controlling the supply chain. They should introduce measures including:

- licensing all participants in the tobacco business;
- tracking and tracing systems from the points of manufacture to all points of sale, which would help identify the point of diversion from the legal to the illicit market;
- traceable methods of payment;
- strict scrutiny procedures in the selection of contractors during the supply process, ensuring for example that they are all genuine companies with real addresses, employees, and do not have any criminal record; and
- significant financial penalties for infringements.

The global scope and multifaceted nature of the illicit tobacco trade requires a coordinated international response.

More than 160 Parties to the WHO FCTC³⁵ met in February and October 2008 to negotiate an international treaty to combat the illicit trade in tobacco products. The illicit trade treaty is being negotiated as a supplementary treaty, or protocol, to the FCTC. Article 15 of the FCTC states that the Convention should deal with all forms of illicit trade in tobacco products, including smuggling, illicit manufacturing and counterfeiting. The third meeting of the International Negotiating Body on the Protocol, INB3, starts in Geneva in June 2009.

Endnotes for Chapter V

³⁰ Joossens L, Merriman D, Yurekli A, Chaloupka F. Issues in the smuggling of tobacco products. Chapter 16, Jha P, and Chaloupka F. (eds) *Tobacco Control Policies in Developing Countries*, Oxford University Press, 2000, p. 393-406.

³¹ Report of the European Anti-Fraud Office, Period 1 July 2004-31 December 2005, Brussels, 2006, p. 47.

³² European Commission. *Contraband and counterfeit cigarettes: frequently asked questions*. Brussels, European Commission, December 14, 2007.

³³ Framework Convention Alliance, *How big was the illicit tobacco problem in 2006?*, Geneva, 2007.

³⁴ Joossens L, Raw M. Progress in combating cigarette smuggling: controlling the supply chain. *Tobacco Control* 2008;17:399-404.

³⁵ World Health Organization. *WHO Framework Convention on Tobacco Control*. Geneva, World Health Organization, 2003.

VI. Recommendations

Measures Recommended by the FCA to Eliminate the Illicit Tobacco Trade

The FCA — an alliance of more than 350 organizations from more than 100 countries working on the development, ratification, and implementation of the FCTC, recommended to INB2 that an effective protocol on illicit trade in tobacco products should contain strong provisions dealing with each of the following issues:³⁶

1. Control of the Supply Chain

Licensing of key participants in the supply chain, including: manufacturers, commercial importers and exporters, wholesalers, brokers and warehouseers of tobacco products; tobacco leaf dealers and commercial importers and exporters of tobacco leaf; manufacturers of manufacturing equipment and key inputs used in the manufacture of tobacco products; and, where practicable, growers of tobacco leaf and retailers of tobacco products;

Customer identification and verification requirements to ensure that key participants in the supply chain conduct due diligence with respect to customers and contractors with whom they transact, including: obtaining information about their identity and business dealings; monitoring their activities to detect transactions that do not appear to be commensurate with product demand; reporting any suspicious transactions; and terminating business relationships where relevant laws have been broken;

Tracking and tracing of products through the supply chain, with: information required to be recorded to allow tracking and tracing as far through the supply chain as possible; sharing of information between authorities in different Parties; and arrangements to allow ongoing improvement of the system in light of technological developments;

Record-keeping requirements for key participants in the supply chain, including requirements that records of all relevant transactions be maintained for a specified period of time and made available to relevant authorities, and sharing of records between Parties.

2. Security and Preventive Measures

Security and preventive measures including: requirements that participants in the supply chain take all reasonably practicable measures to prevent diversion into illicit trade channels; restrictions on acceptable methods of payment; and obligations not to supply products in amounts that exceed legitimate demand; a complete ban on internet sales and other telecommunication-based modes of sale of tobacco products to consumers; a complete ban on tax-free sales and tax-reduced sales of tobacco products to international travelers.

3. Enforcement

Establishment of a comprehensive set of offences, including criminal offences; measures to hold corporate entities liable for the commission of offences; application of effective and dissuasive sanctions; measures to enable search of premises and seizure of evidence; measures to enable confiscation and seizure and identification, tracing and freezing of property, equipment and assets, including proceeds of crime; recovery of unpaid taxes and duties from the producer or manufacturer of seized products (referred to in the Chairperson's text as 'seizure payments'); measures to ensure the destruction of confiscated property (while allowing for use for training or law enforcement purposes); use of special investigative techniques, such as controlled delivery, electronic and other forms of surveillance and undercover operations; measures for the enhancement of law enforcement capacity; measures to ensure necessary public education and awareness-raising.

4. International Cooperation

Information sharing between Parties, include general, statistical and operational information (subject to appropriate safeguards); assistance and cooperation with respect to training and scientific, technical and technological matters; exercise of jurisdiction; establishment of joint investigations; law enforcement cooperation, including with respect to prevention, detection, investigation, prosecution and

punishment of offences covered by the protocol; cooperation for purposes of confiscation of property, equipment or assets, including proceeds of crime; provision of mutual legal assistance in relation to criminal offences covered by the protocol; extradition in relation to criminal offences covered by the protocol; transfer of proceedings for the prosecution of criminal offences covered by the protocol; appropriate cooperation with non-Parties to the protocol.

Endnotes for Chapter VI

³⁶ Framework Convention Alliance, Key elements of an effective protocol on illicit trade in tobacco products, Policy Briefing Paper, Geneva, October 2008.

Appendix 1. Regional and Country Estimates of the Illicit Cigarette Trade

Please see Table 4.1 for a summary of country estimates of the illicit cigarette trade. This appendix provides additional information and notes on data sources; estimates contained in Table 4.1 use standardized terminology determined by the authors to facilitate cross-study comparison; verbatim study terminology are reported in this appendix.

Europe

EU Based on in-depth analysis of data collected by the professional services company KPMG, a European Commission study estimated that, in 2004, total market penetration of illicit cigarette trade represented approximately 8–9% of the European Union (which had 25 member states at the time, designated EU-25) cigarette sales.³⁷ The European Commission report noted also that the illicit market share in the new EU member states — Estonia, Hungary, Lithuania, Poland and Slovakia — were far above the EU-25 average.³⁷ The European Commission report has limitations, as it is based on cigarette seizures in the EU and on studies provided by the tobacco trade and governments, however as its estimate falls between the higher estimates from the UK and eastern and central European countries and the lower estimates from southern European countries like Spain and Italy the overall figure of 8–9% is a reasonable estimate.

According to a survey of 26,500 Europeans (EU-27³⁸ + Norway) in December 2008, just over one tenth of EU citizens (12%) have seen tobacco products being sold in the past six months which they think might have been smuggled into the country. The proportion of respondents who have seen potentially smuggled tobacco products being sold in the past six months is the highest in Lithuania (36%), followed by Greece (25%), then Poland, Hungary and Latvia

(22–24%). In Belgium, the Netherlands, Italy, Portugal, Luxembourg and Denmark, on the other hand, only 5% of respondents have seen potentially smuggled tobacco products in the past six months. In Norway, where in January 2008 a packet of Marlboro cost \$12 (the country with the highest cigarette prices in the world) only 6% of survey respondents had seen tobacco products during the last 12 months which they believed were smuggled. In Lithuania, where in January 2008 a packet of Marlboro cost \$2 (the country with the lowest cigarette prices in the EU) the percentage was 36%.³⁹

UK According to UK Customs officials the illicit market share (of consumption) in 2006–07 was 13% for cigarettes and 53% for hand rolled tobacco in the UK⁴⁰. The UK is one of the few countries to produce reliable yearly estimates of illicit trade, with a methodology based on the discrepancy between trends in legal sales and household survey smoking habits.⁴¹

Poland Customs officials estimate that 10–12% of cigarettes sold in Poland came from the illicit market in 2007.⁴² A 2004 survey of the Cancer Epidemiology & Prevention Division of the city of Warsaw also suggested that only 11% of smokers could have bought cigarettes on the illicit market in Poland.⁴³ Studies based on six surveys in the period 2004–06 concluded that 11% of cigarettes sold in Poland were illicit.⁴⁴

Spain, Italy Cigarette smuggling in Spain and Italy decreased from around 15% of consumption in the 1990s to 1–2% of consumption in 2006.^{45–47} In both countries, cutting off supply to the illicit market was a key factor in reducing smuggling.⁴⁸

Estonia Independent researchers estimated illegal cigarette sales in Estonia at 17% of the total cigarette market in 1999⁴⁹ and between 19% and 32% in 2003.⁵⁰

France In France the difference between registered cigarette sales and cigarettes declared as being smoked was approximately 20% of legal sales in

2005. Most of this difference can be explained by legal tax avoidance (cross-border shopping in neighbouring countries) rather than by large scale smuggling.⁵¹

Albania, former Yugoslavia Illicit markets have been slightly reduced or stabilized, albeit at very high levels, in Albania (50–40%), Bosnia and Herzegovina (45–35%) and the Former Yugoslav Republic of Macedonia (30–35%).⁵²

Russian Federation The European regional office of the World Health Organization estimates that in the Russian Federation 20–30% of cigarettes are smuggled and WHO concludes that the Russian Federation remains the biggest illicit European market in terms of volume.⁵² The marketing research company Euromonitor estimates the illicit cigarette market in the Russian Federation at 20% of legal sales or 76 billion cigarettes in 2006.⁵³ Independent research estimated that 23% of legal sales is illicit in the Russian Federation in 2004 (70 billion cigarettes).⁵⁴

Ukraine The Ukraine is a major supplier of illicit cigarettes in Europe.⁵⁵ There are contradictory estimates of the extent of the domestic illicit cigarette market in Ukraine, which vary from 2% to 18%.

Uzbekistan, Kazakhstan Contraband is estimated to account for around 40% of overall consumption in 2006 in Uzbekistan and 9% in Kazakhstan.⁵⁶

Georgia According to a June 2005 British American Tobacco study, the illicit cigarette market share was 49% in Georgia.⁵⁷

Armenia Independent research estimated cigarette smuggling in Armenia at almost 16% of total consumption in 2004.⁵⁸

Turkey Finally a tobacco industry study reported that 7% of the cigarette market in Turkey in 2007 were illicit.⁵⁹ The 2006 Euromonitor estimate for Turkey is 14%.⁵³

Americas

Canada The Canadian tobacco industry contracted a research company, GfK Group, to assess smoking trends in Canada. Their research reported that 16% of smokers said in 2006 that they had purchased illicit tobacco products within the previous seven days, the figure rising to 22% in 2007 and 33% in 2008.^{60,61} In the 2008 survey, respondents were interviewed in their homes and the survey team asked to see their cigarettes. Illegal cigarettes were on hand in 19% of homes nationwide. The major source of the Canadian illegal trade is cigarettes illicitly manufactured in aboriginal native reserves on the border between Canada and the US, which are smuggled into Canada (mainly the provinces of Ontario and Quebec).⁶²

USA Cigarette taxes in the US vary at the different levels of government. Combined federal, state and city taxes are highest in New York City. In 2004 57% of smokers in New York City purchased cigarettes at least once from a low-tax or untaxed source, while 37% purchased low-tax or untaxed cigarettes regularly.⁶³ In 2007 one third of cigarettes sold in New York State were channelled untaxed through Indian smoke shops,⁶⁴ shops on Indian reserves where cigarettes are sold untaxed. Based on a comparison between cigarette sales data and cigarette consumption data from surveys, a researcher from the Department of Economics of Drexel University estimated that in 1985 in the USA 7.2% of cigarettes were purchased without payment of state taxes and that this had risen to 12.7% in 2001.⁶⁵ A researcher from the Stanford University Institute for Economic Policy Research estimated that between 13% and 25% (average 17.5%) of US consumers purchased cigarettes in a lower-price state or Native American reservation over the period 1992–2002.⁶⁶

Brazil According to the Ministry of Finance, counterfeit, illicit manufacturing and smuggled products represented 35% of legal sales in 2006,

representing 37 billion cigarettes (16 billion illicit manufactured and 21 billion smuggled cigarettes).⁶⁷

Argentina In its March 2005 issue the tobacco trade journal *World Tobacco* estimated smuggling and counterfeit trade in Argentina to be between 15% and 20% of the domestic market.⁶⁸

Mercosur market Independent researchers estimated that manufacturers in Paraguay supplied the illegal cigarette market, mainly in the MERCOSUR countries (Uruguay, Argentina, Brazil and Paraguay), with 70 billion cigarettes in 2007.⁶⁹ They estimated the illicit cigarette market at 12% of the total market in Uruguay and 10% of the total market in Argentina in 2006.⁶⁹

Columbia In 2004 14% of the cigarettes sold were smuggled or counterfeit according to the research company Euromonitor International.⁷⁰

Other estimates of the illicit cigarette market share in the American region are: Chile 3% of sales (2006), El Salvador 10% of market volume, Panama 10% of sales (2000), Nicaragua 10% (market not defined) (2001–2), Guatemala 12% of total cigarette market (2006), Ecuador 12% of total consumption (2006),⁵⁶ Peru 23% of overall cigarette consumption (2006), Costa Rica 8.5% of legal sales (2006), Venezuela 23.2% of legal sales (2005), Mexico 3.3% of total sales (2006), Bolivia 46% of legal sales (2005).⁷¹

Asia and Australasia

Pakistan According to their customs the illegal trade represented 17% of cigarette sales in Pakistan in 2005.⁷² A report by the London based market research company ERC estimates the illicit market at 18% of the total market (5% smuggling and 13% illicit manufactured) in 2006 in Pakistan.⁷³

Vietnam The Vietnam Institute of Economics estimated cigarette smuggling in Vietnam in 2004 to be 10%.⁷⁴ The same figure was mentioned in a 2007 tobacco trade journal.⁷⁵

Malaysia The tobacco industry estimates that smuggling and counterfeit trade made up 21% of the cigarette market in 2002⁷⁶ rising to 24% in 2008.⁷⁷ There is no independent confirmation of these figures.

India Smuggled cigarettes were estimated to account for more than 14% of total cigarette consumption in India in 2004.⁷⁸ The 2007 ERC report noted that non-duty paid sales remains a major problem in India, although there are few accurate figures on the size of the market.⁷⁹

Philippines Euromonitor estimates the illicit cigarette market in the Philippines at 19.4% of legal sales or 18.5 billion cigarettes in 2006.⁵³

Indonesia, Thailand Estimates for illicit cigarette market share in Indonesia are low, 5–6% of sales in 2005, compared to 11% of sales in Thailand.⁸⁰

China There are varying and contradictory estimates of the level of illicit cigarette trade in China. China is by far the biggest producer in the world of counterfeit cigarettes, which are destined for domestic and foreign markets. Of counterfeit cigarettes seized in the EU in 2007, 55% originated in China.⁸¹ A 2005 national survey conducted by the China National Bureau of Statistics on behalf of the China National Tobacco Company (CNTC) found that about 10% of cigarettes on the market were counterfeit.⁸² China's State Tobacco Monopoly Administration announced in January 2008 that it had seized 9.28 billion counterfeit cigarettes in 2007.⁸³ Thus the production of counterfeit cigarettes can be estimated at 93–186 billion cigarettes if we assume that the seized cigarettes represent about 5–10% of total illicit counterfeit production, a plausible assumption. In Vietnam also customs estimate that they seize just 5–10% of illicit cigarettes.⁷⁴ In addition to counterfeit, smuggling has to be added. An estimate for the illicit trade for China will always be difficult, but considering the high level of counterfeit production, the level of seizures in 2007, the 2005 survey on counterfeit market share, and information from key

informants in China, we think 8–10% is a reasonable low estimate of the current illicit market.

Japan Euromonitor estimates illicit cigarette sales make up 1.7% of the Japanese duty paid market in 2006 (or 4.6 billion cigarettes).⁵³ Most observers in the field agree that illicit cigarette trade is low in Japan. A possible explanation for the low level of smuggling in Japan is that the country has a strict control of its distribution network. All retailers of tobacco products have to be approved and are licensed by the Ministry of Finance.

Australia A tobacco industry commissioned report by Pricewaterhouse Coopers estimated the illegal tobacco market in Australia at 1.8 million kilograms or the equivalent of 6.4% of cigarette sales in 2007.⁸⁴ Estimates of illicit cigarette trade in Australia are generally lower than in other high tax countries in other parts of the world, possibly because Australia is a huge country with a small population and relatively few smokers, geographically isolated from neighbouring countries.

Other estimates in the region are: Hong Kong 42% (2005), Taiwan 11% (2005), Singapore 18% (2005), New Zealand 1% (2005)⁷¹ (all % of legal sales), Laos 46% (2005).⁵⁶

Middle East and Africa

Iran Based on a report of the Iranian tobacco companies and the Central Headquarters of the Fight against Smuggling, which is a department of the Presidential office, the illicit cigarette market share in Iran was 74% of the total market in 2001 (40 billion cigarettes) and 14% of the total market in 2007 (8.3 billion cigarettes) in Iran.⁸⁵ The extremely high level of smuggling in 2001 is probably because there was insufficient domestic production to meet demand, and imported cigarettes were subject to high import duties, so Iran was a target for internationally smuggled cigarette brands.⁸⁶ However between 2001 and 2007 the market was liberalised and national production

was increased, leading to a dramatic fall in smuggling. Two studies of the Tobacco Prevention and Control Research Center in Tehran concluded that 44% of the cigarettes in Tehran were illicit in 2005–06 and almost 23% in 2007–08.^{87,88}

Egypt There are no data for Egypt but industry estimates of illicit cigarette trade in Egypt are low.⁸⁹

Tunisia Customs authorities estimated in 2008 that the illicit cigarette trade was 10% of legal sales annually.⁹⁰

Jordan Industry estimates from a 2007 report put the size of the illicit market around 10–12% of total market, mainly from cross-border smuggling from Syria.⁵⁶

Morocco Tobacco trade specialists estimated the illicit cigarette market in Morocco at 22% of total market in 2006.⁵⁶

Syria The Tobacco Control Programme of the Ministry of Health estimated the illicit cigarette trade in 2007 to be between 22% and 29% of total sales.⁹¹

Middle East Smuggling is a serious problem in Lebanon, the Syrian Arab Republic, and the Islamic Republics of Iran and Iraq. After the 1991 Gulf War shortfalls in Iraqi cigarette production were made up by illegal imports. In 2000 almost 11 billion sticks were reported to have been imported illegally.⁹² Trade sources suggest that the size of the illegal market in those four countries remains significant. The illicit cigarette market in these four countries varies from about 10% to about 35% of the total market in recent years and has been influenced by the conflicts in the region, trade sanctions and border controls.⁵⁶

South Africa The Tobacco Institute of South Africa says that 20% of the total South Africa market is illicit.⁹³ An independent researcher estimated that the size of the illicit market peaked at between 10.5 and 13.5 percent of the total South African market in 2000.⁹⁴ A recent estimate suggests between about 7%

and 9% of total consumption in 2007 even though 2006 represented the lowest estimates since the peak of 2000.⁹⁴

Ethiopia An article in the tobacco trade journal *World Tobacco* estimates the illicit cigarette market at 38% in 2006.⁹⁵

Nigeria ERC reports that illicit cigarette sales in Nigeria were greater than legal sales in the period 1995–2002 but decreased as import duties have been reduced. The estimate for 2006 is 18% of total

consumption. The black cigarette market “had been perpetuated by inefficient border controls and rampant smuggling from neighbouring markets such as Benin.”⁹⁶

Other estimates in the region are: Algeria 20% of overall market (2006), Yemen 11% of market volume, Sudan 20%, Zambia 25% (2003) (market not specified), Ghana 17.5% of sales (2005), Cote d’Ivoire 15% of sales (2001),⁵⁶ Saudi Arabia 3.6% (2006), Cameroon 26% (2005), United Arab Emirates 30.3% (2005), Israel 5.1% (2005)⁷¹ (all % of legal sales).

Endnotes for Appendix 1

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Appendix 2. Equations

With the exceptions noted below the methodology used in these calculations was adapted from West et al: West R, Townsend J, Joossens L, Arnott D, Lewis S. Why combating tobacco smuggling is a priority. *BMJ* 2008; 337:1028-1029 (1 November).

Equations used to calculate the number of cigarettes smuggled

The basic formula to calculate the number of cigarettes smuggled in country i is:

$$(1) \text{ smug}_i = S\text{smug}_i * \text{consumption}_i$$

Where $S\text{smug}_i$ is the market share of smuggled cigarettes and consumption_i is the total (legal plus illegal) consumption in country i .

Except in the US, EU-25 and a few other countries consumption is calculated as:

$$(2) \text{ consumption}_i = l\text{consumption}_i * \left(\frac{1}{1 - S\text{smug}_i} \right)$$

Where $l\text{consumption}_i$ is the legal consumption in country i .

In the US, EU-25 and a few other countries we assume that $\text{consumption}_i = l\text{consumption}_i$. The reason for making this assumption in the US is that the vast majority of smuggling is interstate smuggling so that national legal sales come close to representing national consumption. The reason for making this assumption in the EU-25 and a few other countries is that the reported smuggling calculations given in these countries uses total (rather than legal) consumption as the base.

Equations used to calculate increase in average price if smuggling were eliminated

Let

r_0 = average revenue per cigarette with smuggling

r_1 = average revenue per cigarette with no smuggling

$$r_0 = (\pi * I) + (p * l)$$

where π = price of illicit cigarettes

I = share of all cigarettes that are illicit cigarettes

p = price of legal cigarettes

l = share of all cigarettes that are legal cigarettes

and

$$r_1 = (p * I) + (p * l) = p * (I + l) = p$$

percentage change in average revenue is

$$\left(\frac{r_1}{r_0} \right) - 1 = \frac{(p)}{(\pi * I + p * l)} - 1$$

$$= \frac{(p - r_0)}{(\pi * I + p * l)}$$

$$= \frac{(-\pi * I) - (p * l) + p}{(\pi * I + p * l)}$$

$$= \frac{(-\pi * I) + (p * (1 - l))}{(\pi * I + p * l)}$$

$$= \frac{(-\pi * I) + (p * I)}{(\pi * I + p * l)}$$

$$= \frac{(p - \pi) * I}{(\pi * I + p * l)}$$

Let $\pi = a * p$ then

$$= \frac{p(1 - a) * I}{p(a * I + l)}$$

$\left(\frac{r_1}{r_0} \right) - 1 = \frac{((1 - a) * I)}{(a * I + l)}$ = percentage change in price = pctdp

Note that using this methodology we can replicate the calculations in West et al. In that article the authors state that:

$$a = 0.5 \quad I = 20.8 \quad l = 79.2 \quad \text{then}$$

$$\left(\frac{(1 - a) * I}{(a * I + l)} \right) = \frac{(0.5 * 20.8)}{((0.5 * 20.8) + 79.2)} = 0.11607143$$

We also report the "consumption weighted" increase in price. This calculation weights each country's price increase by its relative share of total consumption. Thus the price increase in countries with high shares of consumption (like China) play a larger role in determining average price changes than countries with a small share of consumption (like Slovenia).

Equation used to calculate decline in consumption if smuggling were eliminated

Following West et al we assume that the percentage change in consumption if smuggling were eliminated

$$pctdq = ((\exp(\text{elasticity} * \ln(\pi_{\text{over_pl}}))) - 1) * II$$

where $\pi_{\text{over_pl}}$ is the ratio of the illegal to the legal price;

Note that this replicates West et al. In that case, they assume that

$$\text{Elasticity} = -0.4 \quad \pi_{\text{over_pl}} = 0.5 \quad II = 20.8$$

Note that:

$$\exp(0.4 * \ln(0.5)) - 1 = -0.24 \quad \text{and} \quad -0.24 * 20.8 = 5\%$$

Based on past literature (eg. Tobacco control in developing countries)⁹⁷ we assume that elasticity = -0.40 in high income countries and elasticity = -0.80 in low and middle income countries (as defined by the World Bank). We run alternative estimates under the assumption that elasticity = -0.40 in high income countries and elasticity = -0.40 in low and middle income countries (as defined by the World Bank)

We lack data on $\pi_{\text{over_pl}}$ but assume $\pi_{\text{over_pl}} = 1 - (\text{illicit_discount} * \text{tax_share})$;

This equation imposes the assumption that the extent of the discount for illicit cigarettes depends on two parameters: the tax share, which we observe, and the illicit discount which we do not observe. The logic for our equation is as follows. When cigarettes are smuggled the smugglers benefit by avoiding taxes. In competitive markets the maximum discount on illicit cigarettes relative to legal cigarettes should be equal to the proportion of the price that is tax. If there are upward sloping supply of illicit cigarette curves and downward sloping demand for illicit cigarette curves economic theory suggests that the monetary benefits from tax avoidance will be split between illicit suppliers and their customers. We assume an "illicit

discount" parameter that measures the share of the avoided taxes passed on to consumers. We calculate price increases, consumption decline, revenue gain and lives saved assuming consumers get two thirds of the tax benefits. As the value of the illicit discount falls the price increase, consumption decline and lives lost fall but the revenue gains rise.

Also we define the absolute decline in consumption as $dq = pctdq * \text{consumption}$.

Equations used to calculate tax revenue (in dollars) lost to smuggling

This differs from West et al. in that we subtract the decline in consumption as a result of the price increase when the illicit trade is eliminated (called dq), before calculating the gain in tax revenue.

The basic formula for dollars of tax revenue lost to smuggling is:

$$(3) \quad \$lost_i = (smug_i - dq_i) * price_i * taxshare_i$$

Where $price_i$ is the average price of a pack of cigarettes and $taxshare_i$ is the share of the price accounted for by taxes in country i . In EU-25 we assume that

$$price_i * taxshare_i = \$4$$

Equations used to calculate premature deaths as a result of smuggling

Note that these calculations follow West et al and assume that people pay the same non-monetary price or legal and illicit cigarettes. If people actually pay a higher non-monetary price for illicit than for legal cigarettes consumption would fall less than shown here.

Following West et al we assume that the decline in deaths is proportional to the decline in consumption.

The method is a simple arithmetic calculation. The estimated death toll in 2030 is 8.3 million. If the illicit trade were eliminated there would be an overall fall in global cigarette consumption of 2.0% which would result in a 2% reduction in deaths.

In 2006, Mathers and Loncar report that in 2030 there will be 8.3 million premature deaths attributed to tobacco related illness: 6.8 million premature deaths in low and middle income countries and 1.5 million deaths in high income countries as a result of smoking.

We assume that the 84 countries for which we have sufficient data to estimate changes in consumption if

illicit trade were ended are representative of all (low and middle and high income) countries.

We calculate the decline in deaths from ending of illicit trade as:

$$ddeath = ((dpctq1/100) * 6.8 \text{ million}) + ((dpctq2/100) * 1.5 \text{ million})$$

Where $dpctq1$ is percentage change in consumption in low and middle income countries as the result of ending illicit trade and $dpctq2$ is percentage change in consumption in high income countries as the result of ending illicit trade.

Endnotes for Appendix 2

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Appendix 3. Data Sources

Estimates of population in 226 countries in the world in 2007 were obtained from the US Census Bureau, International Data Base, <http://www.census.gov/cgi-bin/ipc/idbagg> February 10, 2009.

Smug_i A list of smuggling percentages in 84 countries was supplied by Luk Joossens and Hana Ross. Note that Joossens supplied an estimate for the aggregate EU-25 countries and for some individual countries in the EU-25. Only data on average in EU-25 countries are used in the analysis. Also Merriman added data on US using estimates contained in Lovenheim, Michael L. How Far to the Border? The Extent and Impact of Cross-Border Casual Cigarette Smuggling. SIEPR Discussion Paper No 06-40., Stanford Institute for

Economic Policy Research, October 2007. ERC data were used for additional countries.

lconsumption_i Legal consumption data for 123 countries were provided by ERC Statistics International Plc, 2006.

price_i Data on the price in dollars for Marlboro or equivalent were supplied by Hana Ross and derived from Shafey O, Eriksen M, Ross H, Mackay J. Tobacco Atlas 3rd Edition. Atlanta, American cancer Society, 2009.

taxshare_i Data on cigarette taxes as a proportion of price in 150 countries were obtained from Hana Ross on 26 January 2009 also from Shafey O, Eriksen M, Ross H, Mackay J. Tobacco Atlas 3rd Edition. Atlanta, American cancer Society, 2009.

Author contributions

LJ was the project leader; he conceived the project and was responsible for data collection on the illicit trade estimates; his work on this project was funded by the Framework Convention Alliance and Bloomberg Philanthropies. DM was responsible for the calculations of revenue losses, fall in consumption and number of lives saved; his work on this project was funded by Bloomberg Philanthropies. HR contributed to the data collection and the reviewing and writing of the report; her work on this project was supported by the American Cancer Society, with a contribution from Bloomberg Philanthropies. MR led the writing process and the final writing and editing of the report; his work on this project was funded by Bloomberg Philanthropies.

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