

Chapter 8

Tax avoidance and tax evasion

Introduction

Tax avoidance and tax evasion can decrease the economic welfare by making tobacco products more affordable and available, thus exacerbating the negative health consequences associated with tobacco use and secondhand smoking.

Furthermore, tax avoidance and tax evasion can undermine the impact of tobacco control measures, primarily tobacco tax policies. The existence of illicit tobacco trade has been used to increase political pressure on governments and discourage them from adopting and implementing effective tobacco tax strategies. Moreover, illicit tobacco trade can channel sales proceeds to organized crime and lead to a loss in government tax revenues.

This chapter reviews and summarizes the research evidence related to tobacco tax avoidance and tobacco tax evasion from published literature and empirical evidence. This body of information is organized in five sections. The first section explains the difference between tax avoidance and tax evasion, defines the activities that fall into each category, and describes methods used in measuring the extent to which these activities supply tobacco products to the market. The

next section explains the motivation for tax avoidance and tax evasion, and categorizes these motives based on whether they are related to profit generation, costs of supplying illicit products, deterrence or an overall state of the economy. The third section provides the most recent estimates of the extent of tax evasion globally, regionally and also in some selected countries. The following section reviews the literature on the impact of tax avoidance and tax evasion on public health measures such as smoking rate, smoking intensity and health disparities. The final section reviews the impact of policies attempting to curb illicit tobacco trade and summarizes the lessons learned from the implementation of those policies.

Defining and measuring tax evasion and avoidance

Among those working on tobacco tax issues, a variety of circumventing activities for not paying all tobacco taxes are often grouped together and referred to as “smuggling” or “illicit trade” in tobacco products. A clarification of the terms used is necessary as those terms cover different activities. Smuggling refers

to products illegally traded across borders. Illicit trade is defined in Article 1 of the WHO Framework Convention of Tobacco Control (World Health Organization, 2005) 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. Illicit tobacco trade covers more activities than the circumvention of taxes, but includes all illegal activities related to the tobacco trade.

Economists mostly refer to the circumvention of taxes, and prefer to use the terms tax avoidance (legal methods of circumventing tobacco taxes) and tax evasion (illegal methods for circumventing tobacco taxes).

This section defines the activities of tax avoidance and tax evasion that fall into each category and briefly describes approaches to measuring the extent of both, drawing heavily from the classification scheme proposed by Joossens and colleagues (2000) and the methods described in IARC’s Handbooks of Cancer Prevention Volume 12, *Methods for Evaluating Tobacco Control Policies* (IARC, 2008), the World Bank’s tool

on tobacco smuggling (Merriman, 2001), and the book chapter by Merriman and colleagues (2000).

Tax avoidance

Tax avoidance includes legal activities and purchases in accordance with customs and tax regulations, most of which include the payment of some tobacco taxes, and are done mostly by individual tobacco users, including cross-border shopping, tourist shopping, duty-free shopping, Internet and other direct purchases, industry reformulation and/or repositioning. These include:

Cross-border shopping. This type of tax avoidance involves individual tobacco users residing in higher tax jurisdictions purchasing tobacco products in nearby lower-tax jurisdictions for their own consumption within the customs constraints. This can involve crossing national borders, particularly where such border crossing is freely or relatively easily done (as between the European Union Member States) or can take place within a given country where there are significant differences in subnational taxes (as in Canada where provincial taxes differ, or in the United States where state and local taxes can vary considerably across jurisdictions). Within some countries, this also involves purchases from shops located in tax-exempt areas, such as Aboriginal reserves in Canada and Native American reservations in the USA. In some cases, there are limits on how much can be purchased outside of the jurisdiction in which the individual resides (e.g. the European Union), while in others the individual is supposed to pay the difference between the tax in their home jurisdiction and the tax they have paid on the products purchased in other jurisdictions (e.g. in various

US states). However, enforcement of these provisions is difficult.

Tourist shopping. This type of tax avoidance is similar to the cross-border shopping described above, but involves the purchase of tobacco products in more distant jurisdictions, again subject to the constraints imposed by customs laws and/or other policies (e.g. consumption of tax-paid cigarettes by the large tourist population in Thailand). This is a more limited phenomenon, but can account for a significant share of overall tobacco product sales in popular tourist destinations.

Duty-free shopping. This type of tax avoidance is similar to the others, but in this case involves the purchase of tax-free tobacco products purchased in airports, on airlines, and in other travel-related venues. Again, most governments impose limits on how much an individual can purchase and bring home from duty-free sources.

Internet and other direct purchases. This type of tax avoidance involves individual tobacco users buying tobacco products online, through the mail, or over the phone from establishments based in low-tax jurisdictions for consumption in their own higher tax jurisdiction. This has attracted the most attention in the USA, given relatively widespread access to the Internet and significant differences in subnational taxes. For US consumers, for example, these may include purchasing from vendors based on Native American reservations, in low-tax states or in low-tax countries; as above, however, purchasers are obligated to pay taxes to their home state on these types of purchases. Over the past several years, US states have taken steps to curb direct purchases through a variety of policy and enforcement actions and Internet and few smokers purchase cigarettes

through direct channels (Chaloupka *et al.*, in press). Differences in legal obligations for paying taxes in the home jurisdiction can make this type of activity more a form of tax evasion than tax avoidance (e.g. EU countries).

Industry reformulation or repositioning. Tobacco companies can reduce the tax imposed on their products by reformulating or repositioning their products. For example, in countries with multitiered tax structures where higher taxes are levied on higher-priced brands, a company can lower the price of its product so that it moves from a higher tax tier to a lower tax tier. As occurred recently in Germany, where cigarette taxes are based on quantity, companies produced long cigarettes that were readily cut into smaller, standard size cigarettes, effectively reducing the tax per cigarette.

Tax Evasion

The activities included under tax evasion are the illegal methods of circumventing tobacco taxes, such as the purchase of smuggled and illicit manufactured tobacco products. Those activities include both small and large quantities and often, but not always, involve efforts to avoid paying any taxes. Many of these activities are done by larger criminal networks or other large-scale operations.

Small-scale smuggling. This type of tax evasion 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 smuggling or resale in high-tax jurisdictions.

This type of tax evasion is illegal in that the quantities involved exceed the allowable limits and that the purchase does not include the

taxes that are supposed to apply in the jurisdiction where they are used. As with cross-border shopping, this is more likely to occur when tax differentials among nearby jurisdictions are large and where border crossing is relatively easy. For example, small-scale smuggling is one form of tax evasion that occurs between US states, most notably low-tax states with no tax stamps (such as South Carolina) where small-scale smugglers buy tax-paid cigarettes and then resell in high-tax states.

Large-scale smuggling. This type of tax evasion involves the illegal transportation, distribution, and sale of large quantities of tobacco products, conducted by criminal networks, that generally avoid all taxes. As Joossens and colleagues (2000) describe, this typically involves: international brands that are sold by multinational tobacco companies and which are easily sold; transportation over longer distances and often involving “in-transit” regimes and tax-free zones; the passing of tobacco products through a wide range of owners; large organized-crime networks; and a sophisticated system for distributing smuggled cigarettes locally. To avoid detection, counterfeit tax stamps are often applied to smuggled cigarettes that are being sold in jurisdictions that require such stamps. Large-scale smuggling has also been used for large consignments of counterfeit cigarettes or for legally manufactured cigarettes which are targeting the illicit markets in other countries. One example is the cigarette brand Jin Ling, which is legally manufactured in the Russian Federation, but destined for the illegal market in Germany and other European countries and which was one of the most seized cigarette brands in Europe in 2008 (World Customs Organization, 2009).

Illicit manufacturing. This type of tax evasion 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. This type of tax evasion includes underreporting of actual production quantities with the difference between reported and actual production diverted through illegal channels or, in some cases, complete avoiding of reporting with all production diverted to black markets. This type of illegal manufacturing is more likely to occur in countries without effective tax administration that includes monitoring of actual production, and in regions where distribution of the illegally produced cigarettes is relatively easy. Counterfeit tax stamps are often applied to illegally manufactured products when these products are distributed in countries that require tax stamps. The destination of the illegally manufactured cigarettes can be the domestic or a foreign market. Illicit manufacturing includes counterfeiting.

Counterfeiting. Counterfeiting involves the production and distribution of products bearing a trademark without the approval of the trademark owner. These products are produced illegally, often bear counterfeit tax stamps (depending on where they are being sold), and are distributed through the networks established by large-scale smuggling operations. China has been a major manufacturer of counterfeit cigarettes (Shen *et al.*, 2010)

Measuring tax avoidance and evasion

Given the illicit nature of tax avoidance and evasion, developing accurate measures of the extent of these activities is challenging.

Over the past few decades, multiple approaches have been developed and applied, each of which captures some part of the full picture. The various approaches used to estimate the scope of tax avoidance and evasion are briefly described below; estimates based on these methods for various countries are presented later in this chapter. Given the different dimensions of tax avoidance and evasion captured using the different methods and the inherent limitations in each method, a combination of multiple methods will be most likely to produce a good measure of the extent of overall tax avoidance and evasion (IARC, 2008).

Expert opinion. One widely used approach to assess the extent of overall tax avoidance and evasion is to ask “experts” for their estimates of these activities, where the experts may be customs and other law enforcement officials, industry representatives, researchers, tobacco control advocates or others with a particular interest in the issue (Merriman, 2001). Such estimates are subjective and can be biased based on the individual expert’s position and interests. Tobacco industry informants, for example, may have an incentive to report high levels of tax avoidance and evasion as a way of averting tax increases, while tobacco control advocates may understate the extent of the problem in their efforts supporting tobacco tax increases. Estimates based on expert opinion are most prominent in trade and government publications. Overall, however, measures based on expert opinion are generally consistent with those derived from other approaches, suggesting that such measures are valid (IARC, 2008).

Comparison of export and import statistics. One approach to estimating the extent of large scale

smuggling is to compare export and import statistics. The difference between recorded exports and recorded imports is likely to reflect product diverted to illegal markets while in transit. This approach is likely to produce a valid measure for the global level of large-scale smuggling of legally manufactured cigarettes, but is unlikely to produce the same for small-scale smuggling and illicit manufactured cigarettes or at the country level (IARC, 2008). Merriman and colleagues (2000), for example, used this approach in their efforts to assess the extent of illicit trade in cigarettes, finding that about one third of recorded exported cigarettes in the mid-1990s did not appear in recorded imports, accounting for about 6% of global cigarette consumption.

Comparison of tax-paid sales and individually reported consumption measures. If there are no reporting biases in measures of tax-paid sales and measures of average consumption and prevalence obtained from representative population surveys, then the difference between the two will reflect the extent of overall tax avoidance and evasion (IARC, 2008). However, it is likely that there will be some temporal biases in tax-paid sales measures, as these generally reflect shipments at the factory or wholesale level rather than actual consumption. More importantly, there is likely to be some degree of underreporting of tobacco use in population surveys. To the extent that the bias in each is constant over time, changes in the difference between the two can indicate whether tax avoidance and evasion are increasing or decreasing over time (Merriman, 2001). However, as social norms against tobacco use strengthen over time, the extent of underreporting in population surveys is likely to grow, reducing the validity

of a measure based on this approach (IARC, 2008).

Modelling of tobacco product demand. A relatively widely used approach among tobacco control researchers is the econometric modeling of tobacco product demand using data from multiple neighbouring jurisdictions (e.g. US states, European Union Member States). Researchers using this approach have included variables measuring the opportunities for tax avoidance and evasion based on differences in prices across jurisdictions, population distributions near borders, extent of cross-border or tourist traffic, Internet penetration, and other factors reflecting access to lower tax/price jurisdictions. Coefficient estimates from the resulting models can be used to predict what tax-paid sales would have been if the variables reflecting the incentives/opportunities were set to zero, with the difference between predicted sales and actual sales reflecting the extent of tax avoidance and evasion. Depending on what opportunities are being modelled, this approach can be used to assess individual cross-border shopping and direct purchases, as well as small-scale smuggling. This approach has been used widely in the USA (see, for example: Becker *et al.*, 1994; Yurekli and Zhang, 2000; Farrelly *et al.*, 2003) and, to a limited extent, in European countries (Merriman *et al.*, 2000).

Survey of tobacco users' purchase behaviours. Representative surveys of tobacco product users that collect information on various aspects of purchase behaviour, including purchase location and price, can be helpful in assessing the extent of various forms of individual tax avoidance, including cross-border shopping, direct purchases, and duty-free purchases (IARC, 2008).

Hyland and colleagues (2006), for example, reported data from the International Tobacco Control Policy Evaluation Study's (ITC) surveys of representative samples of smokers in Australia, Canada, the United Kingdom and the United States which include questions on cross-border, duty-free, native reserve, Internet and other direct purchases, and other options that potentially reflect untaxed or lower taxed purchases. They found relatively low rates of individual tax avoidance in Australia (0.7–1.1%), Canada (3.1–3.7%), and the United States (4.8–6.1%), but high rates in the United Kingdom (15.3–19.7%), with rates increasing in each country over the two waves of their surveys.

Observational data collection. A relatively untested but potentially promising approach to assessing multiple dimensions of tax avoidance and evasion is direct observation of tobacco product vendors or collection of packs/containers from tobacco product users or other sources. Products can be examined for tax stamps, local warning labels, other pack markings, and product constituents to identify products that do not bear the appropriate stamps/labels/markings or that include constituents that differ from those contained in locally produced products. As part of the ITC survey in Poland, for example, interviewers were trained to recognize Polish tax stamps, warning labels and other pack markings, as well as the same for Ukraine, Belarus and the Russian Federation in an effort to assess the extent of tax avoidance/evasion in the Polish cigarette market (IARC, 2008). Merriman (2010) applied a novel twist on this approach by collecting littered cigarette packs around Chicago in an effort to assess the extent of avoidance/evasion of the local Cook County and Chicago cigarette taxes,

finding that three fourths of the packs collected in Chicago did not bear the Chicago tax stamp. In an ongoing effort, the ITC project is collecting cigarette packs from survey respondents in a variety of countries that will be examined for relevant pack markings, with sophisticated product testing methods used to test for various product constituents that appear at higher levels in counterfeit cigarettes. These approaches are limited by observers' abilities to distinguish licit and illicit (particularly counterfeit) products and by the ability to differentiate licit and illicit products based on product constituents, but do appear promising for capturing at least some aspects of tax avoidance and evasion.

Determinants of tax avoidance/ evasion

The determinants of tax avoidance/ evasion are related to tax/price differences, tobacco products' affordability, corruption, weak tax administration and/or customs, and informal distribution networks as well as to the involvement of global and new firms. The determinants of the supply of illicit tobacco products are related to the profit from the sale of these illegal products. The greater the reward and the lower the costs of supplying these illicit products, the greater the probability an individual will engage in it. The reward depends on the difference in profits from legally sold versus illegally supplied cigarettes.

The costs are related to the probability of detection, the magnitude of punishment, the opportunity costs like foregone salaries from other employment and the cost of the capital employed in smuggling. Other costs may include the cost of bribery (Merriman *et al.*, 2000).

In a competitive market, profits from illicit tobacco trade will be driven to zero. This implies that, in the long run, the cigarette tax revenue the government loses to smugglers is entirely consumed by excess travel costs and costs to avoid detection. This is a wasteful use of scarce societal resources (Bhagwati and Hansen, 1973).

Price/tax differences and their magnitude as determinants of profit

Cigarette prices are high relative to their production costs, in part due to higher level of taxation. Price of tobacco products and the total tax levied on them are related to the amount of profit for those involved in illicit trade.

The absolute price level and the relative price differences can affect the method of delivery of illicit cigarettes to the market.

Small-scale smuggling and legal cross-border shopping are primarily motivated by the relative price differences between adjacent geographical areas. These price differences may be driven by tobacco taxes or tobacco industry pricing strategy (Baltagi & Levin, 1986, 1992). The difference in price or/and tax rate represents the upper limit on the incentive to bootleg or shop across the border due to transaction costs involved in this form of supply (Licari & Meier, 1997).

Wholesale/large scale smuggling is likely to be correlated with the country's absolute retail price of cigarettes (Merriman *et al.*, 2000), because the larger the retail price, the larger the profit for large-scale smugglers who pay wholesale international price for their supply (FIA International Research Ltd, 1999a).

The motivation for small-scale smuggling and legal cross-border shopping has been studied

extensively in the USA and in Europe where sufficient data exist and where a sizable population lives in a close proximity to another state/country (Vedder, 1997; Cnossen, 2005).

Several US studies measured the strength of the relationship between the price/tax differences and cross-border shopping. Baltagi and Levin (1986) studied cigarette small-scale smuggling in the USA using a dynamic demand model and a panel data from 46 states on per-capita sales over the period 1963–1980. They found the cigarette demand to be sensitive to price differences between the state of residence and the neighbouring states: a 10% price increase in a neighbouring state caused a 0.8% increase in taxed sales in the home state in the short run and a 0.21% increase in the long run. Baltagi and Levin (1992) updated their previous study by adding data for 8 additional years extending their panel data to 1963–1988 for these 46 US states. Using various model specifications, they found similar results with respect to the price sensitivity of the cigarette market to the price difference with the neighbouring states.

Goel (2008) used more recent cross-section state-level cigarette sales data from the United States from 2002 to conclude that price differences provide the main motivation for cigarette smuggling as compared to non-price factors related to the probability of apprehension. According to his study, a 10% increase in the lowest cigarette price in adjacent US states increases a state's cigarette sale by about 10%.

DeCicca *et al.* (2010) found relatively larger sensitivity of tax avoidance and tax evasion to the tax/price difference: 1% increase in home-state price increased the likelihood of purchasing cigarettes in a neighbouring state by 3.1%

while controlling for the distance to the border. However, the study used individual-level survey data that do not capture small-scale smuggling, and self-reported prices that can be endogenous. Their result that the probability of cross-border shopping approaches zero at a distance to the border of about 300 miles does not seem realistic and indicates problems with the model specification. The author suggested that there is a surge in cigarette tax avoidance and evasion immediately after a tax increase, which then quickly subsides within several months. A similar observation was made by Farrelly, Nimsch, and James (2003).

As noted above, Merriman (2010) employed a novel empirical approach to estimate tax avoidance/evasion in the city of Chicago and its sensitivity to tax differences in the neighbouring jurisdictions. He collected a random sample of 2391 littered cigarette packs in the city in 2007 and studied their probability of having the correct local tax stamp. The difference between the tax in Chicago and surrounding counties equal to \$2.68 decreased the probability that a littered pack has a local stamp by almost 60 percent. On the other hand, increasing the distance to the lower-tax state border by a one mile increased the probability a pack has a local stamp by about one percent. That means that compliance increases rapidly with the distance to lower-taxed border and that the distance provides a significant barrier to tax avoidance. However, the results of Merriman (2010) are not directly comparable to econometric studies that report tax compliance at the national or state level due to the potential selection bias. This bias arises due to the possibility that those who litter are also less law obedient, therefore more likely to engage in tax avoidance/evasion.

A review of 24 peer-reviewed studies and studies by reputable researchers using US data provided evidence that tax avoidance/evasion via Internet was related to the level of cigarette taxes: US smokers living in states and cities with high cigarette excise taxes were more likely to purchase non-taxed cigarettes online than smokers living in low-tax jurisdictions (Ribisl *et al.*, 2006).

In Europe, Merriman *et al.* (2000) used cigarette sales data for 1989–95, cigarette prices and frequency of travel from 18 countries to estimate the incentives for small-scale smuggling and cross-border shopping. Controlling for the level of corruption and income, he found that policies that raise incentives for small-scale smuggling and cross-border shopping, such as a cigarette tax increase, will significantly reduce domestic tax-paid cigarette sales. If these incentives to bring cheaper cigarettes from abroad were reduced to zero, the official domestic sale would increase by 3%. If foreigners would not have incentives to buy cheaper cigarettes in a country, this country's domestic sale would fall by 1%. For example, a unilateral 10% cigarette price increase in Germany would reduce yearly cigarette sale by 6 packs per capita, but would increase yearly cigarette purchases abroad by 3 packs per capita, resulting in a 3-pack per capita reduction in consumption.

Taal *et al.* (2004) analysed sales and survey data from Estonia, a European country with high incentives for small-scale smuggling and cross-border shopping from 1993 to 2000, when cigarette prices there were up to four times lower than in neighbouring Finland and Sweden (but considerably higher than in another neighbour, the Russian Federation). They found that illegal purchases of cigarettes by Estonians

represent a fairly small part of the total cigarette market. However, legal cigarette purchases by tourists and foreign visitors (that are not part of local consumption) were significant—up to 50% of legal sales. This has been confirmed by the Finish authorities that reported that legal cross-border cigarette shopping by Finish travellers amounted to 12% of total national sales in 1996 (Lipponen *et al.*, 1998).

Buck, Godfrey and Richardson (1994) showed that in the early to mid-1990s there was little incentive for cigarette cross-border shopping between France and Britain, because the savings on 800 cigarettes bought in France and taken back to Britain would be outweighed by the cost of the trip. Cross-border shopping existed at that time, but only when smokers were already across the border for other reasons. Estimates of United Kingdom Department of HM Customs & Excise confirmed that legitimate cross-border shopping was a minor problem in 1997 when the legitimate personal imports of tobacco products was less than 0.5% of total cigarette sales (HM Customs & Excise, 1998).

The situation changed in the second part of 1990s when cigarette prices in the United Kingdom increased by about 25% from 1997 to 2000. The United Kingdom Treasury estimates that the market share of illicit cigarettes in the United Kingdom rose from about 3% in 1996–97 to about 18% by 1999–2000 (HM Customs & Excise, 2000).

In France, similarly, the substantial tobacco tax increases in 2003 and 2004 that led to higher cigarette prices were blamed for an increase in cross-border purchases of tobacco products (both legal and illegal) from a negligible amount to 14–17% of total sales in 2005 and 2006 (Lakhdar, 2008).

The evidence on tax avoidance/evasion in Asia is scarce. Tsai, Sung, Yang and Shih (2003) used survey data collected in 2000 among 437 smokers of imported cigarettes and found that higher cigarette prices were the primary motivation for purchasing of smuggled cigarettes in Taiwan, China. A 1% increase in cigarette price raised the likelihood of purchasing smuggled cigarettes at least 2.60 times (95% confidence interval: 1.08–6.26). Smokers who spent more money on cigarettes were more likely to purchase smuggled cigarettes, but personal income was not significantly associated with smuggled cigarettes purchases (Tsai *et al.*, 2003).

Nelson (2002) suggested that the size of the potential cross-border market plays an important role in the formulation of tax policy for cigarettes. US states with a large potential cross-border market are more likely to set tobacco tax rates below that of neighbouring states to attract non-residents to purchase cigarettes in their state, therefore exporting their tax burden. This seems to be the case of Luxembourg, a country with a high density of foreign population living near its borders that is setting its cigarette taxes at a level considerably lower compared to its neighbours. Using data from 1993, the estimates indicate that 85% of cigarette sales in Luxembourg were due to cross-border sales (Joossens & Raw, 1995).

There is less evidence to support the theory that wholesale/large-scale smuggling is likely to be correlated with the country's absolute retail price.

Merriman *et al.* (2000) found no significant correlation between experts' estimates of large-scale smuggling from 38 countries and the average legal cigarette price.

Joossens *et al.* (2010) employed a larger data set of low-, middle- and high-income countries (84 in total).

They found that the countries with the lowest income had the lowest average prices for legally sold cigarettes, but also the highest illicit cigarette market share. This suggests a negative relationship between the illicit cigarette market share and the cigarette price level.

Joossens and Raw (1998) found the same situation in EU countries in 1995: many European countries with high tobacco taxes and prices had low estimates of cigarette smuggling, while illicit cigarette trade was prevalent in southern European countries where taxes and prices were low. The authors suggest that the size of illegal market in a country is determined by fraud and illegal trade, and not by the level of tobacco taxes/prices.

Data from southeastern Asia also point to no relationship between countries' tax rates, cigarette prices and the level of illicit cigarette trade. For example, in the early 2000s cigarette tax in Singapore was among the highest in the region (about 51% of retail price), but the estimated share of illegal cigarettes on the market was only 2% of domestic sales. On the other hand, illicit cigarettes accounted for about 37% of domestic sales in Cambodia, yet the tax represented only 20% of retail price, one of the lowest tax rates in the region (Ministry of Health Republic of Indonesia, 2004).

Differential treatment of domestic versus foreign products

Restrictions on the supply of imported tobacco (by imposing quotas, tariffs, and other non-tariff barriers such as a prohibition on sale, which is similar to an infinite tax) can lead to significant price differences and motivate illicit trade (Taylor *et al.*, 2000).

China (Hu & Mao, 2002), Viet Nam (Joossens, 2003) and the

Islamic Republic of Iran (World Health Organization, 2003) have prohibited or severely limited the importation of foreign cigarettes. The tax on imported cigarettes in China was 244% in 1997 (reduced to 217% in 1999), but foreign cigarettes with prices lower than this tax were easy to find in urban China (Hu & Mao, 2002). Viet Nam banned cigarette imports from 1990 till 2007. Yet, foreign cigarettes were sold at a premium in the street of Hanoi (Joossens, 2003). Even after lifting the import ban, cigarettes and cigars are subject to an import duty of up to 225%. The illegally imported brands (primarily Winston and Magna) represented about 50% of the total cigarette market in the Islamic Republic of Iran in 1994, and the industry estimated that the illegal or tax-free products had 68% market share in the country (World Health Organization, 2003).

Two older studies suggest that smuggling in low- and middle-income countries increases with the level of tariffs and taxes (Bhagwati and Hansen, 1974; Simkin, 1974).

Differential pricing for cigarettes intended for export and for the domestic market can motivate re-import of products designated for export. To limit this behaviour, in 2000 the US federal government banned imports of cigarettes that are intended for export only (FIA International Research Ltd, 1999b).

Cost of supplying illicit tobacco to the market determines net profit

The costs of supplying illicit products include the cost of manufacturing and/or obtaining tax-free cigarettes, the cost of access to capital, transportation, distribution and countering the government's effort to control tobacco illicit trade as this relates to the possibility that

the smuggler/counterfeiters will be apprehended and penalized if caught. In addition, these costs depend on the opportunity cost of time (as this influences the cost of labour) and social norms with respect to supplying illicit cigarettes (people who believe that engaging in cigarette smuggling is immoral will need to be compensated more to convince them to get involved in this activity).

The costs of obtaining legally produced cigarettes are related to export/wholesale prices and can vary by the country of destination (Yurekli & Sayginsoy, 2010).

New technology such as sophisticated and less-expensive computer scanners reduce the production costs of counterfeit cigarettes and boost their supply on the market, such that in 2007 these cigarettes made up 15% of illicit cigarette trade globally (Euromonitor International, 2008).

Obtaining tax-free tobacco can require capital investment into transportation equipment. Smugglers' transport costs are likely to be greater than those engaged in transporting a similar weight and volume of legal goods, because of the need to avoid detection (Bhagwati and Hansen, 1974). Therefore, this activity represents inefficient use of limited resources (Bhagwati and Hansen, 1974). In Malaysia, for example, smugglers use speedboats to increase their chances of escaping when chased by police and/or border patrol (Unknown, 1995).

On the other hand, Jensen and colleagues (1991) argued that transport costs in the USA account for only 0.5 percent of the value of tobacco products, and that their effect on smuggling is negligible.

Transportation costs may vary by geographical regions and the type of tax avoidance/evasion.

The transportation costs for small-scale smuggling will be lower if a large share of the population lives near the border with another jurisdiction (Saba *et al.*, 1995). This is particularly relevant for Europe and the USA, where a sizable population lives in a close proximity to another state/country (Vedder, 1997; Cnossen, 2005).

Joossens (1998) argued that the ease of evasion of legal authorities might be more important than price when it comes to the proclivity of individuals to engage in tobacco smuggling.

The perceived probability of interdiction depends on the actual level of enforcement. Anthony (2004) suggests that drug smugglers ignore the risk of being caught up to a point, and that there is a threshold interception rate beyond which the smuggling rapidly declines. However, some smugglers are undeterred even when there is 100% probability of detection. This could be due to the practice of receiving advanced payments for taking the risk, which could be greater than the lost earnings due to jail time.

In the United States, small-scale smugglers often use the superhighways, where the likelihood of detection is minimal (Walsh & Ottaway, 2000). Compared to large-scale smugglers, they face lower costs of supplying illegal products to the market, because purchasing tax-paid tobacco in a low-price jurisdiction and transporting it to a high-priced one reduces the legal risk for those involved in the business (Licari & Meier, 1997).

Goel (2008) found that the probability of apprehension, measured by the number of police per 1000 inhabitants, plays a relatively minor role in cross-border cigarette smuggling in the USA.

Insufficient pack markings reduce the probability of illicit cigarettes being confiscated, therefore reducing the costs of involvement in illicit cigarette trade. Press articles have reported that introducing a tax-stamp by the state of Michigan in 1998 helped to reduce the sale of illicit cigarettes (Hyde, 1998).

The relatively weak government controls and the slowness of the judicial process reduce the opportunity costs of illegal cigarette manufacturing in Brazil (Ramos, 2009). The majority of cases involving illicit cigarettes do not fall under criminal jurisdiction, and contraband cases are mostly treated as low-priority misdemeanours that end with the release of the prisoner and sometimes even include the restitution of goods and/or vehicles involved. Inadequate legislation compounded by a lack or absence of specialized prosecutors and judges does not enable authorities to confront associated drug trafficking and money-laundering activities. In addition, handling illicit merchandise is socially accepted in Brazil. As a result, the production of illegal cigarettes in Brazil reached some 9 billion cigarettes in 2007, about 6.4% of the total cigarette market (Ramos, 2009). The size of the illegal market in Brazil is unclear, but experts estimate that it is about 30% of total sales (Ramos, 2009).

The opportunity costs of time can determine the willingness of population to engage in illegal activities. When Australian farmers' opportunity costs of time dropped due to declining official market price of raw tobacco and the diminishing legal outlet for tobacco, some of them began to divert their tobacco to illicit markets (Geis *et al.*, 2003; Geis, 2005).

The costs of distribution of illicit cigarettes are important motivators.

These are discussed in more details below.

The supply chain for illicit tobacco (distribution) reduces cost of illicit transactions

Increase in international/interstate trade. Large-scale organized cigarette smuggling generally involves cigarettes that have passed through a wide range of international traders (European Parliament, 1997). A loose export-import recording system combined with large quantities of traded cigarettes reduces the probability of detection. Pitt (1981) concluded that the greater the volume of legal trade, the lower the costs of smuggling. In Hong Kong Special Administrative Region, trucks with smuggled cigarettes have been disguised as containing duty-free components for assembly at factories within mainland China (Unknown, 1999). The opening of the market in Taiwan, China in 1987 led to an increase in cigarette smuggling measured by an increase in cigarette seizures and reports by the industry (Wen *et al.*, 2006).

Liberalization and frequency of international travel. The ease of small-scale smuggling is proportional to the total number of cross-border travellers taking into account the stringency of border controls (Merriman *et al.*, 2000).

Travellers can also take advantage of duty-free sales. In 1996, approximately 45 billion cigarettes were sold through duty-free outlets. This represents 0.8% of all cigarettes sold in the world (Market Tracking International Ltd, 1997).

Merriman *et al.* (2000) partially attributed a higher share of the German cigarette market being supplied via cross-border shopping and small-scale smuggling to high frequency of travel from and to

Germany. Taal *et al.* (2004) reported that Finns made approximately 3 million visits to Estonia in 1998, and that travellers from Finland and Sweden consume up to 50% of total legal cigarette sales in Estonia. Higher prices in Sweden motivated airline passengers from the Russian Federation to bring with them cigarettes when they travelled to the country (Unknown, 1994). There is anecdotal evidence that youth in Scotland have been given free vacations in Europe in exchange for smuggling tobacco back to Scotland (Unknown, 1994).

Presence of tax free zones. Tax-free zones or free-trade zones play a significant role in illicit trade in both genuine and counterfeit cigarettes (World Customs Organization, 2007). The Financial Action Task Force (FATF) of the OECD estimated that there were about 3000 free-trade zones in 135 countries around the world in 2009 and that their numbers are growing (The Financial Action Task Force, 2010).

The International Consortium of Investigative Journalists discovered that free-trade zones on the island of Aruba and in Colombia are being used for cigarette smuggling into other areas of Colombia, such as the city of Bogota (Beelman, 2000).

Free-trade zones have been misused for money laundering and terrorist financing. A US company used a free-trade zone to repackage tobacco and ship it to another free-trade zone, ultimately smuggling it into US market. The profit was used to finance the Abu Sayyaf Group, a terrorist organization based in the Philippines (The Financial Action Task Force, 2010). Large-scale cigarette smuggling from China to the United States (state of Washington) has been facilitated by a free-trade zone in Hawaii. The cigarettes seized in this free-trade zone represented a

US\$ 2 068 668 revenue loss for the state of Washington (The Financial Action Task Force, 2010). Duty-free shops facilitated small-scale smuggling from Estonia to Finland and Sweden (Taal *et al.*, 2004).

The Akwesasne Indian reservation, located on the US–Canadian border, was used by the tobacco industry for re-importation of cigarettes exported from Canada to avoid Canadian taxes (Cunningham, 1996; Segal, 1999).

Native American reservations in the USA are also the primary source of tax-free cigarettes sold over the Internet. In 2005, nearly two thirds of the US web sites selling cigarettes were affiliated with a reservation. In 2003, 95% of Seneca tribe cigarette sales were conducted over the web or phone (Chen, 2008).

Informal market/retail networks, street-selling, existingsmugglingroutes and black markets. The opportunity cost of labour could determine the existence of the informal distribution networks. If the potential rewards from legal occupations are very small compared to engagements in shadow/underground economy, people should be more willing to provide an informal distribution network for illicit products including cigarettes (Merriman *et al.*, 2000). However, Merriman *et al.* (2000) found no association between experts' estimates of smuggling in 38 countries and these countries' income measured by per-capita GDP.

In some countries, illicit cigarettes are distributed via separate channels, but in some countries illicit tobacco products are distributed alongside the legal products via regular retail channels. The existence of smuggling routes and black markets for other products as well as the presence of unlicensed distributors reduce the transportation and the distribution costs of illicit tobacco supply (Thursby & Thursby, 2000; Campaign for Tobacco-Free Kids, 2008).

Joossens and Raw (1998) and Joossens *et al.* (2000) pointed to the association between the tradition of street-selling and higher share of illicit cigarettes in markets in Spain and Italy.

Social networks often serve as important distribution channels for illicit products (Merriman *et al.*, 2000). In the United Kingdom, between 2.5% and 3.3% of all cigarettes sold in 2002–2003 were supplied via an informal network of independent sellers (Hyland *et al.*, 2006). Coleman (1998) found that the majority of illegal tobacco products consumed in the United Kingdom were sold in pubs.

Technology allowing virtual transactions (online purchases and mail-orders). In the USA, the number of web sites selling cigarettes increased from 88 in 2000 to 772 in 2006 (Chen, 2008). Smokers in the US who purchase cigarettes online are primarily motivated by lower prices, because Internet vendors generally sell cigarettes without paying tobacco excise taxes for the destination state (Kim *et al.*, 2006). Almost all online cigarette sales are illegal due to failure to report the transaction and/or verify the age of the buyer (Chen, 2009). With the recent crackdown on this form of sale in the USA, the overseas internet vendors expanded their role in the US market. In 2003, 10% of all internet vendors were based outside the USA, but in 2006 over 45% of them were based overseas (Chen, 2009). These overseas vendors are beyond the reach of the US law enforcement.

Transaction cost associated with illicit tobacco products

The convenience of a transaction that reflects the opportunity cost of time is related to costs of illicit tobacco use. The less convenient the transaction, the higher the opportunity cost of

time and the lower the probability of buying illicit products. In California, most smokers purchased their cigarettes from the most convenient (but more expensive) sources despite relatively large price differences between the legal and illegal cigarettes (Emery *et al.*, 2002). Very few (5.1%) of California smokers purchased cigarettes from non- or lower-taxed sources, such as out-of-state outlets, military commissaries or the internet (Emery *et al.*, 2002).

The opportunity costs of time seemed to be a major deterrent of cross-border shopping between California and Mexico, as the wait to enter Mexico was well over 30 minutes and travellers were also subject to a customs check on return to the USA (Emery *et al.*, 2002).

Using the 2003 CPS Tobacco Use Supplement (TUS) on individual purchase quantities and locations, Chiou and Muehlegger (2008) found that the impact of a state's tax change on cigarette sales depends upon the tradeoffs between the cigarette price difference and distance to the state with lower cigarette prices. They calculated that a consumer is willing to travel 2.7 miles to save \$1 on a pack of cigarettes. The willingness to travel depends on the number of cigarette consumed: smokers who report smoking every day (or individuals who smoke more than 14 cigarettes a day) have a significantly lower marginal cost of travelling than smokers who only report smoking some days (or those who smoke less than 14 cigarettes a day), and are therefore more likely to travel across the border to purchase cigarettes. Everyday smokers purchase approximately 3 times as many cigarettes when crossing a border than do some-days smokers.

A minimum set of resources seems to be necessary for a person to have access to low/untaxed cigarettes.

These resources are related, for example, to travel costs or to costs of getting internet access (Hyland *et al.*, 2005; DeCicca *et al.*, 2010).

Social norms with respect to the use of illicit products and government interventions can be an important determinant of the demand for non-taxed products. In Taiwan, China, smokers who opposed cigarette taxation policy were 1.69 times more likely to buy smuggled cigarettes (Tsai *et al.*, 2003). United Kingdom smokers living in socioeconomically deprived areas were quite supportive of smuggling, as they perceive it helpful in dealing with the rising financial costs of smoking (Wiltshire *et al.*, 2001). DeCicca *et al.* (2010) reports that anti-smoking sentiment reduces the likelihood of cross-border shopping.

Ineffective tobacco tax administration, insufficient tax enforcement resources, and lack of control over the movement of tax-free cigarettes

The lack of clarity regarding the regulations covering the control of free-trade zones is a major reason for their misuse for illicit trade according to the World Customs Organization. As the government and the customs authorities dispute who has the jurisdiction over free-trade zones, enforcement loopholes allow these zones to play a facilitating role in illicit cigarette trade (World Customs Organization, 2007).

Examining trade transaction between the USA and North Africa and between Hong Kong Special Administrative Region and the rest of SE Asia showed that inadequate controls over the in-transit cigarettes results in a substantial leakage, with many of the cigarettes failing to arrive at their intended destination (Joossens *et al.*, 2000).

In the USA, a change in the balance of enforcement activities between the US state and US federal authorities after passing the Contraband Cigarette Act (CCA) in 1978 generated a loophole in the tax audit (Thursby and Thursby, 2000). This led to an increase in illicit cigarette trade as well as to a change in the preferred method of tax evasion. Commercial/large scale smuggling began to focus on underreporting of the amount of cigarettes released to the distribution (“diversion”) that could have been discovered by the tax audit. The study concluded that effective enforcement requires participation of both law enforcement agencies and tax administrators.

A law that would allow US states to recover taxes from cigarettes sold over the Internet (the Jenkins Act) is enforced by the US federal authorities, who are much less motivated than individual states to enforce the law (Goolsbee *et al.*, 2007). However, in October 2002 Washington State successfully applied the Jenkins Act to internet sales, leading to similar efforts in many other states (Chaloupka *et al.*, in press).

Corruption, war and organized crime facilitate law circumvention, reducing the cost of supplying illicit products

Criminal networks specializing in cigarette smuggling operate more easily in countries where corruption is high, the control of the authorities is lax and commodities other than tobacco are also being smuggled (Joossens, 1999). Using data from 38 countries, Merriman *et al.* (2000) found that the level of corruption (measured by the transparency index) is positively related to the size of the illicit cigarette market. A one-point improvement in a country’s transparency index was

associated with a two-percentage-point decrease in experts’ estimate of cigarette smuggling. Since corruption is more pervasive in low-income and middle-income countries, these countries are at greater risk of large-scale smuggling activities.

Cambodia is an example of a country where a high level of corruption facilitates cigarette smuggling. It is estimated that 79% of cigarettes imported into Cambodia are re-exported or smuggled across Cambodia’s borders (Ministry of Health Republic of Indonesia, 2004).

The European Commission (1998) identified over 50 criminal networks potentially engaged in large-scale tobacco smuggling. In 2005, the investigation by the European Council concluded that the threat imposed by cigarette smuggling within the European Union is primarily related to the involvement of organized crime (Council of the European Union, 2005).

Cigarette smuggling is claimed to be the third largest illegal business in Germany, behind drug trafficking and illegal gambling, with extensive involvement of organized crime (Von Lampe, 1999 as cited in Merriman, 2001). In southern Italy, Calabrian gangsters have been involved in the tobacco smuggling (Unknown, 1997).

The presence of organized crime networks can increase pressure on legitimate distribution networks by reducing their profitability or by forcing them to join in the black market (Joossens *et al.*, 2000).

Smuggling of various goods, and particularly cigarettes, was a prosperous “business” in the Yugoslav republics during the Balkan War in 1991–1995, helping to finance weaponry and otherwise supporting war operations (Hajdinjak, 2002). Smuggling was done with the close cooperation of politicians, their security forces and organized crime,

and fostered the development of a regional net of smuggling channels affecting neighbouring countries like Bulgaria, Romania and Albania. These illegal activities became an important source of income during the war for people of all social groups (Hajdinjak, 2002).

The US Government Accountability Office reported that terrorist organizations including Hezbollah made money through the tobacco black market (United States General Accounting Office, 2003). The profit from large-scale cigarette smuggling via free-trade zones was used to finance the terrorist organization Abu Sayyaf Group based in the Philippines (The Financial Action Task Force, 2010).

Corruption and organized crime does not seem to be a predictor of small-scale smuggling and cross-border shopping. Goel (2008) found that the average number of public corruption convictions is not a statistically significant predictor of cross-border cigarette smuggling in the USA.

Tobacco companies’ profit motivation translated to their marketing strategy and political agendas reduce the cost of supplying illicit cigarettes

The tobacco industry itself often promotes the smuggling of their products, because smuggling does not impact their profit margins, reduces the impact of higher tax/price on cigarette consumption and can be used to advocate for an excise tax reduction as a way to reduce smuggling and associated criminal activities (Leverett *et al.*, 2002). In fact, cigarettes confiscated and destroyed by law enforcement authorities increase demand for replacement cigarettes and therefore the profitability of the industry (Leverett *et al.*, 2002).

Delipalla (2009) developed a decision-making model analysing the factors motivating the industry to get involved in illicit tobacco trade. The model assumes that the industry operates as an oligopoly, and that the market does not differentiate between legal and illegal products (their prices are similar). To maximize its profit, each firm decides the total quantity sold on the market and the fraction of that total it will attempt to sell illegally (without tax) taking into account the probability of successful tax evasion, the level of enforcement, the cost of smuggling, and fines paid if caught. The paper then examines the relative effects of specific and *ad valorem* taxes on the firm's evasion decision given that it is optimal for a firm to engage in tax evasion. It concludes that the optimal fraction of tax-not-paid products is increasing in sales under purely specific taxation and when the *ad valorem* tax is imposed as a percentage of the fixed wholesale price. When the *ad valorem* tax is imposed as a percentage of the retail price, the optimal fraction of tax-not-paid products is decreasing. The analysis suggests that (for given tax rates and enforcement) if demand falls (for example due to effective tobacco control policies), smuggling will also be reduced under a specific tax regime, but it will increase under an *ad valorem* one. The impact of a mixed tax structure on optimal illicit trade is ambiguous. The analysis concludes that higher tax rates do encourage smuggling under purely or predominantly *ad valorem* taxation, but their effect is ambiguous under purely or predominantly specific taxation.

The industry has used the occasion of a tax increase to promote illicit cigarette trade to put pressure on the governments to reverse their decision.

Canada's significant increases in cigarette tax in 1980s and early 1990s motivated the tobacco industry to orchestrate smuggling of cigarettes to Canada to exercise pressure on Canadian government to reduce these taxes (Canadian Cancer Society, Non-smokers' Rights Association, Physicians for a Smoke-free Canada, & Quebec Coalition for Tobacco Control, 1999). The industry developed a tax-dodging scheme allowing the company to smuggle billions of cigarettes into Canada using a Native American reservation in the USA (Segal, 1999; Sugarman, 2002). In response, the government cut cigarette taxes in 1994. Imperial Tobacco Canada Limited and Rothmans Benson & Hedges, the two tobacco companies involved in this smuggling scheme, pleaded guilty in 2008 and admitted "aiding persons to sell or be in possession of tobacco products manufactured in Canada that were not packaged and were not stamped in conformity with the Excise Act" between 1989 and 1994. The companies agreed to pay CA\$1.15 billion, the largest fine ever levied in Canada (Joossens and Raw, 2008). R. J. Reynolds, the third tobacco company involved in the smuggling scheme, has agreed to pay CA\$325 million (\$325 million) to the Canadian governments in April 2010 (Schneider, 2010).

There is evidence that British American Tobacco (BAT) in Bangladesh had some degree of control over the proportion of contraband products on the market. BAT has altered the flow of illicit cigarettes while making the argument that tax increases lead to higher consumption of illegal tobacco products (Collin *et al.*, 2004).

In South Africa, the Tobacco Institute of South Africa (TISA), a body which represents the majority

of tobacco growers and cigarette manufacturers, has long argued that high taxes relative to those of neighbouring countries are responsible for the growth in illicitly traded cigarettes. They claim that illicit cigarettes represent 20% of the total market (Tobacco Institute of South Africa, 2008) without providing solid evidence to support this claim. A peer-reviewed academic study contradicts the industry estimates, estimating the maximum penetration of illicit cigarettes of 7.0% –11.2% of the total market in 2007 (Blecher, 2010).

Illicit cigarette trade can provide the industry a market entry for prohibited brands (brands that are not legally sold in the market). Producers then use customer loyalty as a political wedge to lobby for legal access to the market. The international trade journal *World Tobacco* reported in 1996 that "smuggling has helped to promote some of the world's leading brands in markets which had remained closed to foreign imports" (Market Tracking International Ltd, 1997).

Since the 1980s, the British American Tobacco (BAT) relied on illegal channels to supply markets in Africa (LeGresley *et al.*, 2008). Illicit cigarette trade has been an important component of BAT's market entry strategy to gain leverage in negotiating with governments for tax concessions, compete with other transnational tobacco companies, circumvent local import restrictions, and to gain a market presence. BAT exploited weak government capacity to combat illicit trade and gained substantial market share in major countries (LeGresley *et al.*, 2008).

Smuggling has been an important component of BAT's market entry strategy in Lebanon, a country with a state tobacco monopoly and chronic political instability. After the end of the civil war in the early 1990s, BAT and

other transnational tobacco companies sought a legal presence in the country, but continued to achieve substantial sales through illicit cigarette trade (Nakkash & Lee, 2008).

Smuggling has been used as a market entry in Argentina, Italy, Islamic Republic of Iran, Bulgaria, the former Soviet Union and China, for example (Joossens & Raw, 1998; World Health Organization, 2003; Gilmore and McKee, 2004).

After the market opening in Taiwan, China in 1987, Japan Tobacco International (JTI) set up a Swiss plant as a legal cover for its smuggling operation to the country. This allowed JTI to overcome the existing legal quota of exports to Taiwan, China (Wen *et al.*, 2006).

The involvement of the industry in smuggling operations in Europe became clear when the level of illicit trade on the continent substantially declined following the 2004 and later agreements between major manufacturers (e.g. PMI, JTI) and the EU authorities without admission of liability. This agreement financially motivated the industry to control the illegal supply of their products to the EU market. Since counterfeit cigarettes are excluded from the agreement, companies have an incentive to have seized products declared as counterfeit (World Health Organization, 2007).

The improved collaboration between the industry and the United Kingdom government reduced the availability of genuine brand cigarettes on the black market. This can be regarded as evidence that cigarette manufacturers are indeed in a position to control the supply of illicit cigarettes to the market. However, counterfeit products began to play a larger role in the supply of illicit cigarettes as evidenced by the type of illegal cigarettes seized in the United

Kingdom (HM Customs & Excise, 2001a, 2001b; House of Commons & Treasury Committee, 2005). The volume of seized counterfeit cigarettes increased threefold between 2000 and 2004. In 2003–2004, 54% of seized cigarettes were counterfeit (House of Commons, Treasury Committee, 2005).

Extent of tax evasion and tax avoidance globally, regionally and in key countries

Joossens, Merriman, Ross and Raw (2010) collected data on illicit cigarette trade from different sources. Their estimates of illicit market share (Table 8.1) are based on academic articles, official government publications, estimates from market research companies (whose clients include the tobacco industry and governmental organizations), tobacco trade journal articles, newspaper articles and sometimes estimates from personal contacts in customs organizations. The estimates vary greatly in rigour and in the measure of illicit trade used. Some for example express the size of the illicit market as a percentage but without saying what it is a percentage of, and some do not even state what measure was used. Nor is there a clearly defined methodology for assessing if an estimate is accurate. Joossens and colleagues (2010) have included in their estimates what seem reasonable in terms of the country's population, smoking prevalence, legal infrastructure and other relevant parameters. Thus a combination of methods, including informed expert judgement, is often necessary to cross-validate estimates. Bearing in mind these methodological challenges, the data on illicit and legal market estimates from 2007 show that almost 12%

of global cigarette consumption is illicit, including 17% in low-income countries, 12% in middle-income countries, and 10% in high-income countries.

Europe

European Union. Using cigarette sales data 1989–95 from 18 European countries, Merriman *et al.* (2000) estimated that, in a typical European country, the share of cigarettes acquired by small-scale smuggling and/or cross-border shopping accounted for about 3% of domestic consumption.

Based on in-depth analysis of data collected by the professional services company Klynveld Peat Marwick Goerdeler (KPMG, 2005), a study commissioned by the European Commission estimated that in 2004 total market penetration of illicit cigarette trade represented approximately 8–9% of European Union (which had 25 Member States at the time, designated EU25) cigarette sales. The above-cited report noted also that the illicit market share in the new EU Member States (Estonia, Hungary, Lithuania, Poland and Slovakia) were far above the EU25 average (KPMG, 2005). The KPMG report has limitations, as it is based on cigarette seizures in the EU and on studies provided by the tobacco industry and governments, however as its estimate falls between the higher estimates from the United Kingdom 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.

In 2008, the European Commission estimated that around 13% of total consumption in the 27 EU Member States had not been taxed in the country of consumption.

Table 8.1. Estimates of the illicit cigarette market around the world

Country	% illicit market	Measure used	Year	Illicit % total market
High-income countries				
Hong Kong Special Administrative Region	42	Percentage of legal sales	2005	30
UAE	30	Percentage of legal cigarette sales	2005	23
Singapore	18	Percentage of legal cigarette sales	2005	15
Canada	15–20	Percentage of total cigarette market: estimate based on multiple sources and surveys	2007	15–20
USA	13–25	Percentage of consumers that purchased lower-priced cigarettes	1992–2002	13–25
United Kingdom	13	Percentage of total cigarette consumption (not including hand rolled tobacco)	2006–2007	13
Taiwan, China	11	Percentage of legal cigarette sales	2005	10
Australia	6	Percentage of legal cigarette sales	2007	6
Israel	5	Percentage of legal cigarette sales	2005	5
Saudi Arabia	4	Percentage of legal cigarette sales	2006	4
Italy	2	Percentage of total cigarette market	2006	2
Japan	2	Percentage of legal cigarette sales	2006	2
New Zealand	1	Percentage of legal cigarette sales	2003	1
Spain	1	Percentage of total cigarette market	2006	1
Upper-middle-, lower-middle- and low-income countries				
Georgia	49	Percentage of total cigarette market	2005	49
Bolivia	46	Percentage of legal cigarette sales	2005	32
Albania	40–50	Not stated	Not stated	40–50
Bosnia & Herzegovina	35–45	Not stated	Not stated	35–45
Uzbekistan	40	Smuggling as a percentage of total cigarette consumption	2006	40
Ethiopia	38	Percentage of total cigarette market	2006	38
Brazil	35	Percentage of legal cigarette sales	2006	26
Lao People's Democratic Republic	35	Not stated	2005	35
Iraq	35	Percentage of total cigarette market	2006	35

Country	% illicit market	Measure used	Year	Illicit % total market
Former Yugoslav Republic of Macedonia	30–35	Not stated	Not stated	30–35
Cameroon	26	Percentage of legal cigarette sales	2005	21
Syrian Arab Republic	26	Percentage of total cigarette market	2007	26
Estonia	19–32	Percentage of total cigarette market	2003	19–32
Sudan	25	Percentage of legal cigarette sales	Not stated	20
Zambia	25	Not stated	2003	25
Croatia	25	Percentage of legal cigarette sales	2005	20
Malaysia	24	Percentage of total cigarette market	2008	24
Venezuela	23	Percentage of legal cigarette sales	2005	19
Russian Federation	23	Percentage of legal cigarette sales	2004	19
Peru	23	Percentage of total cigarette consumption	2006	23
Lebanon	23	Not stated	2000–2006	23
Morocco	23	Percentage of total cigarette market	2006	23
Algeria	20	Percentage of total cigarette market	2007	20
Philippines	19	Percentage of legal cigarette sales	2006	16
Nigeria	18	Percentage of total cigarette consumption	2006	18
Ghana	18	Percentage of legal cigarette sales	2005	15
Pakistan	17	Percentage of total cigarette market	2005	17
Armenia	16	Percentage of total cigarette consumption	2004	16
Côte d'Ivoire	15	Percentage of legal cigarette sales	2005	13
India	14	Percentage of total cigarette consumption	2004	14
Columbia	14	Percentage of total cigarette consumption	2004	14
Islamic Republic of Iran	14	Percentage of total cigarette market	2007	14
Ecuador	12	Percentage of total cigarette consumption	2006	12
Uruguay	12	Percentage of total cigarette market	2006	12
Guatemala	12	Percentage of total cigarette market	2006	12
Jordan	10–12	Percentage of total cigarette market	2007	10–12

Table 8.1. Estimates of the illicit cigarette market around the world

Country	% illicit market	Measure used	Year	Illicit % total market
Thailand	11	Not stated	Not stated	11
Yemen	11	Percentage of legal cigarette sales	Not stated	10
Turkey	11	Percentage of total cigarette market	2006–2007	11
Nicaragua	10	Not stated	2001–2002	10
Panama	10	Percentage of legal cigarette sales	2000	9
Tunisia	10	Percentage of total cigarette consumption	2007	10
El Salvador	10	Not stated	Not stated	10
Argentina	10	Percentage of total cigarette market	2006	10
Viet Nam	10	Smuggling as a percentage of total cigarette market	2004	10
China	8–10	Percentage of total cigarette market: extrapolated from multiple sources	Multiple	8–10
Kazakhstan	9	Smuggling as a percentage of total cigarette consumption	Early 2000s	9
South Africa	9	Percentage of total cigarette consumption	2007	9
Ukraine	9	Percentage of total cigarette market: multiple sources	Multiple	9
Costa Rica	9	Percentage of legal cigarette sales	2006	8
Indonesia	5–6	Percentage of total cigarette market	2005	5–6
Mexico	3	Percentage of total cigarette sales	2006	3
Chile	3	Percentage of legal cigarette sales	2006	3

Adapted from Joossens L, Merriman D, Ross H, Raw M. The impact of eliminating the global illicit cigarette trade on Health and Revenue. *Addiction*. 2010; 105(9):1640–1649 with permission from John Wiley and Sons. Notes: The % illicit market has been rounded to nearest integer; UAE = United Arab Emirates; Russian Fed. = Russian Federation; the EU-25 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. EU-27 includes in addition to the EU-25 Bulgaria and Romania. Estimates contained in Table 8.1 uses standardized terminology determined by the authors to facilitate cross-study comparison; verbatim study terminology are reported in the online version. The third column, 'Measure used', reports the measure used in each source document, as described in the original publication, including where the measure was not specified. There is no standard measure thus the table reflects the varied data sources.

About 8–9 percentage points had been attributed to tax evasion and around 4 percentage points to legal cross-border shopping (European Commission, 2009). These estimates are in line with the findings of the KPMG study cited above on the EU25 tobacco market in 2004

commissioned by the Commission in 2005 (KPMG, 2005).

According to a survey of 26 500 Europeans (EU27 plus Norway; EU27 is EU25 plus Bulgaria and Romania; see Table 8.1 footnotes) conducted in December 2008, just over one tenth of EU citizens (12%) had 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 had seen potentially smuggled tobacco products being sold in the past six months was 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 had 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% (European Commission, 2009).

United Kingdom. According to United Kingdom customs officials the illicit market share (of consumption) in 2006–07 was 13% for cigarettes and 53% for hand-rolled tobacco in the United Kingdom. The United Kingdom 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 (HM Revenue & Customs, 2008).

Finland. The Finish authorities reported that legal cross-border cigarette shopping by Finish travellers amounted to 12% of total national sales in 1996 (Lipponen *et al.*, 1998).

Poland. 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 (Gumkowsky *et al.*, 2006). Studies based on six surveys in the period 2004–6 concluded that 11% of cigarettes sold in Poland were illicit (Ciercierski, 2007).

Albania. In 2009, approximately 19% of smokers in urban areas and 27% in rural areas in Albania

suspected that some of the cigarettes that they had purchased in the last year were illicit. Half of these respondents cited a missing tax stamp, and/or a missing Albanian health warning and/or not having nicotine/tar information in Albanian as features of an illicit cigarette pack. Another 29% cited tax stamps and health warnings written in a foreign language, and 27% cited the taste of cigarettes. It is important to note that it is not illegal to purchase illicit cigarettes in Albania, and smokers would not be subject to legal sanction by providing this information (Zaloshnja *et al.*, 2010).

Russian Federation. The European Regional office of the World Health Organization estimates that in the Russian Federation 20–30% of cigarettes are smuggled, and concludes that the Russian Federation remains the biggest illicit European market in terms of volume (World Health Organization, 2007). Independent research estimated that 23% of legal sales were illicit in the Russian Federation in 2004 (70 billion cigarettes) (Ross *et al.*, 2008; Joossen *et al.*, 2009).

Americas

Canada. The Canadian tobacco industry contracted a research company, GfK Group, to assess smoking trends in Canada. Their research reported that 16.5% of smokers said in 2006 that they had purchased illicit tobacco products within the previous seven days, the figure rising to 22% in 2007. The major source of the Canadian illegal trade is cigarettes illicitly manufactured in aboriginal native reserves on the border between Canada and the USA, which are smuggled into Canada (mainly the provinces of Ontario and Quebec) (Royal Canadian Mounted Police, 2008)

USA. Cigarette taxes in the US vary at the different levels of government. Saba, Beard, Ekelund and Ressler (1995) used data from the 48 continental US states and the District of Columbia from 1960 to 1986 to estimate that small-scale smuggling accounts for a small portion of market, usually not exceeding 2% of legal sales despite the price/tax differences.

In a more recent study using data from the Behavioural Risk Factor Surveillance System (BRFSS), Stehr (2005) found that the tax avoidance represented up to 9.6% of sales in the US between 1985 and 2001. However, according to Stehr's findings the level of legal border crossing in the USA was low relative to other forms of tax avoidance.

Combined federal, state and city taxes are highest in New York City. In 2004, 57% of smokers in New York state purchased cigarettes at least once from a low-tax or untaxed source, while 37% purchased low-tax or untaxed cigarettes regularly (New York State Department of Health, 2006). The large tax differentials between Chicago and neighbouring jurisdictions provide an incentive for cigarette tax avoidance. Data from a random sample of cigarette packs littered in Chicago in 2007 reveals a high degree of tax avoidance: three fourths did not display a Chicago tax stamp (Merriman, 2010). 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 (Stehr, 2005). 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 bordering state or Native American reservation over the period 1992–2002 (Lovenheim, 2007).

Asia and Australasia

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. 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 (Joossens *et al.*, 2009). China's State Tobacco Monopoly Administration announced in January 2008 that it had seized 9.28 billion counterfeit cigarettes in 2007 (Globalink news service, 2008). 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.

Japan. Most observers in the field agree that illicit cigarette trade is low in Japan. A possible explanation for the low level of smuggling is the strict control of the distribution network in this country. All retailers of tobacco products have to be approved, and are licensed by the Ministry of Finance.

Australia. The large difference between the price received by tobacco farmers in Australia, and the price of raw tobacco purchased on the market has motivated tobacco growers to sell their products to illegal markets to increase their profit from tobacco growing (Geis *et al.*, 2003).

Middle East and Africa

Islamic Republic of 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 the Islamic Republic of 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 the Islamic Republic of Iran (Joossens *et al.*, 2009). 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 the Islamic Republic of Iran was a target for internationally smuggled cigarette brands. However, between 2001 and 2007 the market was liberalised and national production was increased, leading to a dramatic fall in smuggling. Studies on illicit cigarettes undertaken by the Tobacco Prevention and Control Research Center and relying on smoker self-reports, found that 22.5% of the cigarettes consumed in Teheran in 2006 were illegal (Heydari *et al.*, 2009). A similar study was undertaken during a randomized cross-sectional survey in Tehran in 2008–2009, finding that 21% of the cigarettes were smuggled (Heydari *et al.*, 2010).

South Africa. An independent researcher estimates the size of the illicit market in South Africa to have grown substantially from 1997 until peaking in 2000 between 9.4% and 11.5% of the total market. The most recent estimate for 2007 suggests that the illicit market occupied between 7.0% and 11.2% of the total market (Blecher, 2010).

North and West Africa. According to a report of the United Nations Office on Drugs and Crime, as much

as 80% of the cigarette market in Guinea Bissau and the Libyan Arab Jamahiriya is illicit. In Mali the illicit market share is 40%; estimates are lower for other listed countries (United Nations Office of Drugs and Crime, 2009).

Impact of tax avoidance/evasion on public health

The impact of tax avoidance/evasion on tobacco products on public health can be classified as the impact on average tobacco price, on health disparity, on other tobacco control policies, and generally on public safety.

The impact of higher taxes/prices on tobacco use is not diminished by smuggling if the market equilibrium quantity of the taxed products in the absence of tax avoidance/evasion is equal to the quantity of their supply in the presence of tax avoidance/evasion. This equilibrium depends on the degree of substitution between legal and illegal cigarettes and whether the availability of illegal substitutes increases total consumption. To the extent that legal and illegal tobacco products are not perfect substitutes, an increase in cigarette taxes translated to increased cigarette prices will reduce their consumption even when smuggling is possible (Merriman *et al.*, 2000; Merriman, 2002).

The degree of substitution between legal and illegal products is based on the notion that consumer incurs both “transaction” and “inconvenience” costs (Merriman, 2002). The transaction price/cost is the amount of money paid for the product at the point of sale. The inconvenience price/cost is the value of the additional time it takes to obtain a product illegally as well as the value of discomfort to engage in an illegal activity. Although the

price of inconvenience does not require a monetary transaction, it represents real costs since black market purchasers may face potential legal sanctions and other risks. For example, the location of the street sellers can be undependable, there can be uncertainty about the authenticity of the brand, or consumers may fear embarrassment or legal penalties if caught buying smuggled cigarettes. The sum of the transaction price and inconvenience price represent the “effective” price, the price that consumers consider when deciding whether to make a purchase or not. In general, the higher the effective price, the lower the quantity of cigarettes demanded. Illicit products often have a lower transaction (or sales) price than legal products, because consumers who purchase smuggled cigarettes pay higher inconvenience price. Given that the general theoretical model of smuggling is applicable to a broad range of societies, it is reasonable to expect that conclusions based on empirical evidence from high-income countries will be applicable to certain degree to middle- and low-income countries (Merriman *et al.*, 2000).

Therefore, in theory, smuggling does not completely reduce the public health benefits of cigarette taxes (Merriman, 2002).

There is some empirical evidence that consumers are aware of the inconvenience price. A study in the United Kingdom found that 17% of adult smokers prefer to buy cigarettes from recognized outlets rather than individuals even if the transaction price of the cigarettes sold by the individuals is £1.00 per pack lower (DTZ Pleda Consulting, 2000).

Using United Kingdom data, Duffy (2006) also suggests that smuggled and non-smuggled tobacco products are imperfect substitutes. The majority of smokers are not inclined to

break the law, and only some of them are willing to use illegal products. Therefore, the observed reduction in the legal consumption after a tax increase is only partially driven by substitution towards contraband.

Even though the theory suggests that the impact of illicit cigarette trade on cigarette prices is likely to be small, the competition between the legal and the illicit cigarettes could result in lower average cigarette prices and therefore in higher consumption (Joossens *et al.*, 2000).

The empirical evidence on prices of illicit tobacco products is mixed, as the price differences between legal and illegal cigarettes vary by country, the location of the selling point, and the brand name and the perceived quality of the illicit cigarettes. In general, the price of the illicit cigarettes is lower than the retail price of legal products. In the United Kingdom, for example, smuggled cigarettes in 2005 were sold at 50% of the duty-paid products (West *et al.*, 2008). In Germany, the price of the smuggled Chinese brand Jin Ling was 40% of the retail price of a premium brand in 2009 (Candea *et al.*, 2009). The price of illegal “chop-chop” tobacco in Australia ranged from AUS\$45 to AUS\$100 per kilogram in 2001, while a kilogram of legal roll-your-own tobacco was AUS\$320 in the same year (Geis *et al.*, 2003).

Internet sites often sell cigarettes tax-free or with taxes from low-tax jurisdictions (Ribisl *et al.*, 2006). The average online site selling cigarettes in the USA passes about 90% of the tax savings through to the consumer (Goolsbee *et al.*, 2007) making cigarettes available at prices substantially lower than in stores.

In some markets, however, the price of illicit cigarettes can be higher. In Viet Nam, for example, the price of the smuggled brand 555,

manufactured in the United Kingdom, was higher than the locally produced 555, because the smuggled cigarettes were perceived as being of higher quality (Joossens, 2003).

Several studies used the gap between the legal and illegal products and calculated the impact of eliminating this price difference on tobacco use and on public health. Joossens and colleagues (2009) used data from 84 countries and estimated that the global average cigarette price in 2007 was about 3.75% lower due to the presence of illegal trade in cigarettes. If the global illicit market were eliminated in 2002, 164 000 premature deaths would be averted a year from the year 2030 on. That means that by 2036, close to a million tobacco-related premature deaths would not occur.

A similar study has been conducted in the United Kingdom, where in the presence of smuggling the average tobacco product price was found to be about 11.6% under the legal market equilibrium. Eliminating the illicit cigarette trade in the United Kingdom would reduce the cigarette consumption by 5.0–8.2% and lower the tobacco death toll in the United Kingdom by 4000–6500 premature deaths a year (West *et al.*, 2008)

Experience from several European countries suggests that an increase in cigarette taxes can result in increased smuggling, but also in the decline in total cigarette consumption.

Two sizeable tobacco tax increases in Sweden (December 1996 and August 1997) led to a 43% increase in average cigarette prices, but also an increase in the estimated amount of cigarette smuggling (from 200 million cigarettes in 1996 to 500 million in 1998). However, smoking prevalence has also declined (from 1996 to 1997 there were 19.1%

and 4.4% declines among men and women, respectively), particularly among youth and young adults (in the age group 16–24 there were 25% and 17.4% declines among men and women from 1996 to 1997). In addition, tobacco tax revenue rose by 9% in 1997 compared to 1996 (Wendleby & Nordgren, 1998; Joossens, 1999).

After the Swedish government responded to pressure to reduce cigarette smuggling by reducing cigarette tax in August 1998, per-capita tax paid cigarette sales increased, but tax revenue went down (Joossens *et al.*, 2000).

France nearly doubled its nominal cigarette retail price between September 1991 and December 1996 (74% increase in real terms) by increasing tobacco taxes. During the same time, cigarette sales dropped from 97 billion cigarettes in 1991 to 83 billion in 1997, adult smoking prevalence decreased from 40% in 1991 to 34% in 1997 (Baudier, 1997), and youth smoking prevalence (12–18 years old) dropped from 30% in 1991 to 25% in 1997 (Arènes *et al.*, 1998). Tobacco tax revenue rose from 32 billion FF in 1991 to 57 billion FF in 1996 while illicit cigarettes kept occupying a relatively unimportant share of the market—around 2% (Baudier, 1997). The relatively low level of illicit cigarette trade in France has been explained by its efficiently controlled retail environment in which all tobacco retailers must be licensed.

A United Kingdom study found that higher taxes increased prices of both legal and illegal tobacco products and led to an overall decline in tobacco consumption (Duffy, 2006). However, the price elasticity of duty-paid tobacco has also increased since 1995 when cigarette smuggling began to grow, meaning that some of the drop in legal consumption was replaced by

an increase in the consumption of products evading taxes.

Merriman *et al.* (2000) used data from 23 European countries during 1989–1995 and predicted that a tax increase in an individual country will increase small-scale cigarette smuggling, but coordinating these increases with neighbouring countries would reduce the incentives for this type of tax avoidance. For example, a unilateral 10% price increase in Germany would reduce annual sales by 6 packs per capita, but total consumption only by 3 cigarette packs per capita per year, with 3 packs per capita being smuggled to Germany from other countries. With a multilateral price increase, the consumption in Germany would still drop by 3 packs per capita, but domestic sales would drop by only 4 packs (with one pack still being supplied from other countries). This means that the health impact of a tax increase will be independent of the coordination of tax increases, but the revenue impact will depend on this coordination. If incentives for small-scale smuggling in Europe disappeared, legal cigarette sales would increase by 3%.

The European experience with tobacco tax increases and their impact on tobacco use in the presence of illicit cigarette trade has been very similar to what happened on the American continent.

Canada's significant increase in cigarette prices due to its tax policy in 1980s and early 1990s resulted in 43% decline in per-capita cigarette consumption from 1979 to 1993 despite the presence of illicit cigarettes on the market. Smoking prevalence fell sharply, particularly among youth (15–19 years old): from 43% in 1981 to 23% in 1991 for this age group (Canadian Cancer Society, Non-smokers' Rights Association, Physicians for a Smoke-

free Canada, & Quebec Coalition for Tobacco Control, 1999). As in Sweden, the Canadian government responded to the political pressure to reduce cigarette smuggling and in 1994 reduced cigarette taxes. This led to a sharp increase in per-capita consumption (a 27% increase between 1993 and 1998) and higher smoking prevalence among youth and adults as well as loss of tax revenue (Canadian Cancer Society, Non-smokers' Rights Association, Physicians for a Smoke-free Canada, & Quebec Coalition for Tobacco Control, 1999).

Several empirical studies used Canadian data to study the response to these cigarette tax changes. Galbraith and Kaiserman (1997) used monthly sales data from 1980–1994 and found that the total consumption (taxed plus smuggled sales) was less responsive to price increases (short-run elasticity of -0.40) than taxed consumption (short-run elasticity of -1.01), meaning that 1% increase in price due to tax increased illicit cigarette trade by 0.5–0.6%. Gruber, Sen and Stabile (2002) and Goel (2004) confirmed that taxed cigarette consumption in Canada is more sensitive to price than is total cigarette consumption, meaning that there is a substitution between the illicit and legal cigarettes, but a tax increase is still an effective measure for reducing total cigarette use.

A similar conclusion has been reached in the USA. Baltagi and Levin (1986) showed that price elasticities of cigarette demand in the USA were lower after controlling for small-scale smuggling. Licari and Meier (1997) used a pooled time series of cigarette sales in all 50 US states from 1951 to 1994 and found that higher taxes reduce consumption, but their effect is lower when controlling for cross-state small-scale smuggling.

A study from California using data from the California Tobacco Surveys found that a significant cigarette tax increase in 1999 that resulted in relatively large price difference with all its bordering states (including Mexico) motivated only 5.1% of all smokers to purchase tax-free cigarettes. The study concluded that higher cigarette taxes did not pose a threat to the public health objective of reducing smoking despite the presence of tax avoidance/evasion (Emery *et al.*, 2002).

One US study using data from four waves of the CPS Tobacco Supplement 1992–2002 found that the possibility to obtain cheaper cigarettes from another state or Native American reservation could reduce the average price responsiveness of consumers to zero, but the price sensitivity also varied with the distance of residence to a lower-price border: a 1% increase in distance resulted in a decrease in the home state price elasticity by about 0.2 percent (Lovenheim 2007). The study found that cross-border purchases increase consumption by 4.0–8.2% and the smoking participation by 2.0–4.3%. The study concluded that cigarette price increases would be effective in reducing cigarette use if cigarette smuggling was eliminated.

Making cheaper cigarettes available via the internet can undermine the public health gain from imposing higher tobacco taxes. Kim *et al.* (2006) found that New Jersey adult smokers who purchased cheaper cigarettes via the internet significantly increased their consumption over time, compared to smokers who reported paying full price at retail stores.

Goolsbee, Lovenheim and Slemrod (2007) used US sales data, smoking prevalence and tax rates from 1980 to 2005 to find that there has been a considerable increase

in the sensitivity of taxable cigarette sales that is correlated with the rise of internet use within states. The growth of internet penetration in the USA has induced an elevation in the taxable sales elasticity of over 60%. Cigarette tax evasion over the internet has substantially reduced the revenue-generating potential of cigarette tax increases: states have collected 8% less cigarette tax revenue between 2001 and 2005 due to tax-free cigarette internet sales. This has serious implications for funding of state programmes, including tobacco control and other public health programmes. In addition, unregulated web sites offer various price promotions or gifts with purchases, and many require a minimum purchasing quantity thus further encouraging cigarette consumption (Ribisl *et al.*, 2001). Of 88 internet sites selling cigarettes in the USA in 2000, one third featured promotional programmes (Ribisl *et al.*, 2001).

The evidence on the impact of higher prices/taxes on the substitution between legal and illegal cigarettes outside Europe and North America is limited.

Yurekli and Sayginsoy (2010) used the market shares of illicit cigarettes in 110 countries to estimate the impact of a tax increase on tax avoidance/evasion. Assuming a perfect substitution between legal and illegal cigarettes in their econometric and simulation models, they found that a global tax-induced increase in real cigarette prices would lead to higher smuggling if it is not accompanied by an improvement in law enforcement. Despite the tax avoidance, the overall cigarette use would be reduced: a 10% increase in total tax (excise and VAT) would reduce total consumption by 1.97% with no change in Gross Domestic Product (GDP) or by 0.2% with 5%

real GDP growth. This reduction would be even larger if enforcement of anti-smuggling laws would improve at the same time.

The studies above estimate the impact of tax avoidance and tax evasion on the general public. There are also studies that have examined the impact of this behaviour on health disparities, since the availability of lower-priced smuggled cigarettes could have a disproportionate impact on smoking and health among children and the poor given their greater price sensitivity (Townsend *et al.*, 1994; DTZ Piedad Consulting, 2000; Joossens *et al.*, 2000). In addition, illicit cigarettes are primarily products of the multinational tobacco companies, because these are easy marketable and have price advantage over less-known brands (Joossens & Raw, 1998). Marlboro, for example, represented 66% of all seized cigarettes worldwide in 2005 (World Customs Organization, 2007). International brands, and particularly Marlboro, are favoured by young people in low-income and middle-income countries where Western products are especially attractive (Joossens & Raw, 1998).

This evidence of the impact of illicit trade on health disparities is much more scarce compared to the evidence on the general population, and most of it comes again from North America and Europe.

A study from Canada using data from 2006/2007 Youth Smoking Survey reported that over 13% of daily teenage smokers reported usually consuming contraband cigarette brands (Callaghan *et al.*, 2009). These smokers consumed significantly more cigarettes compared to those who smoke legally circulating cigarette brands. Contraband cigarettes represented 17.5% of all youth daily-smokers cigarette consumption in Canada,

but in some regions such as Ontario and Quebec, the share of illegal cigarettes were much higher—over 25% of the youth cigarette market consisted of illicit cigarettes.

Another study analysing cigarette butts collected in 2007 at smoking locations near high schools in two Canadian provinces found that 26% and 36% of them were contraband in Ontario and in Quebec, respectively. The comparison with 2006 results when the share of illicit butts was 24% and 35%, respectively, suggests an increasing trend in illicit cigarette use among the teenage population (Canadian Convenience Stores Association, 2007; Unknown, 2008).

Gruber, Sen and Stabile (2002) used data from the Canadian Survey of Family Expenditure 1982–1998 and concluded that cigarette smuggling disproportionately affects low-income groups: illicit trade reduces the average price of tobacco products, leading to the disproportionately higher consumption of tobacco among the poor, who are more price sensitive compared to the general population. Therefore, cigarette smuggling increases smoking-related disparities.

Cantrell *et al.* (2008) interviewed 614 Chinese-American smokers living in New York City between September 2002 and February 2003 and found that younger smokers were most likely to engage in tax avoidance behaviour and were also less likely to change their smoking behaviour in response to the tax increase. Close to 55% of male Chinese smokers engaged in at least one low- or no-tax strategy after a substantial increase of tobacco tax in 2002.

Smokers in socioeconomically deprived areas of Edinburgh in the United Kingdom admitted buying contraband products as a way to deal with the rising financial costs of

smoking and perceived smugglers as “providing a valuable service” to the community (Wiltshire *et al.*, 2001). The availability of cheaper illicit cigarettes undermined the desire of many smokers to quit, thus reducing the impact tobacco tax policy can have on consumption (Wiltshire *et al.*, 2001).

One study from Asia, in Taiwan, China, indicated that low-income and poorly-educated smokers are more likely to purchase smuggled cigarettes (Lee *et al.*, 2009). Smokers who had a personal monthly income of less than NT\$10 000 in 2004 (US\$287) and had the least amount of education were 54% more likely to smoke smuggled cigarettes than those with just one or none of these characteristics.

Using data from 84 countries, Joossens *et al.* (2009) found that the burden of illicit trade falls disproportionately on lower-income countries, where the illicit cigarettes in 2007 made up on average 16.8% of the market; The average market share of illicit cigarettes in high-income countries was about 9.8% in that year. The tax loss associated with illicit cigarette trade was estimated at US\$18.3 and US\$13 billion in low- and high-income countries, respectively. If the problem of illicit cigarettes were solved, low- and middle-income countries would experience 132 000 fewer premature tobacco-related deaths per year from 2030 on. In high-income countries, the toll attributable to illicit cigarette trade is lower, about 32 000 per year.

In addition to the impact on the average tobacco price, the presence of illegal cigarettes on the market can interfere with other tobacco control regulations, such as those related to youth access to tobacco and requirements of tobacco product contents and labelling of products (Stephens *et al.*, 2005; Pappas *et*

al., 2007). In addition, the presence of smuggled cigarettes can result in a competitive disadvantage for legitimate retailers, increasing their motivation not to comply with tobacco-control laws (Joossens *et al.*, 2000).

There is some evidence that illicit cigarette trade undermines efforts to limit youth access to tobacco products, since vendors of smuggled cigarettes are less likely to comply with these restrictions (Joossens *et al.*, 2000). Data from the USA suggest that retailers selling tax-free cigarettes via internet, phone or by mail often fail to check the age of the buyer. Of the 88 internet sites selling cigarettes in the USA in 2000, 18.2% did not feature a minimum age of sale warning (Ribisl *et al.*, 2001). The issue of youth access to cigarettes via Internet may become more important with better retailers' compliance with youth access laws, as it may drive youth to use the internet more frequently as their source of cigarettes (Ribisl *et al.*, 2006).

A US study found that only 28.4% of internet sites selling cigarettes featured the legally required health warning (Ribisl *et al.*, 2001). Only 3.5% (5 sites) of internet cigar vendors had health warning on their web sites (Malone & Bero, 2000). Internet sites selling cigarettes often failed to comply with advertising ban and, instead promote specific tobacco brands and use of other tobacco products such as cigars and loose tobacco, and feature links to pro-smoking or smoker's rights organizations (Ribisl *et al.*, 2001).

Illicit tobacco trade can affect public safety by attracting organized crime and by increasing the general level of corruption (FIA International Research Ltd, 1999a). In New York City, cigarette smuggling has been associated with organized crime as well as activities of small-time crooks,

and has led to murders, kidnappings and armed robberies to earn and protect illicit profits. Such crime has exposed average citizens, such as truck drivers and retail store clerks, to violence (Fleenor, 2003).

Money gained from illicit tobacco trade is used for other serious criminal enterprises, including terrorist operations (United States General Accounting Office, 2003). In 2002, a US federal court found Mohamad Hammoud guilty of providing material support for terrorists in his role as leader of a Charlotte, North Carolina-based cell that raised money for the Lebanese terrorist group Hezbollah by smuggling cigarettes within the United States (Fleenor, 2003). Thus, illicit tobacco trade can have implications for the overall welfare of the country (Bhagwati and Hansen, 1973; Ray, 1978) including the overall public health.

***Policies to curb tax avoidance/
evasion; new policies/
technologies***

Sweeting, Johnson and Schwartz made an extensive review of the effectiveness of policy measures to combat cigarette contraband in 2009. While focusing on the Canadian situation, the report provides updated information on anti-contraband policies in different parts of the world. Case studies in Brazil, Canada, Australia, United Kingdom, Spain and the EU are discussed in detail in the report (Sweeting *et al.*, 2009).

Their research methods consisted of three elements:

1. A systematic literature review was undertaken, collecting both academic and non-academic publications on contraband tobacco and relevant policies.
2. Interviews were conducted with representatives from academia, nongovernmental organizations,

governments and international organizations. Key informants were chosen for their overall knowledge of tobacco smuggling or their intimate knowledge of a specific anti-contraband policy measure.

3. Four expert focus panels were convened to validate, enrich understanding of, and further assess the feasibility of implementing the various policy measures.

In its conclusions, the report identifies and defines the different forms of contraband tobacco, including casual small-scale smuggling, organized international smuggling, illicit manufacturing, tax avoidance from duty-free sources, and counterfeit cigarettes. The effectiveness of ten anti-contraband policy measures are explored: licensing, tax-markings/stamping, tracking and tracing, record-keeping/control measures, enhanced enforcement, export taxation, tax harmonization, tax agreements/compacts, legally binding agreements with the tobacco industry, memoranda of understanding and public awareness campaigns.

According to the authors, the analysis suggests that both the type of contraband and means of distribution influence the effectiveness of different policies and the unintended consequences of action. For example, policy measures that were effective in the 1990s for legally manufactured cigarettes smuggled across borders are less effective for the illicitly manufactured and counterfeit cigarettes that dominate contraband activity today in many countries.

Case studies indicate that while contraband sources often emerge domestically, given the ease of transport and manufacture, sources can be easily displaced to

neighbouring or overseas jurisdictions. Inter-agency cooperation (both domestic and international) emerges as a vital component of all successful anti-contraband strategies. The dynamic nature of contraband supply requires a comprehensive approach that focuses on both immediate and future threats. Policies designed to ensure that contraband tobacco products do not appear in the legitimate retail sector (such as tax-paid markings, licensing and record-keeping) and measures to ensure that counterfeit products are easily identified (such as enhanced taxation stamps) are vital resources. Adequate investment in enforcement is also essential to the success of anti-contraband measures. Given the global scope of the phenomenon, greater international cooperation and information sharing is paramount.

A central theme in the research findings is the multifaceted nature of successful anti-contraband tobacco policies, which require combinations of regulation, fiscal/taxation policy, enforcement, and public awareness campaigns.

The literature on the effectiveness of anti-contraband policies is rather limited, and even less evidence is available for measures to reduce tax avoidance. The methodology of the illicit trade estimates is often poorly described, and the research is underfunded for an area which is described as difficult. For evident reasons, smugglers do not keep records and are not interested in research on their activities. Enforcement agencies are often reluctant to make their findings public for confidentiality reasons. One of the major recommendations of Sweeting and colleagues (2009) is to make statistics and information regarding the tobacco trade and contraband tobacco much more available to the public, to assist with research and

debate on this subject. For example, many jurisdictions (including Canada) do not provide official estimates of the size of the illicit market or comprehensive data on contraband tobacco seizures made by federal and provincial agencies, making it extremely difficult to evaluate and assess approaches in this area (Sweeting *et al.*, 2009).

There are many forms of illicit trade, and illicit activities may change over time as illicit traders adapt their business as a result of the measures taken by governments. Some examples of the changing nature of the illicit trade of tobacco products and the effectiveness of the anti-illicit trade policies are described below in the case studies of California, Washington state, Brazil and Europe.

Case study: California

The Californian Board of Equalization estimated in 2001–2002 that 25% of the state's retailers were selling counterfeit cigarettes (California State Auditor, 2006). To reduce the losses in revenue, the authorities introduced licensing obligations, high-tech tax stamps and investigative authority to better control the distribution chain. In January 2004, the Cigarette and Tobacco Products Licensing Act was introduced, which required all entities engaged in the sale of tobacco products within the state to be licensed. In January 2005, the attachment of tax stamps to tobacco products containing coded information that was more difficult to counterfeit than the stamps previously used was required. The stamping machines applied a new generation of tax stamps using invisible ink, featuring a unique covert code containing product data relating to each cigarette pack and uploaded to a central Data Management System.

Under the new system, retailers and distributors can easily detect counterfeit cigarettes by using specific hand-held scanners. Law enforcement field inspectors are equipped with more sophisticated scanners which give them access to a whole range of data for compliance verification. The legislation imposes fines of up to US \$25 000 for possessing, selling or buying counterfeit cigarettes or fraudulent cigarette tax stamps.

The results of the Californian system have been evaluated positively. The costs have been calculated to be US\$9 million per year in return for significant additional tax revenue on cigarettes—an additional US\$75 million was collected between January 2004 and March 2006 as a result of the licensing act and the tax stamps. Investigators have tracked retailers' tax compliance since the provisions of the Act commenced operation. Their reports suggest that after implementation, the seizures of counterfeit products at retail locations and the percentage of retailers carrying counterfeit products decreased (California State Auditor, 2006).

In combating illicit trade, no one measure is likely to be effective when implemented in isolation. Tax stamps and coded information should be implemented in combination with other measures such as licensing. California had a problem with the retail selling of counterfeit cigarettes; the solution was easy detection of the counterfeit cigarettes combined with the introduction of high-tech tax stamps, better control over the distribution chain by the enforcement officers and the withdrawal of the licence for those retailers who sell illicit cigarettes.

Case study: Washington State

Cigarette tax evasion from Internet sales motivated the state of Washington to apply the Jenkins Act (15 USC 376a), a US federal statute originally intended to curb tax evasion resulting from the interstate sale of mail-order cigarettes (Chaloupka *et al.*, in press). The Act requires vendors who market or ship cigarettes across state lines to register with the tobacco tax administrator of the destination states, and to send that office monthly statements or copies of invoices documenting the names and addresses of recipients and the quantities of cigarettes shipped. This information should aid states with collecting excise taxes from recipients of cross-state shipments. However, the effort to apply the Jenkins Act met resistance from internet cigarette vendors and received little support from the US federal government. However, in 2002 the state of Washington filed a complaint against an online vendor who failed to provide information on Internet sales to Washington residents. A federal court decided that the state has the right to enforce the Jenkins Act to crack down on cigarette tax avoidance, and the online vendor agreed to provide the information required by the Jenkins Act (Banthin, 2004). Washington's success in applying the Jenkins Act led to similar efforts in many other US states. Comprehensive information on the extent of these efforts, their costs, and the revenues generated from them is not publicly available, but newspaper articles suggest that these efforts are cost-effective. For example, Michigan reported collecting US\$5.9 million from about 9000 residents based on lists provided by 13 online vendors (Christoff 2006).

Case study: Brazil

The illicit tobacco trade has been a concern for the Brazilian authorities since the mid-1990s. In 1998, Brazilian manufacturers were exporting 34 billion cigarettes to neighbouring countries, many of which returned illegally to Brazil as contraband. To deal with this problem, the government imposed an export tax of 150% on cigarettes to neighbouring countries. After the export tax was introduced, exports of cigarettes declined rapidly, but cigarette smuggling continued, as newly established factories in a neighbouring country were fuelling the contraband market. In addition to the smuggling problem, 14 domestic cigarette companies were not paying the taxes on cigarettes. According to the Brazilian Ministry of Finance, the illicit cigarette trade represented 35% of the market in Brazil in 2006: 20% smuggling from neighbouring countries and 15% illicit domestic manufacturing (Fisch, 2006, 2009).

To tackle illicit domestic manufacturing, the licensing of manufacturers was made mandatory. Noncompliance with the legislation or failure to pay taxes could lead to the withdrawal of the manufacturer's license and the closure of the factory. In addition to the licensing obligations, a national integrated control and monitoring system for cigarette production was fully implemented in 2008. The system included the installation of automatic production counters at each production line and mandated the implementation of a digital tax stamp, with capabilities for identifying each individual pack. The purpose of the new legislation was to ensure that all due taxes were collected on cigarettes produced in Brazil and to verify the authenticity of the tax stamps applied by the

manufacturers on the cigarette packs (Fisch, 2006, 2009).

The high-tech tax stamps contain a unique code using invisible ink for each cigarette pack. The codes on the tax stamps include product data relating to each cigarette pack, which is uploaded to a Data Manager Server under the control of the Ministry of Finance. Besides the possibility of verifying whether the products are authentic or counterfeit, the stamps are encrypted with the following information, such as name of the manufacturing site, the date the stamp was validated, and the tax category of the stamp.

If a manufacturer uses tax stamps whose electronic codes are not detected, not allocated to that specific manufacturer, or not in accordance with the fiscal category of the pack, the Data Manager Server will issue an alert to the Secretariat of Federal Revenues to start an investigation.

Inspectors, retailers and distributors can easily detect counterfeit cigarettes by using specific hand-held scanners. Law enforcement field inspectors can have access online to package related data available on the Data Manager Server by scanning the code.

According to the Brazilian Ministry of Finance, the implementation of the programme led to the closure of several companies that did not comply with the licensing rules and to US\$100 million less tax evasion at the domestic market in 2008 (Fisch, 2009).

The new policy was not intended to have an impact on the smuggling of cigarettes from the neighbouring countries, and its impact on this type of illicit trade is probably minor or non-existent. As in the case of California, it was only a combination of policies (control and monitoring system, licensing of manufacturers

and enforcement) that led to positive results.

Case Study: United Kingdom

In the United Kingdom, the main problem was genuine cigarettes produced in the United Kingdom that were exported in large numbers to dubious export markets, then illegally imported through smuggling networks back into the United Kingdom (Joossens and Raw, 2008).

Over the last decade, illicit cigarette trade fell from about 21% to 13% in the United Kingdom (HM Revenue & Customs, 2008). Anti-smuggling measures in the United Kingdom included scanners for container detection, prominent fiscal marks on packs, increased punishment for offenders, more customs officers, and parliamentary hearings, which exposed tobacco industry export practices. The United Kingdom strategy to tackle illicit trade was continuously updated and included a strong cooperation between different agencies. The approach includes improved intelligence, risk profiling, tasking and coordination to detect and disrupt the supply of illicit tobacco products (HM Revenue & Customs, 2008).

Case study: Italy and Spain

In the 1990s, cigarette smuggling was a significant problem in the EU. In 1996, US cigarette companies were exporting billions of cigarettes to Europe, under the transit regime, many of which disappeared during transport and ended up in the illegal markets of Italy, Spain, Germany and other EU markets. However, over the last decade illicit cigarette trade fell from about 15% to 1–2% in Italy and Spain (Joosens & Raw, 2008).

In Italy, following Italian and European investigations which led

to legal action against the tobacco industry, and subsequently to a legally binding agreement with Phillip Morris, there was a dramatic fall in customs seizures and corresponding rise in legal sales. The supply of smuggled cigarettes into Spain was reduced by a combination of measures, including intelligence, customs activity in border areas, and international cooperation, both within Europe and with US authorities over the supply of seized US brands. The European Fraud Office (OLAF) investigation of the tobacco companies in the US in 1998 and the Spanish and Italian customs activities and ensuing lawsuit against American tobacco companies also appear to have had a significant impact. Over the period covered by these actions there was a

dramatic fall in US exports to Europe (Joossens and Raw, 2008).

The European examples have common factors. Smuggling was reduced by interrupting the supply chain from the manufacturers to the illicit market, and the evidence suggests that the supply chain is to a great extent controlled by the tobacco industry. International cooperation was also crucial. Enforceable measures to control the supply chain, and international cooperative measures including information sharing and cooperation in the investigation and prosecution of offences are essential to deal with the cross border illicit cigarette trade.

One study (Merriman *et al.*, 2000) on small-scale smuggling and cross-border shopping in Europe using

1989–95 sales data suggests that coordinated multilateral increases in cigarette taxes would result in significantly less tax avoidance and tax evasion than unilateral tax increases.

Combating tax evasion remains difficult, but empirical evidence from around the world suggests that a combination of measures such as more investment in enforcement and dissuasive penalties, international cooperation, including information sharing and cooperation in the investigation and prosecution of offences, legislative measures to control the supply chain and the legal business can lead to positive results.

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