REVIEW

Price and Tax Measures and Illicit Trade in the Framework Convention on Tobacco Control: What We Know and What Research Is Required

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ABSTRACT

Introduction: Article 6 of the Framework Convention on Tobacco Control commits Parties to use tax and price policies to reduce tobacco use, whereas Article 15 commits Parties to implement measures to eliminate the illicit trade in tobacco products. This paper identifies research gaps/needs, especially in low- and middle-income countries, which, if adequately addressed, would help in implementing Articles 6 and 15.

Methods: Based on a recent comprehensive review on the impact of tax and price on tobacco consumption and a summary of reviews and narratives about the illicit tobacco market, research gaps are identified.

Results: Countries have highly diverse research needs, depending on the stage of the tobacco epidemic, previous research and data availability, and making a ranking of research needs infeasible. Broad issues for further research are the following: (1) monitoring tobacco consumption, prices, and taxes, (2) assessing the effectiveness of the tax structure in generating revenue and reducing tobacco use, (3) strengthening the tax administration system in order to reduce tax evasion and tax avoidance, (4) improving our understanding of the political economy of tobacco tax policy, and (5) employing a multidisciplinary approach to assessing the magnitude of illicit tobacco trade.

Conclusions: At a technical level, the case for increasing excise taxes to improve public health and increase government revenue is easily made, but the political and policy environment is often not supportive. In order to effectively impact policy, the required approach would typically make use of rigorous economic techniques, and be cognizant of the political economy of raising excise taxes.

INTRODUCTION

The World Health Organization's Framework Convention on Tobacco Control (FCTC) sets out a number of measures that aim to reduce the demand for (Articles 6–14) and supply of tobacco (Articles 15–17). The focus of this paper is on Article 6, and to a lesser extent on Article 15. Article 6 (Box 1) commits the Parties to implement tax policies (and where appropriate, price policies) that aim to reduce tobacco consumption, while Article 15 (Box 2) aims to eliminate the illicit trade in tobacco products.

As a framework treaty, the FCTC does not provide specific detail on best practices and how Parties should implement the treaty but rather leaves it to a series of Protocols and Guidelines which are negotiated at a later stage. Guidelines provide recommendations on the implementation and/or interpretation of treaty obligations while protocols are legally binding and introduce new obligations. A Protocol on the illicit trade in tobacco products has been negotiated and a working group to

develop Guidelines for Article 6 has been established. Both the Protocol and the Guidelines are on the agenda for adoption at the Conference of the Parties in November 2012.

Article 6 encourages the Parties to increase the tax on cigarettes, which would increase their retail prices, make cigarettes less affordable and thus discourage consumption. Since illicit trade in tobacco products can undermine such efforts, policies on tax and illicit trade are often considered jointly. Illicit trade can take a variety of forms, including large- and small-scale smuggling, illicit manufacturing, and counterfeiting of existing brands. Article 15 commits each Party to adopt measures to eliminate this illicit trade.

The primary aim of this paper is to identify research needs, especially with regard to Articles 6 and 15. While additional research can certainly help guide future policy efforts, this should not detract from the fact that there is clear and convincing evidence that regular increases in the excise tax are a very effective means to reduce tobacco consumption and improve public health.

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Box 1: FCTC Article 6

Article 6: Price and Tax Measures to Reduce the Demand for Tobacco

1. The Parties recognize that price and tax measures are an effective and important means of reducing tobacco consumption by various segments of the population, in particular young persons
2. Without prejudice to the sovereign right of the Parties to determine and establish their taxation policies, each Party should take account of its national health objectives concerning tobacco control and adopt or maintain, as appropriate, measures which may include:
 - (a) implementing tax policies and, where appropriate, price policies on tobacco products so as to contribute to the health objectives aimed at reducing tobacco consumption; and
 - (b) prohibiting or restricting, as appropriate, sales to and/or importations by international travellers of tax- and duty-free tobacco products.
3. The Parties shall provide rates of taxation for tobacco products and trends in tobacco consumption in their periodic reports to the Conference of the Parties, in accordance with Article 21.

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ARTICLE 6: PRICE AND TAX MEASURES TO REDUCE THE DEMAND FOR TOBACCO

Empirical studies from both high-income countries (HICs) and low- and middle-income countries (LMICs) have consistently found that an increase in tobacco prices causes a reduction in tobacco consumption (International Agency for Research on Cancer [IARC], 2011; Jha & Chaloupka, 1999). At a policy level, the advice to increase the retail price by increasing the excise tax on tobacco products in order to decrease tobacco consumption is undisputed, and the excise tax on tobacco products is regarded as the single most effective tobacco control measure (World Health Organization [WHO], 2010).

Measures restricting the sales of tax- and duty-free tobacco products (Article 6.2b) have been included in the Illicit Trade Protocol (see the section “Article 15: Illicit Trade in Tobacco Products”). Some countries (e.g., Barbados, Singapore, Sri Lanka) do not allow duty-free imports of tobacco products while others (e.g., Nepal, the European Union for internal travel) have banned duty-free sales (WHO, 2010). Although limiting or banning duty-free sales might reduce tobacco consumption since it reduces smokers’ ability to legally avoid taxes, there is a greater concern about duty-free products being diverted into the illicit market. Eliminating duty-free sales simply removes this possibility.

Point 3 of Article 6 requires Parties to “provide rates of taxation for tobacco products and trends in tobacco consumption in their periodic reports to the Conference of the Parties.” While this requirement may put peer pressure on Parties to meet the requirements of the FCTC, the reported data are not always comparable across countries (see the section “Research Gaps” for further details). Even though WHO is partially filling this knowledge gap by collecting tax and price data more systematically (published in the WHO Report on the Global Tobacco Epidemic, also known as MPOWER report), there is still a need for more comprehensive data on tax, tax collections, pricing and illicit trade across parties to the FCTC, and methods to validate the data available.

ARTICLE 15: ILLICIT TRADE IN TOBACCO PRODUCTS

Article 15 recognizes that the elimination of all forms of illicit trade is essential to tobacco control and provides some guidance to Parties on achieving this. Forms of illicit trade that are explicitly identified in Article 15 are smuggling, illicit manufacturing, and counterfeiting. The term illicit trade refers to illegal tax evasion. Tax evasion should not be confused with tax avoidance, which refers to the legal avoidance of taxation by consumers (e.g., U.S. citizens living in high-tax states buying cigarettes in low-tax states). In this paper, tax evasion and illicit trade are used interchangeably to refer to *illegal* evasion of tax.

In July 2007, the Parties decided to begin negotiations on a protocol to further address the illicit trade in tobacco products. This made Article 15 the first and only article in the FCTC for which a protocol rather than a guideline is being negotiated, highlighting the importance of illicit trade to tobacco control.

Financial gain underlies nearly all smuggling activities, but in some cases, illicit trade is motivated by a ban of certain tobacco products (e.g., snus in Europe and Cuban cigars in the United States). However, in both the academic literature and from a policy perspective, most attention is focused on the illicit trade in cigarettes, rather than other tobacco products. Since the financial gain is achieved by evading tobacco taxes, measures to reduce and/or eliminate illicit trade are a necessary part of an effective tobacco tax policy. In some cases, consumers can legally avoid taxes. While the focus of Article 15 is on curbing the illegal evasion of taxes, the FCTC aims to minimize the opportunity for tax avoidance as well (e.g., Article 6.2b). The existence of a substantial illicit market, or the threat that illicit trade will increase, can jeopardize future excise tax increases. This can be both *real* in that it undermines the effect of the tax or *latent* in that the threat of increases in illicit trade prevents increases in tax from taking place.

TRENDS IN CIGARETTE TAXATION, PRICING, AND CONSUMPTION

The FCTC encourages Parties to raise the excise tax on tobacco products, but does not set specific targets. The targeted level of excise tax (expressed either in a common currency or as a percentage of the retail price) and/or the rate at which the excise tax should increase from year to year is necessarily arbitrary. However, some organizations have set benchmarks or targets.

Box 2: FCTC Article 15**Article 15: Illicit Trade in Tobacco Products**

1. The Parties recognize that the elimination of all forms of illicit trade in tobacco products, including smuggling, illicit manufacturing, and counterfeiting, and the development and implementation of related national law, in addition to sub-regional, regional, and global agreements, are essential components of tobacco control.
2. Each Party shall adopt and implement effective legislative, executive, administrative or other measures to ensure that all unit packets and packages of tobacco products and any outside packaging of such products are marked to assist Parties in determining the origin of tobacco products, and in accordance with national law and relevant bilateral or multilateral agreements, assist Parties in determining the point of diversion and monitor, document and control the movement of tobacco products and their legal status. In addition, each Party shall:
 - (a) require that unit packets and packages of tobacco products for retail and wholesale use that are sold on its domestic market carry the statement: “*Sales only allowed in (insert name of the country, sub-national, regional or federal unit)*” or carry any other effective marking indicating the final destination or which would assist authorities in determining whether the product is legally for sale on the domestic market; and
 - (b) consider, as appropriate, developing a practical tracking and tracing regime that would further secure the distribution system and assist in the investigation of illicit trade.
3. Each Party shall require that the packaging information or marking specified in paragraph 2 of this Article shall be presented in legible form and/or appear in its principal language or languages.
4. With a view to eliminating illicit trade in tobacco products, each Party shall:
 - (a) monitor and collect data on cross-border trade in tobacco products, including illicit trade, and exchange information among customs, tax and other authorities, as appropriate, and in accordance with national law and relevant applicable bilateral or multilateral agreements;
 - (b) enact or strengthen legislation, with appropriate penalties and remedies, against illicit trade in tobacco products, including counterfeit and contraband cigarettes;
 - (c) take appropriate steps to ensure that all confiscated manufacturing equipment, counterfeit and contraband cigarettes and other tobacco products are destroyed, using environmentally-friendly methods where feasible, or disposed of in accordance with national law;
 - (d) adopt and implement measures to monitor, document and control the storage and distribution of tobacco products held or moving under suspension of taxes or duties within its jurisdiction; and
 - (e) adopt measures as appropriate to enable the confiscation of proceeds derived from the illicit trade in tobacco products.
5. Information collected pursuant to subparagraphs 4(a) and 4(d) of this Article shall, as appropriate, be provided in aggregate form by the Parties in their periodic reports to the Conference of the Parties, in accordance with Article 21.
6. The Parties shall, as appropriate and in accordance with national law, promote cooperation between national agencies, as well as relevant regional and international intergovernmental organizations as it relates to investigations, prosecutions and proceedings, with a view to eliminating illicit trade in tobacco products. Special emphasis shall be placed on cooperation at regional and sub-regional levels to combat illicit trade of tobacco products.
7. Each Party shall endeavor to adopt and implement further measures including licensing, where appropriate, to control or regulate the production and distribution of tobacco products in order to prevent illicit trade.

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For example, the World Bank recommends that excise and sales taxes combined should comprise between 67% and 80% of the retail price of cigarettes (Jha & Chaloupka, 1999). The WHO recommends that excise taxes should account for at least 70% of the retail price (WHO, 2010). The latter recommendation sets a particularly high bar, and according to WHO data (WHO, 2011) is currently met by only five countries (Cuba, San Marino, Fiji, Egypt, and the United Kingdom). The European Union sets a minimum excise tax burden of 57% of the retail price (with a minimum tax floor of €64 per 1,000 cigarettes), to be increased to 60% (with a minimum €90 per 1,000 cigarettes) as of January 1, 2014 (Council Directive 2010/12/EU). None of the international organizations have set specific targets for the retail price of cigarettes.

Comparable price and tax data over long periods of time exist for a limited number of countries, mainly HICs. Based on a sample of 31 HICs and 21 LMICs, van Walbeek et al. (forthcoming) found that real, inflation adjusted cigarette prices increased in nearly all HICs between 1990 and 2008, but that they decreased in more than half of the LMICs during the same period. These trends, together with rapid economic growth in LMICs can explain the divergence in cigarette consumption trends between the HICs and the LMICs. Cigarette consumption in HICs decreased from 1.8 trillion to 1.4 trillion cigarettes between 2000 and 2009, while cigarette consumption in LMICs increased from 3.4 trillion to 4.5 trillion cigarettes over the same period (van Walbeek et al., forthcoming). As a result, global aggregate cigarette consumption increased

from around 5.2 trillion cigarettes in 2000 to 5.9 trillion cigarettes in 2009.

WHAT IS KNOWN IN THE SCIENTIFIC LITERATURE?

Price and Consumption

Many studies have investigated the determinants of cigarette demand. Until the 1980s, these studies used time series data focusing exclusively on HICs (Baltagi & Goel, 1987; Warner, 1977). Chapman and Richardson's study of cigarette demand in Papua New Guinea in 1990 was the first time series-based tobacco demand study using LMICs data. Despite differences in the individual countries, the quality of data, and the methodologies used, these studies found that an increase in cigarette prices is at least as effective, and possibly even more effective, in reducing cigarette consumption in a typical LMIC compared to a typical HIC.

Over the past number of years, fewer studies have used time series data while more and more researchers employ cross-sectional data. This trend is being supported by major advances in micro-econometric techniques and computing power, allowing researchers to interrogate large survey datasets. Such datasets allow one to ask more nuanced questions than time series data. Specifically, one can obtain different price elasticity estimates for different demographic and socioeconomic groups. Also, such data allow one to determine the extent to which lower cigarette consumption is explained by quitting smoking (the prevalence elasticity of demand) versus reduced intake among continuing smokers (the conditional elasticity of demand).

In 1999, the World Bank published *Curbing the Epidemic*, which synthesized all the available evidence at the time. This book, together with a more comprehensive companion, *Tobacco Control in Developing Countries* (Jha & Chaloupka, 2000), became a blueprint for tobacco control for the subsequent decade. The World Bank (Jha & Chaloupka, 1999, p. 42) concluded that "tax increases are a highly effective way to reduce tobacco consumption in low- and middle-income countries ... and that the effect of such tax increases will be more marked in these countries than in high-income countries."

The recent IARC review (IARC, 2011), based on a much larger literature than the World Bank publication, comes to the same conclusion, but refined the conclusions as follows:

- The price elasticity estimates based on cross-sectional data fall in the inelastic range. Among HICs, the price elasticity estimates are clustered between -0.2 and -0.6 while among LMICs the range is somewhat wider between -0.2 and -0.8 .
- There is no consistent pattern between countries regarding the relative magnitude of the prevalence and the conditional elasticities of demand.
- There is very strong evidence that the demand for cigarettes is much more price elastic (i.e., responsive) among youth, young adults, and in the long run, and much less elastic among older adults.

An innovation of the past 10 years was the increased focus on cigarette affordability (Blecher & van Walbeek, 2004, 2009; Guindon, Tobin, & Yach, 2002). Given that some economies, especially in Asia, are growing so quickly, an excise tax rule or

principle that aims to increase the price of cigarettes, but that does not consider the changes in people's spending power (i.e., income), might not be sufficient to reduce cigarette consumption. Affordability considers both changes in the retail price and people's income. The concept has been receiving increasing coverage in the tobacco control literature and is one of the ways in which countries' tobacco excise tax policies can be evaluated and compared (WHO, 2008).

Illicit Trade in Cigarettes

Higher taxes and prices create greater incentives for traders to enter the illicit market or for consumers to legally avoid taxes since the higher taxes and prices increase the "rents" they can achieve by evading or avoiding taxes. However, many other commodities that are not specially taxed also suffer from a large illicit market (e.g., music, films and, to a lesser extent, clothing, and medicines). Thus, factors other than taxes also contribute to the illicit trade. These include, for example, the value to weight ratio or the value to size ratio of the commodity, border and customs enforcement, and the existence of organized crime and corruption. Furthermore, tax increases do not necessarily result in price increases or price increases of the same magnitude (see the section "Industry Efforts to Influence Tax Policy and Industry Pricing Strategies"); thus, it is important to consider that it is also the tobacco industry's pricing policies that influence the "rents" achieved by avoiding or evading taxes.

Generally, the focus of the tax avoidance and evasion literature has been on HICs, primarily because taxes and prices are considerably higher in HICs, but also because the required data are more likely to be available in HICs, relative to LMICs. Furthermore, the problem of tax avoidance and evasion has been more thoroughly documented in HICs, most probably owing to data availability. Higher per unit taxes in HICs mean that government revenue losses are significantly higher, creating a greater incentive for governments to investigate and reduce tax avoidance and evasion. Illicit trade is, however, a global problem and evidence of tobacco industry collusion in cigarette smuggling in Asia, Africa, the Middle East, and the former Soviet Union has emerged via the industry's own documents that it was forced to release through litigation (Collin, LeGresley, MacKenzie, Lawrence & Lee, 2004; LeGresley et al., 2008; Nakkash & Lee, 2008). These documents show the various ways the tobacco industry use cigarette smuggling, including as a means of entering closed markets in order to establish a brand presence (Gilmore & McKee, 2004a, 2004b; Gilmore, Collin, & Townsend, 2007; Lee & Collin, 2006).

Despite common features, including tobacco industry involvement, the well-known cases have unique narratives. For example, in the United States, tax avoidance and evasion has been made easier by state level taxation, where each of the 50 states (and the District of Columbia) apply their own, often unique, tax regimes. Some city and county authorities apply their own taxes on top of the state taxes. Thus, consumers and illicit traders have incentives to cross state borders to purchase cigarettes for their own consumption or for resale. Making matters more complicated is the availability of tax-free cigarettes from Native American Reservations (this problem is unique to the United States and Canada). Research by Stehr (2005), Lovenheim (2008), and Chiou and Muehlegger (2008) all consider tax avoidance and evasion in the United States. More recently, the purchasing of cigarettes across state

lines via the Internet has also become prevalent (Goolsbee, Lovenheim, & Slemrod, 2010). However, Internet purchasing has lost momentum in the United States due to collaboration between the U.S. government and major credit card companies. The Prevent All Cigarette Trafficking (PACT) Act of 2010 targeted organizations that sell tax-free cigarettes, improved enforcement toward cigarette smuggling between states, and banned the delivery of cigarette products through the postal system, but required other delivery agents to ensure that all applicable taxes have been paid (CTFK, 2011).

In Canada, cross-border smuggling from the United States was common in the early 1990s. Cigarettes were legally manufactured in Canada and then exported to the United States with no Canadian taxes applied. The cigarettes were then smuggled back into Canada by organized crime syndicates with no tax paid. The Canadian cigarette manufacturers were complicit in organizing the smuggling and paid significant fines to the Canadian government in out of court settlements and admission of guilt fines (Joossens & Raw, 2008). Recently, illicit cigarette trade has again resurfaced with cigarettes coming from Native American Reservations that are immune to government intervention. In certain parts of Canada, tax-free Indian-manufactured cigarettes have undermined the legal market to such an extent that government officials are considering lowering the tax on cigarettes.

In Europe, the main type of illicit trade was historically large-scale cigarette smuggling. Containers of cigarettes were legally exported, duty unpaid, to countries where these products had no market, and where they disappeared into the contraband market. Such blatant smuggling has now decreased. However, other types of illicit trade, such as counterfeiting and “cheap whites” (new cigarette brands, produced in an open and non-clandestine manner, intended solely for the illegal market of another country) have emerged (Joossens, 2011).

Several European countries, namely the United Kingdom, Spain, and Italy, have seen a dramatic reduction in illicit trade without lowering taxes (Joossens & Raw, 2008). Methods used to reduce illicit trade include the use of improved technology to scan shipping containers, fiscal markings (tax stamps), tracking and tracing systems, increased punishment, more customs officers, and campaigns to increase public awareness. Legal proceedings and agreements with the industry have played a role in reducing illicit trade in Europe (Joossens, 2011).

In LMICs the illicit trade problem is different. Taxes and prices are generally lower than in HICs, thereby creating fewer direct financial incentives to enter the illicit market. However, other incentives for illicit trading in cigarettes are greater, including higher levels of corruption, fewer customs and border controls, and lower penalties, implying lower risk. Furthermore, organized crime syndicates are more prevalent. Recent evidence, based on both formal and informal sources, suggests that the prevalence of illicit cigarettes in many LMICs is higher than the prevalence in many HICs (Joossens, Merriman, Ross, & Raw, 2010). Thus, the expected payoff from engaging in tax evasion in LMICs (with low profit but low risk) is equal to or greater than the expected payoff in HICs (with high profit but high risk).

Industry Efforts to Influence Tax Policy and Industry Pricing Strategies

The ability of tax increases to raise the retail price of cigarettes depends crucially on the industry's response to an increase

in the excise tax. By under-shifting the tax, the industry can absorb at least part of the tax increase, thus reducing the impact of the tax increase on cigarette consumption. Alternatively, the industry can fully shift the increase in the excise tax onto the consumer, or it can over-shift the tax by raising the retail price by more than the increase in the excise tax.

Economic theory indicates that the structure of the industry has a significant impact on the ability of individual firms to shift the tax onto consumers. If the firms are highly concentrated (i.e., a monopoly or a near-monopoly), over-shifting of the tax is the rational response for price inelastic products such as cigarettes, especially if the market is not growing. If the industry is more competitive, economic theory indicates that individual firms might want to absorb at least a part of the tax increase in order to gain a competitive advantage. In most countries (and certainly in all major markets), the industry is now highly consolidated (Gilmore, Branston, & Sweanor, 2010).

Early empirical evidence, limited largely to the United States, identifies both under- and over-shifting of taxes although the majority document under-shifting (IARC, 2011). In a relatively competitive environment, as was the case at the time, this corresponds to theoretical predictions. More recent studies—covering the United States, South Africa, Jamaica, and Ireland—find that tax increases are over-shifted to consumers (Barnett, Keeler, & Hu, 1995; Hanson & Sullivan, 2008; Howell, 2012; Keeler, Hu, Barnett, Manning, & Sung, 1996; Sullivan, 2010; van Walbeek, 2010). This is consistent with the continuing trend of industry consolidation and the increase in industry profitability despite declining sales (Gilmore et al., 2010). Moreover, the research from Ireland shows that, while over-shifting taxes, the tobacco industry has simultaneously argued that tax increases will increase smuggling, thus undermining its own rhetoric (Howell, 2012).

Data from the United Kingdom demonstrate that the industry's pricing strategy is more complex than that revealed by average prices or other general price indices (Tavakoly, Taylor, Reed, & Gilmore, 2012). Researchers identified four price segments and showed how the industry over-shifts taxes on all but the cheapest price segment. As a result, real prices of cigarettes have increased in recent years in all but the “ultra-low price” segment which has, as a result, grown in market share. The authors suggest the industry uses profits from its more expensive brands to offset potential losses on its cheaper brands. This serves to keep smokers, who would otherwise quit, in the market, make cigarettes affordable to low income groups, and attract price-sensitive young people to take up the habit (Tavakoly et al., 2012).

Tobacco document and related research sheds further limited insights on industry pricing strategies, highlighting their context-specific nature. For example, price discounting has been used to gain market share in newly opened markets (Szilágyi & Chapman, 2003; Vateesatokit, Hughes, & Ritthphakdee, 2000), while price leadership and high prices are more common in longer established markets (Chaloupka, Cummings, Morley, & Horan, 2002). Moreover, while the industry initially attempted to keep taxes and prices low in the countries that were created after the breakup of the former Soviet Union, recent evidence from Ukraine indicates a shift in the industry's strategy. Rather than shielding consumers from the impact of smaller tax hikes in 2007–2008, the industry is over-shifting the recent larger tax increases, increasing their net-of-tax price (Ross, Stoklosa, & Krasovsky, 2012).

Tobacco companies can employ a variety of marketing techniques that lower the price of or otherwise add value to their products. Mandated reporting on marketing remains rare, limiting research in this area. Such data are, however, required in the United States and they show a marked increase in price-based marketing over time, specifically to reduce the consumption-reducing impact of tax increases and other tobacco control efforts (Chaloupka et al., 2002; Keeler et al., 1996; Loomis, Farrelly, Nonnemaker, & Mann, 2006; Ruel et al., 2004; Slater, Chaloupka, & Wakefield, 2001). Of course, a major reason for the increase in price-based marketing has been the reduction in avenues for conventional advertising.

There is more evidence on industry efforts to influence tax policy (Smith, Savell, & Gilmore, 2012). Based on tobacco industry document research, this evidence largely concerns efforts to influence tax levels and is focused on North America (particularly the United States). It shows that tobacco companies lobby aggressively to influence tobacco tax levels and particularly to prevent the earmarking of tobacco taxes for health purposes. Evidence also indicates that adequately funded tobacco control campaigns can successfully overcome industry efforts, at least at the subnational level (Smith et al., 2012).

The industry has also attempted to influence tobacco excise tax structures (i.e., the mix of specific and ad valorem tax). These studies cover the former Communist Bloc and the Middle East (e.g., Gilmore & McKee, 2004a, 2004b; Gilmore et al., 2007; Nakkash & Lee, 2008; Szilágyi & Chapman, 2003). They indicate that different companies support different tax structures, favoring those that will benefit their brands at the expense of their competitors. The tobacco industry experiences greater difficulties in influencing policy on this issue because of the divergence between companies' interests.

RESEARCH GAPS

While it would be valuable to prioritize tobacco control research gaps globally, this is not practically possible, because countries have highly diverse research needs. For example, estimating the overall price elasticity of demand in the United States and some other HICs is unlikely to add much value, since many studies, using a variety of different datasets, have already investigated this. On the other hand, in some countries, notably the LMICs, no price elasticity estimates are available.

The stage of the tobacco epidemic in which countries find themselves is also likely to influence the research priorities. For example, HICs such as the United States, the United Kingdom, and Australia have been experiencing decreases in tobacco consumption for decades and their research agenda should presumably consider end-game strategies. In Asia, where tobacco consumption has increased sharply in the past decade, and where rapid economic growth tends to make tobacco more affordable, the research agenda should consider strategies to reverse this trend. In Africa, where smoking prevalence is still relatively low, the research agenda should focus on the prevention, rather than the reversal, of the tobacco epidemic.

The prioritization of the research agenda would also be influenced by the policy objectives of the users of the research. A policy objective to save as many people as possible from premature tobacco-related death is likely to result in a different research agenda than a policy that, for example, aims to curb the tobacco industry's power.

Thus, without prioritizing the research agenda, some gaps in the literature are discussed below.

The Availability of Appropriate Data

Article 6.3 of the FCTC requires all parties to inform the COP of tobacco taxes and trends in tobacco consumption. Solid data form the cornerstone of all quantitative research. While the idea to report to the COP is attractive, it has been hampered by technical difficulties including inadequacies in the data collection template and the data submitted. Therefore, the data are usually insufficient to facilitate comparisons between countries and/or to analyze trends within countries. A possible solution would be for the COP to "outsource" the collection of price and tax data to an international body that has the expertise and contacts to compile comparable data for lengthy periods of time. An example of a centralized institution that does an excellent job of collecting tax information is the European Commission which obtains comparable data on tobacco taxes from each of the 27 EU Member States. The IMF, the WHO, and the World Bank also have the capacity to collect such data for their member countries.

Obtaining data on tobacco consumption can be even more challenging even though there are multiple methods to estimate it. Extrapolating aggregate consumption from population-based surveys on individual tobacco use tends to grossly understate consumption (HM Revenue and Customs, 2007; Stehr, 2005) and may result in problems of comparability over time. Alternatively, one can derive consumption from industry-provided sales data or from government tax revenue. In both cases, but especially for government revenue data, actual tobacco consumption can be understated if illicit trade is a significant problem. Having data on the extent and nature of the illicit trade is therefore another prerequisite for measuring actual consumption. Currently, very few countries have such data and where it exists, it is rarely made available for research and is often of poor quality.

Using an Increase in Excise Taxes as an Effective Tobacco Control Strategy

While many HICs and a small number of LMICs have aggressively increased excise taxes on tobacco in the past decades, many countries have not. Presumably, countries have their idiosyncratic reasons why they have or have not aggressively increased the excise tax. Some of these narratives have been recorded (De Beyer & Waverley Brigden, 2003), but it would be useful to expand this record, focusing on the political economy of tobacco control. For successful countries, the focus would be on the political will, the processes, organizations, and personalities that allowed these countries to overcome the (presumed) resistance of the industry to increase the excise tax. For unsuccessful countries, the focus would be on those factors that inhibit the government from raising the excise tax. Once the blockages are identified, the next step would be to determine how such blockages should be addressed and removed.

It is unclear if increasing the excise tax in a small number of large increases is better than increasing the excise tax in a large number of small increases. The rationale for a large excise tax increase is that it is more difficult to absorb by producers, and thus generates a larger "shock effect" for consumers. This could have a more significant impact on consumption and prevalence, but may also create a stronger stimulus for people to engage in

illicit trade or to switch to cheaper forms of tobacco. On the other hand, a series of small tax increases may create an expectation that taxes will continue rising in future, which would, according to [Becker and Murphy \(1988\)](#), result in a larger decrease in current consumption. Theory and intuition do not provide a cogent answer; more empirical work is required.

The structure of the excise tax (i.e., ad valorem or specific) needs to be studied while considering countries' specific conditions. Current best practice is a uniform specific tax (i.e., applied at the same amount per cigarette, irrespective of the retail price), regularly adjusted for inflation and income growth ([WHO, 2010](#)). Are countries simplifying the excise tax structure, thus reducing opportunities for both producers and consumers to avoid tax? How much tax revenue is lost in countries with unnecessarily complex tax structures? If countries loathe simplifying their tax structures, what are the main impediments to making the structural changes? Should the system of tax collection be the same in all countries? How could this system be improved in order to prevent tax avoidance and evasion? In addition, we know very little about the impact of different tax structures and the resulting price variation on inequalities in smoking.

As noncombustible tobacco and nicotine products (e.g., snus and e-cigarettes) become popular in many countries, there is a need to estimate the demand sensitivity of such alternatives to changes in the price of traditional tobacco products. The methodology of estimating the cross-price elasticity of demand for different tobacco/nicotine products exists (e.g., [Chapman & Richardson, 1990](#)), but appropriate data and research capacity are needed to conduct these studies.

Much has been written about the impact of excise tax changes on the poor. It is generally acknowledged that tobacco taxes are regressive, but that an increase in the excise tax reduces the regressivity of the tax ([Jha & Chaloupka, 1999](#)). Current studies have indicated that the poor are more likely to engage in some form of tax avoidance/evasion relative to the better off ([Licht, et al., 2011a, 2011b](#)). While an increase in the excise tax may make some poor households absolutely better off (especially if the smokers quit, rather than simply reduce their consumption) the fact of the matter is that many poor people do not quit or reduce their consumption. Who are these households and what drives their behavior? What is the opportunity cost of the increased expenditure on tobacco products? Do households switch from higher priced tobacco products to lower priced tobacco products? While these questions have been investigated in some HICs, especially the United States, they have not been sufficiently addressed in LMICs.

There are theoretical arguments for and against the earmarking of tax revenue. Even though some countries earmark a portion of their tobacco tax revenue for tobacco control, or for public health in general, we know very little about the success or failure of such efforts, and to what role can earmarking play in reducing the impact of higher tobacco taxes on the poor.

The implicit assumption in recommendations to raise the excise tax is that countries have adequate tax administration systems. For HICs, this is typically a reasonable assumption, but in some LMICs the lack of a robust tax infrastructure may be a serious problem. If countries lose tax revenue to illicit activities and other forms of leakage, this would undermine calls to raise the excise tax. The research in such countries should identify the weaknesses of the tax system and to come up with recommendations how to minimize the possible leakages.

The Role of the Industry

More research is needed on the use and impact of price-related marketing techniques, including price-reducing and market segmenting techniques. While these techniques have been well researched in the U.S. cigarette market, we know very little about them when it comes to other tobacco products in the United States and all tobacco products in other countries ([IARC, 2011](#)). There is an urgent need to understand tobacco industry pricing strategies (e.g., buy one get one free, use of coupons, smart cards), their retailer-oriented methods (e.g., buyback programs, volume discounts), and the ways in which these strategies can undermine tobacco tax policies. Data on brand-specific prices and price-related marketing are also needed. Little is known about how the industry allocates their price marketing budget in markets other than the United States, whether government-owned tobacco businesses (like in China) have such budgets at all, and how prices are set. In order to conduct such research, governments should request industry to provide relevant data and make it available to researchers.

Almost no empirical evidence exists on the impact of minimum tobacco pricing policies (i.e., government setting up a price floor, e.g., in Malaysia) or on bans on tobacco industry price-related and price-reducing marketing efforts. These interventions aim to prevent price-based fragmentation of the tobacco market and the creation of a low-price market segment. Research is therefore needed to evaluate the effect of these policies on tobacco price variation and on price responsiveness of the population.

What techniques does the industry use to influence tax policy? To date most research focuses on the industry's attempts to influence tax levels and tax earmarking in North America; more research in other countries is required. The greatest research gap is in understanding industry efforts to influence tax structures.

Economic theory suggests that market structures play an important role in determining prices in a market. However, little research to date has focused on the relationship between market structures, excise taxes, tobacco product prices, and the degree of over-shifting or under-shifting of the excise tax. We know little about the impact of other tobacco control policies (like advertising bans) on industry concentration, price structure, and the degree of over-shifting or under-shifting of the excise tax. Better understanding of these dynamics would allow us to better assess the impact of tax changes (both in terms of structure and level) on prices and tobacco use in order to design optimal policies.

The value chain approach provides a useful framework for addressing questions related to, amongst others, the asymmetrical distribution of the value added at different stages of the value chain and the determinants of the geographical spread of the main economic activities associated with the global tobacco industry ([Kaplinsky, 2000](#)). Historically, tobacco growing is concentrated in LMICs; tobacco processing and cigarette manufacture, distribution, and trading are organized by big tobacco companies, based in HICs, at an international level. There is a growing consensus that tobacco control policies have to take into account the diverse economic structures of tobacco producing countries. As the developing world is becoming economically stronger and consuming more tobacco, will this alter the balance of power in the tobacco value chain? What will be the impact on local producers, consumers, and governments, and what will be the impact on tobacco control policies, especially in the developing world?

Illicit Trade Issues

There is limited data on the magnitude of tax evasion and tax avoidance, both at the global and at the individual country levels. Many industry or quasi-industry estimates are available but should not be considered reliable. Quasi-industry estimates include those from studies commissioned by the industry or published by private sector research firms. A number of innovative techniques to generate such estimates, used by independent researchers and governments, have recently appeared in the literature. In Chicago and New Zealand, researchers collected discarded cigarette packs and then identified those on which the appropriate tax was not collected (Merriman, 2010; Wilson, Thomson, Edwards, & Peace, 2009). In Italy, Gallus Tramacere, Zuccaro, Colombo, & La Vecchia (2009) used a survey instrument while a “gap analysis” has been used in South Africa and the United Kingdom (Blecher, 2010; HM Revenue and Customs, 2007). These methods have advantages and disadvantages and are found to be relevant in specific settings. For instance, pack collections, while innovative and insightful, can only be undertaken in settings where illicit cigarettes can be distinguished from tax paid cigarettes through health warning labels, fiscal markings, or other locally distinguishable markings. These data challenges are most likely to be more significant in LMICs where pack identifiers are less likely to be used. There is also an urgent need for data, where it is available (e.g., that collected by the European Commission) to be made public and thus subject to scrutiny.

Some jurisdictions have employed modern technology in order to reduce cigarette tax evasion. For example, the U.S. state of California implemented a high-tech tax stamping system in 2005, which, together with increased enforcement, decreased tax evasion by 37% and substantially increased tax collection for the state (California State Board of Equalization, 2007). Similarly, Brazil has requested all cigarette manufacturers to be licensed as part of a national monitoring system. The government has mandated equipment that automatically counts cigarettes made on every production line, using high-tech, encrypted tax stamps to identify each individual cigarette pack (Joossens, 2008). Researchers need to study mechanisms that are available to counter illicit trade as well as their costs and cost-effectiveness. Will these mechanisms work equally well in HICs and LMICs, and should industry or government bear the cost of implementing these measures?

Illicit trade undermines tobacco control and the government's fiscal policies since it increases cigarette consumption and lowers government revenue. At what point does the excise-induced increase in illicit activity become large enough to undermine the increased excise tax? Although Article 15 aims to eliminate illicit trade this may not be entirely possible and the costs of doing so may also be too high. One might need to consider an optimal level of illicit trade where the net benefit of tax policy is maximized alongside some acceptable level of tax evasion.

ADDRESSING THE RESEARCH AND POLICY GAPS AND FACILITATING PROGRESS

Policy makers in LMICs may dismiss one-size-fits-all solutions, especially if they are based on the experience of HICs. Therefore, research aimed at providing support for

implementing the FCTC will need to be credible and country specific.

We have identified five broad areas that deserve the upmost attention in order to speed up the FCTC implementation and achieve the greatest public health gains:

1. Monitoring tobacco consumption, prices, and taxes.
2. Assessing the effectiveness of the existing tax structure in generating revenue and reducing tobacco use.
3. Strengthening the tax administration system in order to reduce tax evasion and tax avoidance.
4. Improving our understanding of the political economy of tobacco tax policy.
5. Employing a multidisciplinary approach to assessing the magnitude of illicit tobacco trade.

It is vital to engage local researchers, academic institutions, and/or government agencies in collaborative research with content experts. The type of collaborative arrangement will differ by country depending on the local research infrastructure and resources. Given the large variation in the ways in which countries generate research and the differences in the knowledge gaps, it is an imperative to conduct a capacity and needs assessment, and an institutional scan, before a strategic plan for local or regional capacity building can be developed. Local tobacco control advocates need to be involved in each stage of this process. They play a crucial role in understanding the culture, institutional structures, and behavioral norms in the local setting.

The strategic plan will need to identify research priorities. These should include topics in epidemiology, surveillance, and economics. Research would have to be multidisciplinary, with collaboration between economists, political scientists, and policy experts. For example, the large empirical literature has shown that the public health and fiscal case for raising excise taxes can be easily made (i.e., the demand for tobacco is typically found to be price inelastic). However, the political economy issues (e.g., getting public support for the measures and overcoming the industry's arguments against the tax increase) are often more difficult. If research is to have policy impact, topics related to policy implementation need to be part of the research agenda.

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DECLARATION OF INTERESTS

None declared.

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