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The Use of Excise Taxes to Reduce Tobacco, Alcohol, and Sugary Beverage Consumption

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Abstract

In countries around the world, tobacco use, excessive alcohol consumption, and consumption of sugar-sweetened beverages (SSBs) are significant contributors to the global epidemic of noncommunicable diseases. As a consequence, they contribute, as well, to excess health care costs and productivity losses. A large and growing body of research documents that taxes specific to such products, known as excise taxes, reduce consumption of these products and thereby diminish their adverse health consequences. Although such taxation has historically been motivated primarily by revenue generation, governments are increasingly using these taxes to discourage unhealthy consumption. We review the global evidence on the impact of taxes and prices on the consumption of these products and the health and social consequences. We then evaluate arguments commonly raised against these taxes, identify best practices in excise tax policy, and conclude with a summary of the current status of tobacco, alcohol, and SSB excise taxes globally.

> Sugar, rum, and tobacco, are commodities which are no where necessaries of life, which are become objects of almost universal consumption, and which are therefore extremely proper subjects of taxation.
>
> —Adam Smith (49)

INTRODUCTION

Governments have long taxed tobacco products and alcoholic beverages. A growing number of governments have recently implemented taxes on sugar-sweetened beverages (SSBs). Revenue generation has historically motivated, and often continues to motivate, these taxes. Most of the market is produced by a small number of manufacturers, the products are easily classified, and they are widely consumed. Thus, taxes on these products are relatively easy to collect and generate significant revenues. As the health, economic, and social consequences of these products have become clearer—they are major contributors to the global noncommunicable disease epidemic—governments have increasingly used these taxes to discourage unhealthy consumption.

Tobacco use, excessive drinking, and SSB consumption create significant health care costs to treat related diseases and contribute to productivity losses. The economic costs of smoking exceeded $1.4 trillion globally in 2012, with $422 billion spent to treat smoking-caused diseases (23). The costs from alcohol consumption were recently estimated as equivalent to 2.5% of gross domestic product in high-income countries (HICs) and 2.1% in middle-income countries (45). The costs of obesity and type 2 diabetes, two of the health consequences of SSB consumption, were recently estimated at $2 trillion and $670 billion, respectively (14, 29).

In many countries, at least some health care costs are paid through publicly financed health care systems. In addition, individuals who consume these products impose costs on nonusers, what economists call negative externalities. Nonsmokers are harmed by exposure to tobacco smoke. Innocent victims suffer from alcohol-related traffic crashes and violence. Smoking, drinking, and obesity during pregnancy result in low birthweight, premature birth, congenital anomalies, stillbirth, fetal alcohol syndrome, and sudden infant death syndrome and can affect a child's health later in life.

We review the global evidence on the impact of taxes and prices on consumption of these products and their health and social consequences. Next, we consider arguments commonly raised against these taxes. We then identify best practices in excise tax policy, after which we describe the current status of tobacco, alcohol, and SSB excise taxes globally. We conclude with a brief summary.

EXCISE TAXES REDUCE CONSUMPTION AND IMPROVE HEALTH

Excise taxes generally result in higher prices for consumers, reducing demand for taxed products. The size of the reduction and whom prices most affect depend on consumers' price elasticity of demand (the percentage change in the quantity demanded resulting from a 1% price increase). Price elasticity is a function of whether consumers treat the good as a necessity or a luxury item, how much of a consumer's income is spent on that good, and the availability of substitutes.

Extensive evidence has accumulated on the impact of taxes and prices on the demands for tobacco products and alcoholic beverages. Similar evidence has recently emerged on the demand for SSBs. Much of the early evidence on tobacco and alcohol demand came from HICs. Over the past two decades, considerable research has been done on the demand for tobacco products in low- and middle-income countries (LMICs), but similar evidence on alcohol demand is limited. Much of the evidence on SSB demand with respect to prices comes from HICs, whereas recent evidence based on taxes comes from LMICs.

Tobacco Products

Hundreds of studies from around the world have estimated the impact of taxes and prices on the demand for tobacco products (28, 40), most focusing on manufactured cigarettes, which account for most tobacco consumption. Evidence also exists on the demand for other tobacco and nicotine products, including bidis, cigars, pipe tobacco, smokeless tobacco, and, more recently, electronic cigarettes (30).

Most HIC price elasticity estimates are around −0.4, implying that a 10% increase in price reduces overall consumption by 4% (40). Estimates from LMICs range from −0.2 to −0.8, clustering around −0.5 (28, 40). Limited evidence for other tobacco products generally finds that their demand is more responsive to price than is cigarette demand (30). One study from India, for example, finds that a 10% increase in prices would reduce bidi smoking by about 9% while reducing cigarette smoking by less than 3% (31).

Research documents substitution among tobacco products in response to changes in relative prices, particularly among similar products (e.g., roll-your-own tobacco, little cigars, and cigarettes) (30). Increases in income lead users to trade up to products they perceive as higher quality (30). For example, in Bangladesh, some smokers have switched from bidis to cigarettes as incomes have increased (39).

Given nicotine addiction, smokers fully respond to higher prices over time; the long-run impact of price increases about doubles the short-run impact (28, 40). Approximately half of the short-run impact reflects the impact on smoking prevalence, with the remainder from reductions in the number of cigarettes smoked by continuing smokers (28, 40). Estimates of price elasticity for youth smoking tend to be 2–3 times greater than those for adults (28, 40). The inverse relationship between youth smoking prevalence and price is illustrated in **Figure 1** for the United States. High-socioeconomic (SES) populations tend to be less responsive to cigarette prices, whereas low-SES populations are relatively more responsive (28, 40).

Higher cigarette taxes and prices reduce smoking-related disease and premature death. One recent US study found that higher taxes reduced overall mortality and deaths from throat, lung,

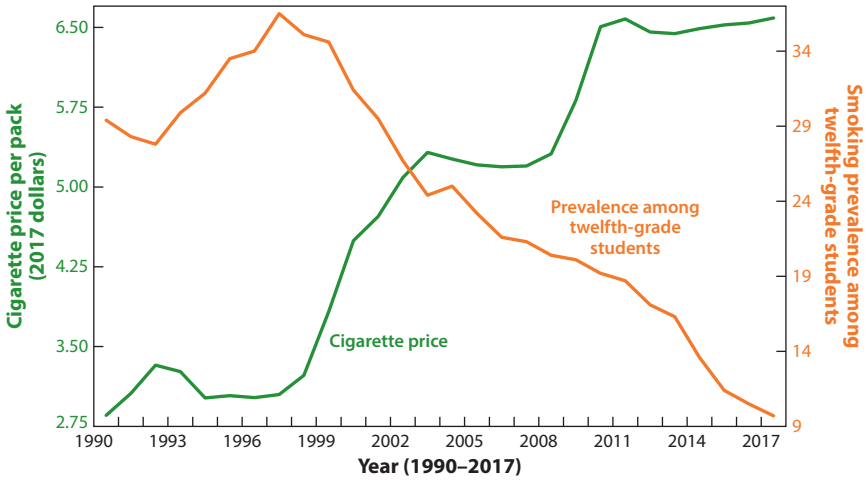

Figure 1

Cigarette price and youth smoking prevalence among high school seniors in the United States, 1990–2017. Data from Monitoring the Future, Bureau of Labor Statistics, Tax Burden on Tobacco, and authors' calculations.

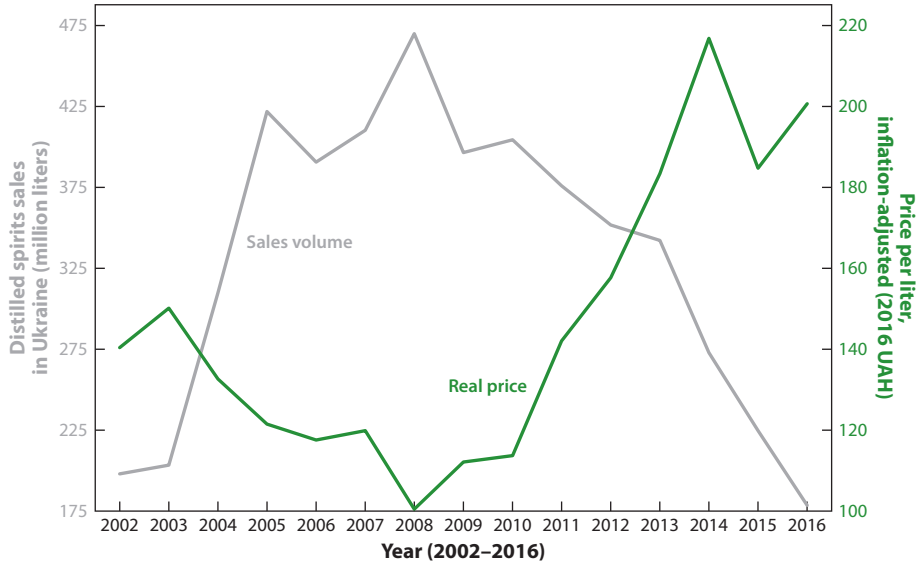

Figure 2

Distilled spirits sales and prices in Ukraine, 2002–2016, adjusted for inflation. Data from Euromonitor, World Bank, and authors' calculations. Abbreviation: UAH, Ukrainian hryvnia.

and other cancers and respiratory diseases (5). Other studies have found that higher cigarette taxes reduced hospitalizations for heart failure and reduced the severity of childhood asthma (26, 27). Smoking among pregnant women is particularly price responsive; prevalence elasticities are 2–3 times those for adults in general (46). As a result, higher taxes and prices reduce low-birthweight births, sudden infant death syndrome, and overall infant mortality (17, 36, 42).

Alcoholic Beverages

Overall price elasticity of demand for alcohol in HICs falls between −0.51 and −0.77 (15, 56) and centers on −0.64 in LMICs (51). The demand for spirits is most responsive to price; beer demand is least responsive (15, 51, 56). **Figure 2** illustrates the inverse relationship for distilled spirits in Ukraine. For changes in relative prices, evidence indicates substitution among beverages within a given category (e.g., between low- and high-alcohol beer, or between red and white wine), but little substitution has been demonstrated across beverage categories (e.g., beer to wine or spirits) (38, 53).

Many HIC studies find an inverse relationship between prices and drinking prevalence, frequency, and intensity (15, 56). One review found a mean elasticity of −0.28 for heavy drinking (56), and another study associated higher taxes and prices with reductions in binge drinking and other measures of excessive drinking (15). Heavier drinkers appear to be less price responsive than light or moderate drinkers (56). Regarding excessive drinking, studies find that young men are more price responsive than young women (15). We lack evidence on alcohol price elasticity differences by SES.

HIC studies document the impact of higher taxes and prices on decreasing harms from excessive drinking, including motor vehicle crashes and fatalities; deaths from liver cirrhosis, alcohol dependence, and other diseases caused by excessive drinking; incidence of sexually transmitted diseases; crime and violence; and workplace accidents (57).

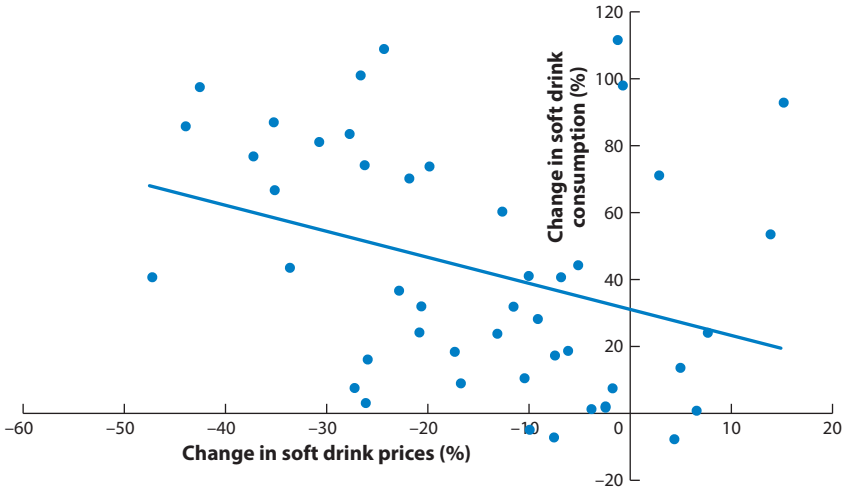

Figure 3

Percentage changes in soft drink prices and consumption, 2000–2014, in selected countries. Data from Euromonitor International, World Bank, and authors' calculations.

Sugar-Sweetened Beverages

Studies in HICs on the demand for soft drinks (carbonated beverages, fruit drinks, sports drinks, ready-to-drink teas and coffees, energy drinks, and flavored waters, including both sugar-sweetened and artificially sweetened varieties) estimate the elasticity to be about −0.8 (1). This relationship is illustrated in **Figure 3** and is based on data from a variety of countries. Studies that focus only on SSBs find demand to be more price responsive than soft drink demand, with an elasticity of about −1.2, reflecting the opportunity to substitute from SSBs to artificially sweetened or unsweetened beverages in response to higher SSB prices (16, 43). Recent studies of LMICs produced similar or greater elasticity estimates; studies from Mexico, Ecuador, and Chile estimated soft drink price elasticities of −1.06, −1.20, and −1.37, respectively (12, 25, 41). A study from India estimated a price elasticity of SSB consumption of −0.94 (2). Consumers substitute among different beverage types in response to changes in relative prices, such as substituting bottled water and milk when soft drink prices rise (20, 50). A few studies have concluded that beverage price increases lead to some substitution to foods, partially offsetting reductions in added-sugar and/or caloric intake from reduced consumption of higher-priced beverages (18, 64). Recent research indicates that SSB demand is more price responsive in lower-income than in higher-income populations (19, 34, 55).

In 2014, Mexico became the first country in the Americas to adopt a significant excise tax on SSBs: one peso per liter. This tax reduced SSB purchases, while increasing bottled water purchases (8, 10, 11, 13). Low-SES households were more responsive than high-SES households (9, 10). Recent evidence from the one-cent-per-ounce tax implemented in March 2015, in Berkeley, California, found that one year post-tax, SSB sales dropped by 9.6%, whereas sales of untaxed beverages rose by 3.5% and bottled water sales increased 15.6% (48).

Early research on the impact of beverage taxes and prices on weight outcomes in the United States capitalized on differences in state-level sales taxes on various beverages (43). These studies produced mixed evidence on the impact of taxes, given relatively low sales tax rates (typically below 7%), the nonspecificity of the taxes (e.g., taxing both sugar-sweetened and artificially sweetened beverages), and the noncomprehensiveness of the taxes (e.g., taxing only carbonated soft drinks

and excluding other soft drinks). A few studies provide evidence of an association between higher prices and lower body weight (18, 50). Several simulation models suggest that tax-induced reductions in SSB consumption would lower obesity rates, reduce incidence of diabetes, and improve health (2, 33, 35, 47).

ECONOMIC IMPACT OF EXCISE TAX INCREASES: MYTHS AND FACTS

Taxed industries and their allies raise arguments opposing tobacco, alcohol, and SSB taxes. They contend that a tax increase will reduce tax revenues owing to decreases in consumption; cause unemployment; hurt the poor, given the regressivity of consumption taxes; and lead to extensive tax avoidance and evasion. Experiences from around the world demonstrate that these arguments are false or exaggerated.

Effect of Excise Taxes on Government Revenues

For the foreseeable future, tax increases on tobacco and alcohol will increase revenues, given the relative inelasticity of demand for these products and the percentage of the price attributable to tax. For example, in a country where the cigarette excise tax accounts for half of the retail price, doubling the tax, if fully passed on to consumers, would increase the price by 50%. For the average LMIC with a price elasticity of demand of −0.5, cigarette consumption would fall by 25%. The remaining 75% would be taxed at twice the prior rate, generating a 50% revenue increase. The positive relationship between cigarette tax rates and cigarette tax revenues is illustrated in **Figure 4** for South Africa, where cigarette taxes have increased steadily since the mid-1990s. Even in countries with very high taxes, increases continue to generate new revenues, as seen with recent cigarette tax increases in Australia and the United Kingdom. In every country that has raised its tobacco tax by a nontrivial amount, consumption has fallen and revenues have increased. The revenue impact will be greater for alcoholic beverage tax increases as these taxes typically account for a

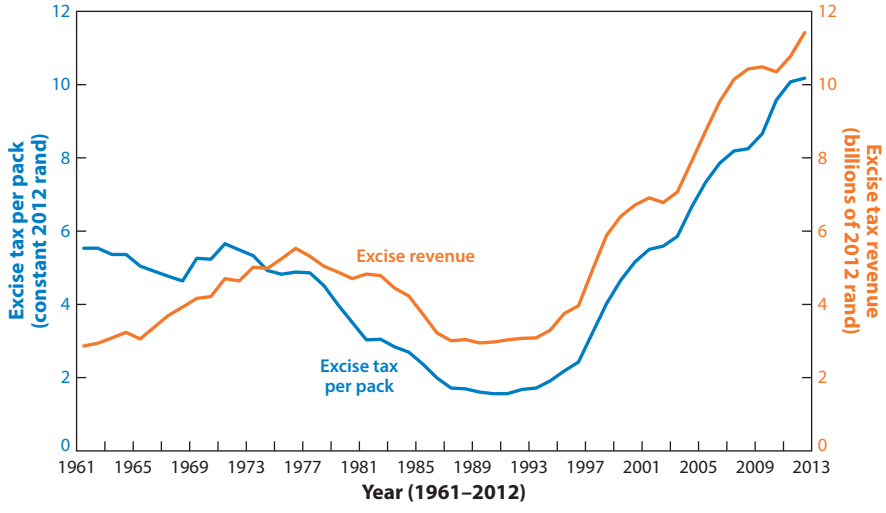

Figure 4

Cigarette taxes and cigarette tax revenues in South Africa, 1961–2012. Data from the National Cancer Institute (NCI) and the World Health Organization (WHO) (2016) (40).

much smaller share of prices than do cigarette taxes. Similarly, the imposition of a new SSB tax will generate significant new revenues, as in Mexico. Given the low price percentage attributable to existing SSB taxes, increases in these taxes will still generate new revenues despite the elastic demand for these beverages. For example, the doubling of an existing SSB tax that accounts for 10% of the price, fully passed on to consumers, will raise prices by 10%. Given a price elasticity of demand of −1.2 for sugary beverages, the price increase would decrease consumption by 12%. The remaining 88% of consumption would be taxed at twice the rate, increasing revenue by 76%. Tax increases may eventually decrease revenues, but this outcome is a long way off in nearly all countries.

Effects of Excise Taxes on Employment

The affected industries contend that tax increases, by reducing sales, will cause significant job losses for workers who manufacture, distribute, and sell these products. However, job losses in the taxed industry will be offset by job gains in other sectors. Consumers spending less on the taxed products will spend more on other goods and services, and governments will spend the new tax revenues, leading to job gains in other sectors. Research consistently finds that reductions in smoking due to higher taxes or other tobacco control efforts either have no net impact on jobs or lead to modest job gains (40). Recent studies from the United States and Mexico have reached similar conclusions for alcoholic and sugary beverage taxes (24, 44, 54). To address concerns about job losses in the taxed sector, governments can dedicate some of the new revenues to programs to facilitate worker transitions to other livelihoods, as Turkey did by earmarking some of its tobacco tax revenues to help tobacco farmers shift to other crops (63).

Excise Taxation and Regressivity

Consumption taxes are generally regressive, meaning that they take larger shares of income from the poor than from the rich. Tax opponents therefore argue that the taxes will have an adverse impact on the poor, particularly for tobacco products and SSBs, whose consumption is often higher for low-SES groups. However, owing to the higher consumption levels among lower-SES groups, the health burden is greater among the poor. Coupled with the greater price sensitivity of lower-income populations, tax increases will have a progressive health impact. Recent work by the World Bank that considers the longer-term impact of consumption on medical care spending and on working years finds that tobacco tax increases are financially progressive in countries such as Chile and Moldova (21, 22). Finally, to the extent that the revenues generated by these taxes are used to support programs that disproportionately benefit the poor (e.g., the universal health care program funded by tobacco tax revenue in the Philippines), their impact will be even more progressive (37).

Tax Avoidance and Evasion

Another common argument used by opponents of tax increases is that they will lead to tax avoidance and evasion, undermining the health and revenue impacts of the tax. Experiences with tobacco taxes in a wide range of countries offer several lessons. First, tobacco tax increases produce health and revenue benefits even in the presence of tax avoidance/evasion, albeit smaller than with full compliance (40). Second, other factors, particularly strength of governance, are as important as, or more important than, tax rates in explaining tax avoidance and evasion; **Figure 5** illustrates that the market share of illicit cigarettes tends to be lower in countries with higher cigarette taxes and prices (40). Countries with relatively low tobacco and alcohol taxes often have larger problems

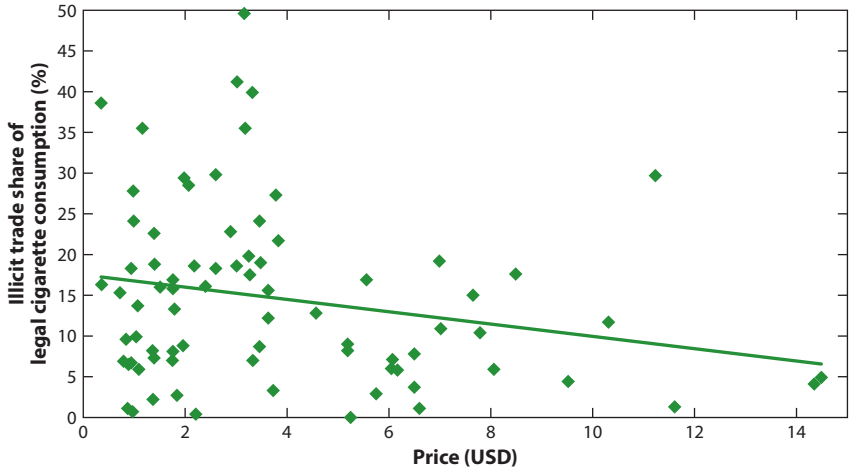

Figure 5

Illicit cigarette market share and cigarette prices, 2012. Data from Euromonitor International, Economist Intelligence Unit, and authors' calculations. Abbreviation: USD, US dollars.

with illicit trade than do countries with relatively high taxes (32, 40). Third, through strengthened tax administration, enhanced enforcement, and strong penalties, governments can curb illicit trade at the same time that they raise taxes, enhancing the health and revenue impacts of the tax (40). Similar strategies should be effective in curbing illicit trade in alcohol and SSBs.

BEST PRACTICES IN EXCISE TAX POLICY

Governments impose a variety of taxes on tobacco, alcohol, and SSBs, including customs duties, value added or general sales taxes, and excise taxes. Excise taxes are most important to promote health because they are uniquely applied to these products and thus will have a greater impact on relative prices than will taxes applied to a broader range of goods and services. In addition, excise tax rates can be set at much higher rates than is likely feasible for broader-based taxes.

Specific excise taxes (those based on some measure of quantity) have many advantages over *ad valorem* excises (those based on value or price) (40, 58). They reduce price gaps among different brands, reducing opportunities for consumers to switch to cheaper brands when taxes are increased. They tend to encourage the production of higher-priced products. As a result, they tend to result in higher prices, as shown in **Figure 6** for cigarettes. Specific taxes are relatively easy to administer and produce more stable revenues as they are not as subject to industry price manipulation. The main disadvantage of specific taxes is that they need to be increased regularly, or their value will be eroded by inflation.

Other challenging issues include determining precisely which products to tax and at what rates. Most countries levy tobacco excises on manufactured cigarettes, cigars, bidis, and roll-your-own tobacco—often at different rates—but some do not tax smokeless tobacco products (61). Most governments tax alcoholic beverages, but not always all beverage categories (e.g., beer and spirits but not wine) (52). Some governments tax carbonated beverages but not other sugary beverages, whereas other governments levy taxes on both sugar-sweetened and artificially sweetened beverages (7). Which products are included can impact the tax's health and revenue effects. The narrower the product base is, the greater the opportunity for substitution to untaxed products, which reduces the health impact while generating lower revenues.

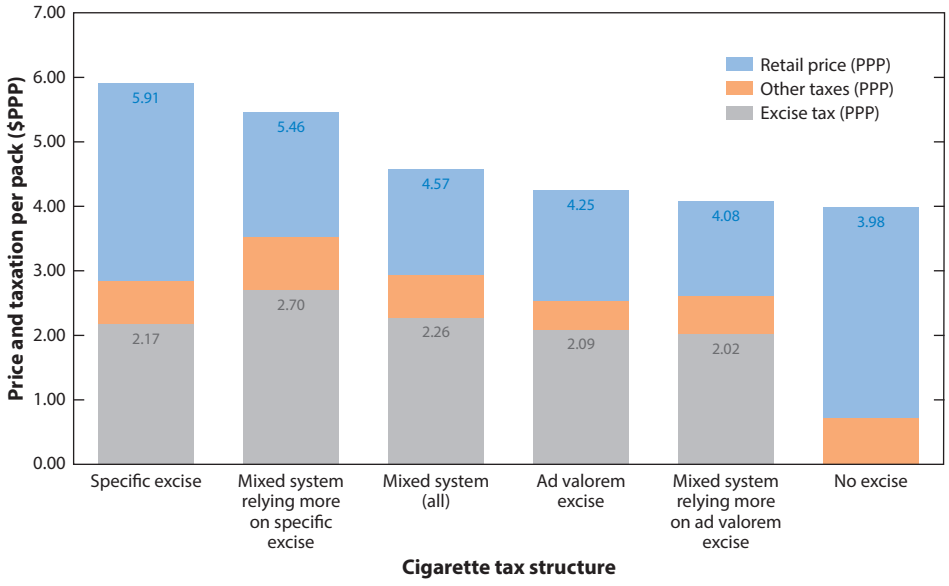

Figure 6

Cigarette tax structure and cigarette prices, 2016. Averages are weighted by World Health Organization (WHO) estimates of number of current cigarette smokers ages 15+ in each country in 2015; prices are expressed in purchasing power parity (PPP) adjusted dollars or international dollars to account for differences in the purchasing power across countries. Based on prices as of July 2016 for 53 high-income, 100 middle-income, and 27 low-income countries with data on prices of most sold brand, excise and other taxes, and PPP conversion factors. Data from WHO (2017) (61).

A related issue concerns the possibility of taxing a product ingredient rather than taxing quantity or volume. Taxing ingredients can directly reflect the harms caused by consumption. Before it became clear that low-tar/nicotine cigarettes were just as harmful as full-flavor cigarettes, some governments levied taxes on the basis of tar and nicotine content, undermining the health impact of the tax by encouraging substitution to lower-taxed products rather than promoting cessation (6). More recently, some have suggested differential taxing of tobacco and nicotine products on the basis of clear differences in harmfulness, proposing, for example, lower taxes on lower-risk products, such as low-nitrosamine smokeless tobacco and e-cigarettes, than on the highest-risk products, such as cigarettes and other combustible tobacco products (6). Taxing alcoholic beverages on ethanol content, the primary driver of the adverse consequences of excessive drinking, may promote health more effectively than taxing volume (3). The same is likely true for SSB taxes levied on sugar content rather than on volume (3).

Ingredient-based taxes encourage consumers to switch to lower-taxed products and incentivize producers to reformulate products to face a lower tax; such efforts may also encourage producers to market lower-taxed products more aggressively. These supply-side responses were observed in South Africa following the country's shift to a beer excise tax based on ethanol content rather than on volume alone (3). Given the demand side and supply side responses, ingredient-based taxation will almost certainly produce better health outcomes. However, ingredient-based taxation raises challenges for tax administration, given the need to verify the product's composition.

Taxes need to be increased regularly over time to offset inflation and income growth to counter increasing product affordability (4). Modest and infrequent increases in taxes may not keep pace with inflation, resulting in reductions over time in inflation-adjusted prices, leading to increases in

consumption. Cigarettes have generally become less affordable over time in HICs, with increased taxes and small income growth, but more affordable in LMICs, where taxes have changed little and incomes have grown rapidly (40). In contrast, alcoholic and sugary beverages have generally become more affordable in both LMICs and HICs.

Determining the optimal tax level is challenging. Recently, the World Health Organization (WHO) recommended that excise taxes account for 70% of cigarette retail prices, a target requiring significant tax increases in nearly all countries (58). Such targets, however, may not create high retail prices if industry prices are very low. Similarly, the WHO has recommended that SSB tax rates be set to raise prices by at least 20%, which would likely result in net reductions in caloric intake large enough to improve population-level weight (60). There are no similar recommendations for the level of taxes on alcoholic beverages.

The effects of excise taxes on consumption and health will be proportionate to their size. Large tax increases signal to consumers that these products are dangerous and lead to large reductions in their use. This effect is captured in the World Bank's recent recommendation that governments "go big, go fast" when increasing tobacco taxes. A more gradual approach, the report states, "means condemning large numbers of people to avoidable illness and premature death" (37).

Finally, the use of revenues that result from excise taxes can add to the health impact of these taxes. Experiences with tobacco show that earmarking revenues for interventions that discourage consumption, such as mass media public education campaigns, can result in greater reductions in use and its consequences (40). Moreover, public support for tax increases is much stronger when there is a clear connection between the use of the revenues and the behaviors targeted by the tax. For example, many smokers support cigarette tax increases when the revenues are targeted to support youth smoking prevention (59). However, earmarking can be politically difficult in some environments.

Space precludes coverage of a myriad of additional important and often complicated issues pertaining to best practices in excise taxation and also to excise tax administration. Interested readers should consult other resources (7, 40, 52, 58).

CURRENT STATUS OF TOBACCO, ALCOHOL, AND SSB EXCISE TAXES

Of the 188 countries that reported 2016 tobacco tax and price data to the WHO, 173 levied an excise tax on manufactured cigarettes (61). Tobacco taxes have increased in many countries since the 2005 entry into force of the WHO's Framework Convention on Tobacco Control. The treaty emphasizes the effectiveness of tax and price increases in reducing tobacco use, particularly among young people. On average, cigarette excise taxes account for 32% of the price in LMICs and 48% in HICs. Many, but not all, countries tax some or all other tobacco products, generally at rates well below the rate imposed on manufactured cigarettes.

Similarly, nearly all governments levy excise taxes on at least some alcoholic beverages. Of the 192 countries that provided data to the WHO in 2012, 155 levied an excise tax on beer, 138 on wine, and 151 on distilled spirits; alcohol sales were banned in some of the nontaxing countries (52, 62). Alcoholic beverage excise taxes appear to be relatively low, according to the limited information provided. As with cigarette taxes, alcohol excise taxes account for a lower share of price in LMICs than in HICs (both lower, in general, than for cigarettes). Among 74 reporting countries, excise taxes as a share of retail prices ranged from a low of 0.3% in Kyrgyzstan to a high of 44.9% in Norway, with an average of 17.3%. Taxes as a percentage of price are, generally, lowest on beer and highest on distilled spirits.

Relatively few governments levy an excise tax on SSBs, although some have had relevant broader taxes for years (7). Norway, for example, implemented a tax on products containing

refined sugar, including SSBs, in 1922. Denmark first imposed a soft drink tax in the 1930s, although it was repealed in 2014. Revenue generation appears to be the primary motivation for these early taxes. As concerns about obesity have grown, governments have adopted taxes to promote healthier diets. Hungary began taxing SSBs in 2011 as part of its broader public health product tax, and France implemented a tax on soft drinks with added sugars or artificial sweeteners in 2012 (7). These and other taxes implemented in the first wave of health-motivated taxes tended to be relatively small, although a few countries implemented larger taxes (e.g., Mauritius). In 2014, Mexico became the first country in the Americas to adopt a significant tax specifically on SSBs, a one-peso-per-liter tax that raised taxed beverage prices by about 10% (13). Since then, other countries have adopted more significant taxes to reduce SSB consumption and promote health, including several US localities, South Africa, the United Kingdom, Ireland, Portugal, Saudi Arabia, the United Arab Emirates (UAE), Dominica, and Barbados. Most aim to raise retail prices by at least 10%, with a few resulting in more significant increases (e.g., Saudi Arabia and the UAE's special 50% value-added tax on soft drinks and 100% value-added tax on energy drinks).

Tobacco, alcohol, and SSB excise taxes account for a relatively small share of government revenue in most countries. In 90 countries with available data in 2013, tobacco excise tax revenues accounted for <3% of total revenues in 64 countries and for >5% in only 10 countries. In 19 of 24 countries with available data in 2013, alcohol excise tax revenues accounted for <3% of total revenues and for >5% in only 3 countries. Generating nearly 16 billion pesos in 2015, Mexico's SSB tax accounted for <0.5% of total revenues.

SUMMARY AND CONCLUSIONS

Excise taxes are a powerful tool for reducing tobacco use, excessive drinking, and SSB consumption. The demands for these products are sensitive to prices, and governments that have raised or introduced taxes have seen reductions in consumption and, for tobacco and alcohol tax increases, improved health outcomes. Simulation modeling suggests that SSB taxes may produce a similar impact on weight, diabetes, and other health outcomes.

Given their ability to target specific products and raise their relative prices, excise taxes are the most effective option for taxing tobacco, alcohol, and SSBs. Taxes based on ethanol content for alcoholic beverages and sugar content for SSBs are likely to induce product reformulation and other supply-side responses that can increase their positive impact on health. Differentiating tobacco taxes according to products' relative risks could help drive some smokers to less hazardous means of consuming nicotine.

Most countries' tobacco excise taxes are well below recommended levels as a share of price. Alcoholic beverage taxes generally account for a small share of the price, thus having little impact on the affordability of these products in most countries. Few countries have taxes on SSBs, and taxes in these countries are low. The potential of these taxes to significantly reduce consumption and save lives remains high.

DISCLOSURE STATEMENT

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