

Taxation of Tobacco, Alcohol and Sugar-Sweetened Beverages for Achieving the Sustainable Development Goals

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1. Introduction

NCDs cause more than two-thirds of mortality in the world. More than 40 percent of these deaths are premature, and most of them are preventable. About 80 percent of NCD attributable premature deaths happen in low- and middle-income countries (LMICs). Moreover, low- and middle-income households bear 67 percent of NCD disease burden (IHME 2019), and one third of these deaths affects the economically productive age group, the age group below 70. Numerous studies show that tobacco use, obesity, and diabetes, especially among lower socioeconomic groups, have been high risk factors for NCDs (Niessen et al. 2018), and can lead to long-term economic consequences for individuals, their families, and the society. Around 60 percent of deaths from HCDs are caused by cardiovascular and respiratory diseases and diabetes. The number of deaths from these diseases has increased globally by 21.7 percent between 2000 and 2015. In terms of their share in total NCDs, there has been a very modest decline, from 61 percent in 2000 to 59 percent in 2015, primarily driven by a decline in high-income countries (HICs) (Figure 1). Potential economic implications of NCDs can be enormous if this trend continues, with an estimated cumulative global output loss by 2030 of USD 47 trillion (Bloom et al. 2012).

SDGs represent a global plan of action to end poverty, fight inequality, tackle climate change, and ensure that people live in peace and prosperity by 2030 (UN 2015b). Among its 17 goals, SDG target 3.4 under SGD 3 (good health and well-being for people) focuses on reducing premature mortality attributed to NCDs by one third by 2030. Progress on SDG target 3.4 is of a major relevance in accomplishing at least five other SGDs, specifically, SDG 1 (reducing poverty), SDG 2 (zero hunger), SDG 4 (quality education), SDG 8 (decent work and economic growth), and SDG 10 (reduced inequalities).

NCDs tend to be disproportionately clustered in lower socioeconomic groups of a society. While evidence on the relationship between the socioeconomic status and NCDs in HICs is extensive, there is little systematic evidence to support this link in LMICs. There are a few ways of how NCDs and poverty (SDG 1) are related. Firstly,

poverty is linked to limited access to health care, and to an unhealthy diet and use of tobacco, which are targeted under SDG 3 (The Lancet 2017). People living in poverty are less able to practice healthy living and are more predisposed to suffering from chronic diseases (Wagstaff 2002).

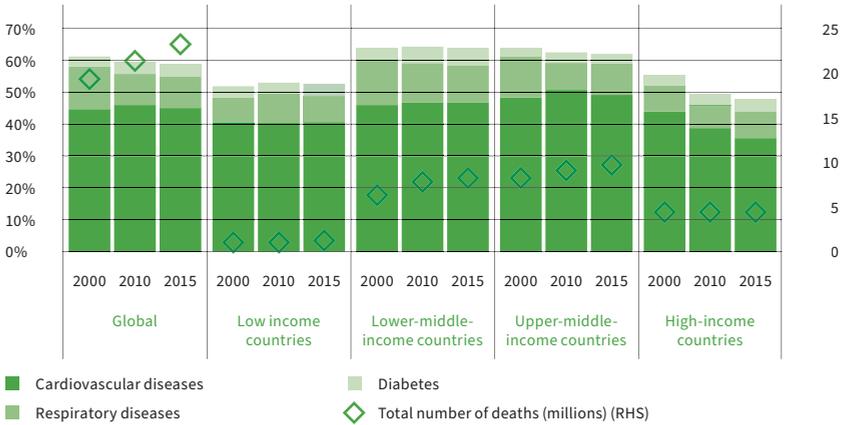


Figure 1. Deaths from selected NCDs by country-income group. Deaths caused by cardiovascular diseases, respiratory diseases, and diabetes total presented as % in total NCDs (LHS); total number of deaths from these three diseases presented in millions (RHS). Source: Authors’ calculations using WHO (2018a).

Good nutrition is estimated as a necessary determinant for reducing NCDs and meeting most of SDGs (WHO 2017). Malnutrition at an early stage in life increases the risk of developing chronic diseases and hinders children’s cognitive development and growth (Fall et al. 2010; Boney et al. 2005). Moreover, low socioeconomic status increases one’s risk to develop chronic diseases and predisposes them and their families to economic hardship due to high out-of-pocket costs, lost earnings and employment, and then impoverishment (Hanratty et al. 2007). In such situations, families can lose the ability to support opportunities for education and human development of their children, especially when they have to stay at home and provide care to ill family members (Engelgau et al. 2012). Even those who are insured can incur very high medical costs of treatment of NCDs when they have low income or limited coverage (Jan et al. 2018), and they are commonly not able to pay for it (Levesque et al. 2007).

Better economic conditions and quality education enhance the health outcomes of household members, while low socioeconomic status leads to poor health, which further reduces their income status and may lead to poverty (Nugent et al. 2018; Jan

et al. 2018). High premature mortality and morbidity from NCDs reduce workers' labor productivity and earnings and their family income (Bertram et al. 2018) and hinders a country's economic growth and development (SDG 8). Without a reduction in NCD attributed mortality and an increase in economic growth, especially in LMICs, the world will see not only the continued but deepening inequality within and between countries (SDG 10).

Around 39 percent of 40 million NCD attributed deaths in 2015 was caused by tobacco use (8 million), heavy alcohol consumption (3 million), and obesity (4.5 million) (WHO 2018b, 2019c; Gakidou et al. 2017). One of the major causes of obesity, globally, has been an increase in consumption of SSBs. Taxation is one of the most cost-effective measures that encourage healthy behavior, and prevent and reduce NCDs. By increasing prices, they can discourage consumption of tobacco, alcohol, and SSBs, and generate additional government revenues much needed for development spending (NCI and WHO 2016; Wagenaar et al. 2010; Sornpaisarn et al. 2013; Thow et al. 2018). However, despite their potential, these taxes have been frequently opposed and underused by the policymakers. Current tobacco tax collection in most LMICs is still well below 1 percent of GDP, which does not come even close to covering the estimated healthcare costs associated with tobacco-related illnesses estimated at well above 1.8 percent of GDP (Goodchild et al. 2018).

One of the most commonly used arguments by the policymakers for opposing taxation of tobacco, alcohol, and SSBs is that they may be regressive. While the evidence from developing countries on the distributional impact of taxation of tobacco, alcohol, and SSBs is limited, the findings from available studies suggest that the concern about their harmful effect on the poor may be overstated and that, on the contrary, they can result in health and welfare gains without imposing an excessive burden on the poor (Sassi et al. 2018).

This paper reviews existing evidence on adverse effects of consumption of tobacco, alcohol, and SSBs on health (SDG 3), and their relevance for achieving a few other related SDGs, including poverty reduction (SDG 1), nutrition (SDG 2), education (SDG 4), economic growth (SDG 8), and reduced inequality (SDG 10). Based on this evidence and evidence on the effectiveness of taxation in influencing consumer behavior and in collecting additional much needed revenues, this paper also builds a case for accelerating tax policy to meet development goals. The rest of the paper is organized as follows. Section 2 reviews the evidence on the health and development impacts of consumption of tobacco, alcohol, and SSBs. Section 3 discusses the evidence on impact of tax and price policy on consumption of these products and revenue impact of policy changes. Finally, Section 4 concludes the paper.

2. Impact of Consumption of Tobacco, Alcohol and SSBs on Selected SDGs

2.1. Tobacco

There is a significant body of research offering evidence on a negative impact of tobacco consumption on health and economic development. It has been estimated that tobacco causes more than 8 million deaths per year (WHO 2019c). Most of those deaths (7 million) are attributed to direct tobacco use, and more than 1 million to the exposure to second-hand tobacco smoke. Around 80 percent of these deaths happen in LMICs, and most of them are preventable. In terms of the regional disparity, almost 60 percent of tobacco-attributable deaths happen in South-East Asia and Western Pacific regions (Figure 2). Around half of lifetime smokers die before reaching 70, while quitting before the age of 40 reduces the mortality risk by 90 percent (Jha et al. 2015). Tobacco use significantly increases the risk of death from lung and other cancers, heart disease, stroke, respiratory disease, and tuberculosis (WHO 2019c).

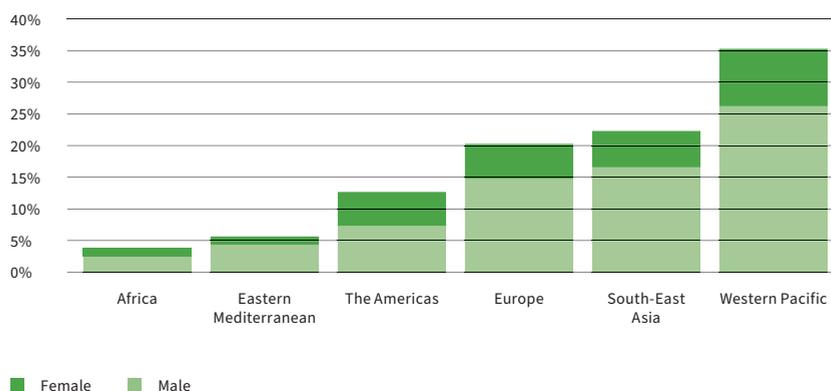


Figure 2. Smoking-attributable deaths by gender and WHO region, 2016 (% in total by gender). Source: Authors' calculations using GBD 2015 Risk Factors Collaborators (2016).

The evidence on the impact of tobacco use on health outcomes in HICs has been well documented, and it shows significant tobacco-related health disparities (TRHDs) among lower socioeconomic groups (Haustein 2006). This trend is in line with disparities in cigarette consumption showing relatively higher consumption by lower-income groups (Figure 3). Moreover, this disparity has been increasing, as smoking prevalence has declined relatively more among higher income groups than among those below the poverty line (NCI and WHO 2016). On the other hand, while still limited, the evidence from LMICs has been increasing, and showing a similar

trend for male smokers, as lower income men are significantly more likely to smoke than the higher income men (Efroymson et al. 2001). However, the picture is different among women. While in about two thirds of countries the poorest women are significantly more likely to smoke than the wealthiest women, in about one third of countries, mostly in Eastern Europe, the case is the opposite (Hosseinpoor et al. 2012).

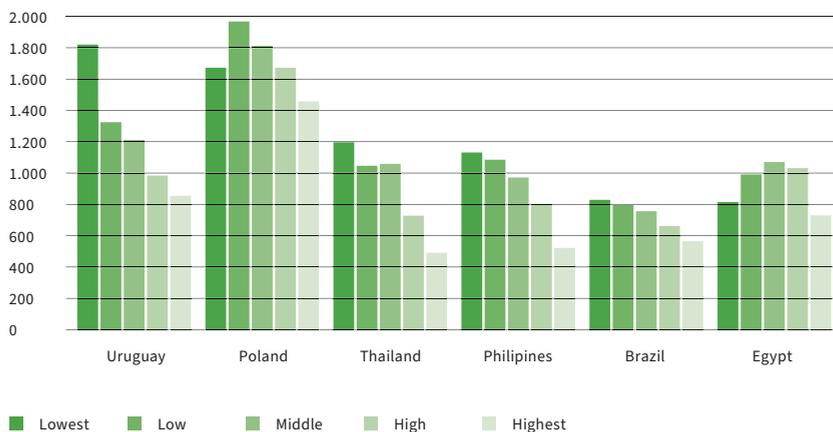


Figure 3. Cigarette consumption by income group in selected countries in 2009. Measured by an average number of cigarette sticks per person. Source: Authors’ calculations using CDC (2019).

The economic impact of tobacco use can be very high. Evidence suggests that total global economic cost of smoking in 2012 was around 1.8 percent of global GDP (PPP\$) (Figure 4), of which 25 percent were direct medical costs, and 75 percent indirect costs due to morbidity and mortality (Goodchild et al. 2018). LMICs accounted for almost 40 percent of this cost, while regionally, most of the cost (70 percent) was in the Americas and Europe. A systematic review of studies from various countries conducted between 1990 and 2011 finds that estimates vary greatly, depending on the scope, type of data, and methodology (NCI and WHO 2016). In LMICs, estimated direct and indirect costs of tobacco use range from 0.1 percent of GDP in Lao PDR to 3.4 percent of GDP in Philippines, while in HICs it is between 0.3 percent of GDP and 2 percent of GDP.

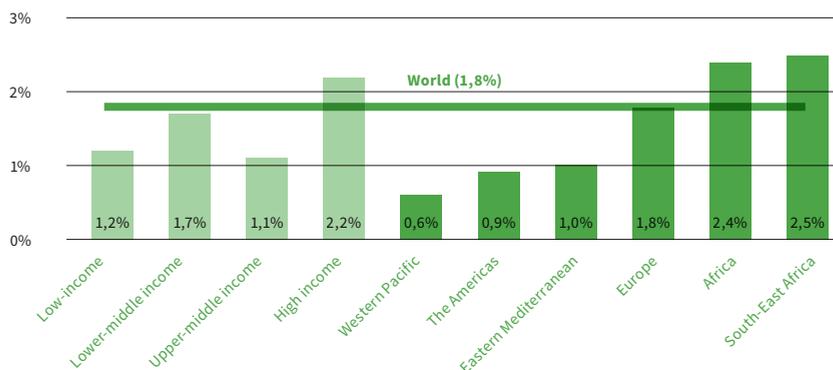


Figure 4. Economic costs of smoking by country-income group and WHO region, 2012 (% of GDP). Source: Authors’ calculations using Goodchild et al. (2018).

Through its adverse effect on physical health, tobacco use can significantly negatively impact people’s financial health and socioeconomic status, even in the long run. If a household’s principal earner is a smoker and develops a disease, this would lead to medical costs associated to a treatment of that illness, and possibly a loss of earnings due to disability, and even mortality. In 1998, in China, 30.5 million people in urban areas, and 23.7 million people in rural areas were impoverished due to direct tobacco spending and medical costs for treatment of tobacco-attributable illnesses (Liu et al. 2006). As workers from poorer households commonly have lower level of education and lower skills, and usually work in labor intensive jobs, their disability often results in a relatively greater loss of earnings than with people with higher income and more resources.

Tobacco use can contribute to or exacerbate both primary and secondary poverty (NCI and WHO 2016; John et al. 2011). Primary poverty is defined as a situation in which an individual has no sufficient resources to afford necessities of life, while secondary poverty refers to a situation in which these resources are sufficient, but are not used effectively (Liu et al. 2006). There are two main tobacco-associated factors contributing to the impoverishment, the opportunity cost of tobacco use, and the burden due to illness, disability, and mortality.

With limited resources, spending on tobacco products requires a trade-off in consumption and crowds out basic necessities—food and non-food items (clothing, housing, education, healthcare, fuel). In India, spending on tobacco reduces spending on food, education, and entertainment (John 2008). In Bangladesh, it crowds out spending on education and healthcare (Do and Bautista 2015), while in South Africa, low income households sacrifice spending on dairy, fruits, nuts, and oils

due to spending on tobacco (Chelwa and Koch 2019). In other words, this foregone consumption of basic necessities is called the opportunity cost of tobacco use. Tobacco use can hamper the standards of living of all income groups, but relatively more with poorer than with richer households (Pu et al. 2008). These changes in the household's internal resource allocation could lead to a poor diet and malnutrition in children, poor health, and decreased opportunities to obtain education and gain skills (Semba et al. 2007; Paraje and Araya 2018; Virk-Baker et al. 2019).

Moreover, numerous studies provide evidence on the wage-gap between smokers and non-smokers (Hotchkiss and Pitts 2013; Bondzie 2016). The estimated gap ranges from as little as 1.5–3.5 percent to more than 20 percent, depending on which factors that may contribute to lower earnings have been accounted for, in addition to tobacco use (Leigh and Berger 1989; Hotchkiss and Pitts 2013). In an attempt to explain the wage-gap due to tobacco use, studies have tried to evaluate the underlying causes, and have identified different reasons, from deteriorated health to lower productivity. In addition, it has been found that smokers place a higher emphasis on gratification in the present over their future well-being, and therefore tend to make relatively lower investments in education and a healthy life-style than non-smokers.

Economic costs from lost productivity resulting from presenteeism, absenteeism from work, and premature death of employees due to tobacco-related illnesses can be substantial, and consist of lost earnings for employees and lost revenues for the employers. Most of the available evidence comes from the HICs. It has been estimated that smokers are absent from work 6.6 more days per year than non-smokers in the US (Bunn et al. 2006) and 2.7 more days in the UK (Weng et al. 2013). In terms of lost productivity, the estimated cost of smokers in the US is around \$US 151 billion (0.9 percent of GDP) and around \$US 6 billion (0.03 percent of GDP) for non-smokers due to second-hand smoke (SHS) exposure (USDHHS 2014), and in Australia around \$AU 8 billion (or 0.9 percent of GDP) (Collins and Lapsley 2008). Moreover, the cost of presenteeism represents more than 50 percent of total lost productivity attributed to tobacco use in the US (Bunn et al. 2006). Evidence from the US, European Union, China and Japan shows that around four years post-cessation, recent quitters report already higher work productivity than current smokers (Baker et al. 2017; Suwa et al. 2017).

In a long term, due to insufficient resources to meet basic needs caused by tobacco use and burden due to tobacco-attributed illnesses, mortality, and morbidity, and resulting poor nutrition and health, and poorer education and skills, a household can end up in a poverty trap (Haustein 2006; Liu et al. 2006), which may impair a country's welfare and economic development, and would widen social inequality.

2.2. Alcohol

There is an extensive body of research on the health risks of alcohol consumption. The relevance of alcohol consumption to health and global development is reflected in its inclusion within the SDGs. Specifically, SDG 3.5 focuses on strengthening prevention and treatment of substance abuse, including harmful use of alcohol.

Harmful use of alcohol contributed to 3 million deaths globally (WHO 2018b), which was about 39 deaths per 100,000 people (Figure 3), or 5.3 percent of all global deaths in 2016 (Figure 5). There is a significant variation in number and percentage of alcohol-attributable deaths by country-income group and WHO region. In 2016, the burden of deaths was the highest in lower-middle income countries (46.2 deaths per 100,000 people) and low-income countries (42.1 deaths per 100,000 people) and, regionally, in Africa (70.6 deaths per 100,000 people) and Europe (62.8 deaths per 100,000 people) (Figure 6). While there is no safe level of tobacco use, harm caused by alcohol use depends on the volume and patterns of drinking. In 2010, alcohol-attributable cancer contributed to 4.2 percent of all cancer deaths (Parry et al. 2011). It has also been shown that alcohol increases the risk of coronary heart disease and stroke (Corrao et al. 2004), and inadequate nutrition and obesity (Traversy and Chaput 2015).

As in case of tobacco, economic costs of alcohol use can be very high, and range substantially between countries. Global evidence, which, until recently, has mostly been from HICs, on estimated economic burden of alcohol misuse ranges from 0.45 to 5.44 percent of GDP (Thavorncharoensap et al. 2009). In the US, the estimated economic cost of excessive drinking in 2006 was US\$ 223.5 billion (1.7 percent of GDP), of which 72.2 percent was from lost productivity and 11.0 percent from healthcare costs (Bouchery et al. 2011). Similar, the estimated cost in the EU in 2003 was 1.2 percent of GDP (Anderson and Baumberg 2006), and in the UK in 2009 was 1.4 percent of GDP (HM Government 2012). In Sri Lanka, it was estimated that the economic cost of alcohol-related illnesses in 2015 was US\$ 885.9 million, or 1.1 percent of GDP (Ranaweera et al. 2018). A more comprehensive study conducted in South Africa included both tangible and intangible costs, and estimated total economic cost of harmful use of alcohol in 2009 at 10–12 percent of GDP (WHO 2014).

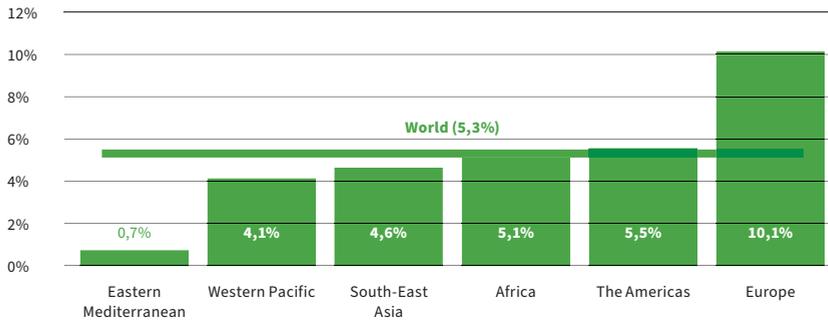


Figure 5. Alcohol-attributable deaths (% of all deaths) in 2016 by WHO region. Source: Authors' calculations using WHO (2019b).

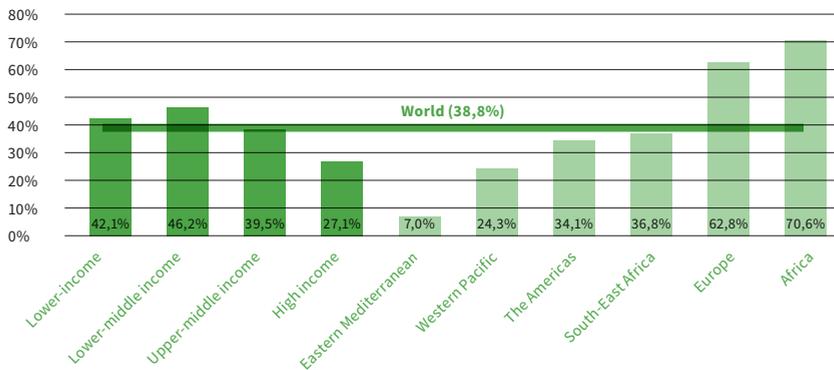


Figure 6. Alcohol-attributable deaths per 100,000 people (age-standardized) in 2016, by country-income group and WHO region. Source: Authors' calculations using WHO (2018b).

Alcohol consumption has multiple social and economic impacts. Firstly, harmful alcohol use and poverty are connected in many ways, as alcohol use can be both a response to, and a driver of, poverty. The risk of poverty is not related only to direct spending on purchase of alcohol, but also the medical cost for treatment of related illnesses and lost earnings due to disability and mortality. Evidence shows that disadvantaged socioeconomic groups are more likely to bear heavier alcohol-related burdens than the higher income groups with the same level of consumption (Smith and Foster 2014). In LMICs, as in case of tobacco, alcohol use tends to crowd out spending on basic necessities, such as healthy food, education, and healthcare. In Sri Lanka, the poorest users of alcohol and tobacco spend more than 40 percent of their income on these items (De Silva et al. 2011). In Madagascar, alcohol consuming households spent 14.1 percent of average monthly income on alcohol in 2010, with

33.6 percent of these households declaring that they had never been able to save (Tsikomia and Şarpe 2012). Even in countries with relatively low spending on alcohol and tobacco, such as Taiwan, the crowding out effect can be damaging to the lowest income households (Pu et al. 2008).

In many vulnerable socioeconomic groups, children bear a disproportionate burden of household's alcohol consumption. With limited resources, spending on alcohol crowds out spending on food and education, depriving children of nutrients and their right to primary education, both necessary for living a productive life. Moreover, heavy alcohol use among youth has been found to diminish chances of completing a degree, especially among male youth from lower socioeconomic background (Staff et al. 2008), and chances of being employed after college graduation and of securing employment (Bamberger et al. 2018).

Work problems associated with alcohol use are very relevant in many market economies due to their high costs of alcohol-related productivity losses and other work problems (Rehm and Rossow 2001). The relationship between alcohol use and earnings has received significant attention in the literature, especially in HICs. The empirical evidence on the impact of alcohol abuse on earnings is inconclusive. While some earlier studies suggested that moderate drinking may even be beneficial for work performance (Baum-Baicker 1985), but that the wage premium may decline as alcohol use increases (Berger and Leigh 1988), some more recent studies offer a slightly different insight. A study from Canada found that heavy alcohol users have lower earnings and lower returns to higher education relative to moderate or abstinent users (Hamilton and Hamilton 1997). Similarly, in the US, evidence suggests that alcoholism leads to lower earnings, but more due to reduced number of work hours than to a reduction in hourly wage (Renna 2008).

2.3. Sugar-Sweetened Beverages

Obesity is a form of malnutrition and represents a significant risk to public health and economic development. In 2016, 39 percent of world's adult population (18 years and above) were overweight and 13 percent were obese, which was an increase from 2000, with 30.8 and 8.7 percent, respectively (Figure 7). In recent years, the increases have been happening among children and young adults as well. In 2016, around 41 million children under the age of 5, and 340 million children and adolescents aged 5–19, were either overweight or obese. Global trends show a positive relationship between wealth and obesity (Low et al. 2009; Misra and Khurana 2008), as almost 60 percent of population in upper-middle-income and more than 80 percent in high-income countries were either overweight or obese in 2016. However, lower

income countries have been catching up, as they have been experiencing a much higher increase than higher income countries, with more than 50 percent growth in overweight and obesity from 2000 to 2016 (Figure 7). While HICs do have a relatively higher obesity problem than LMICs, with economic development in LMICs, such as in China and India, obesity develops as well (James 2008). Almost half of overweight and obese children under the age of 5 now live in Asia, and the number has increased by almost 50 percent in Africa since 2000.

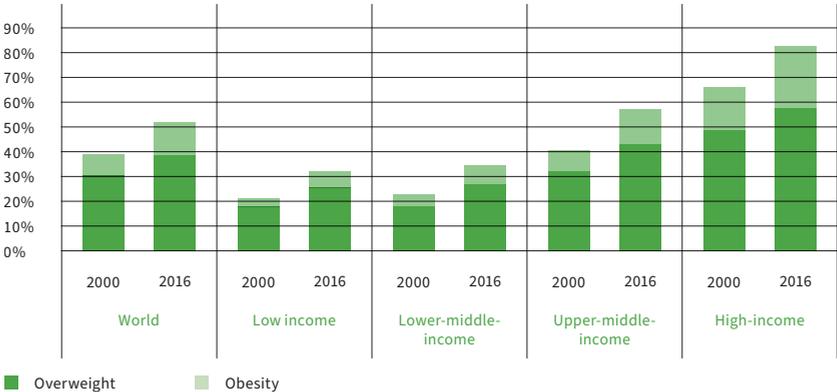


Figure 7. Prevalence of overweight and obesity among adults (18+ years of age) by country-income group, 2000 and 2016 (%). Source: Authors’ calculations using WHO (2019a).

In 2016, 4.5 million deaths worldwide was attributed to obesity, in comparison to 3.5 million in 2006 (Gakidou et al. 2017). Diabetes caused 1.6 million deaths in 2015, which was 65.6 percent more than in 2000 (Figure 8). The increase has been much more rapid in LMICs than in HICs, and, by region, in Africa, Eastern Mediterranean, and South-East Asia.

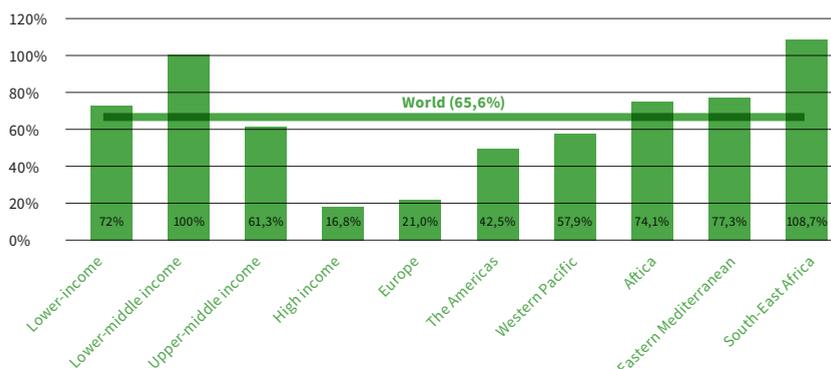


Figure 8. Percent increase in diabetes attributed mortality between 2000 and 2015, by country-income group and WHO region. Source: Authors' calculations using WHO (2018a).

Overweight and obesity are among the main contributors to poor health condition, as they may increase the risk of a large number of health problems, either independently or in association with other diseases (Kopelman 2007). Overweight and obese children are more likely to develop serious health problems, including type-2 diabetes and high blood pressure, but also the psychological disorders. Added sugar intake has been associated with multiple health risks, both among children and adults (Bovi et al. 2017). SSBs, in particular, are known to have a very high sugar content, and have been highly associated with overweight and obesity (Malik et al. 2006) and high blood pressure (Malik et al. 2014). The same amount of sugar and calories consumed in solid foods results in a significantly lower overall calorie intake than when consumed as liquids, because calories are less satiating in a liquid form (Mourao et al. 2007).

The economic costs attributed to obesity can be substantial and will only increase if the current trend continues. The global economic cost from obesity has been estimated at USD 2 trillion per year, which accounts for 1.5 percent of the 2018 global GDP (PPP\$) (Dobbs et al. 2014). As the evidence from LMICs is still emerging, most evidence on economic costs of obesity is from the HICs. In the US, the direct medical cost of treatment of severe obesity-related illnesses in 2014 was estimated at US\$ 69 billion (Wang et al. 2015), while the estimated cost of lost productivity due to absenteeism in 2012 was US\$ 8.65 billion (Andreyeva et al. 2014). When converted to 2014 prices, these two costs together reached around 0.5 percent of national GDP. The evidence from Germany suggests significantly lower estimated economic costs of EUR 12.2 million in 2008 (Lehnert et al. 2015). A corresponding

estimate for Thailand in 2009 was US\$ 725.3 million, which accounted to 0.3 percent of its GDP (Pitayatienanana et al. 2014). Recent study estimated that, if current trends in overweight and obesity continue, around 92 million lives will be lost in OECD countries by 2050, and GDP will decline by 3.3 percent, on average (OECD 2019).

Different socioeconomic groups are differently impacted in HICs and LMICs by consumption of SSBs. A comparison of a relationship between obesity, economic development and socioeconomic status, including income and education level, in 67 countries, has produced some useful insights (Pampel et al. 2012). While obesity problem increases with a country's economic development, in HICs, higher socioeconomic groups are less likely to be obese, while in LMICs, those with higher income and education level are more likely to be obese. The authors highlight that this trend has a very relevant development implication. While economic development of a country is associated with an improvement in health condition of its citizens, it does not mitigate the problem of poor nutrition, as with development malnutrition is replaced by obesity. At the same time, some countries, such as India, with economic development struggle with both malnutrition and obesity (Ravishankar 2012).

3. Taxation of Tobacco, Alcohol and SSBs and SDGs

There is a very convincing body of evidence from various countries that substantially increasing prices of tobacco through taxation is the single most effective way to reduce tobacco use and alcohol consumption (NCI and WHO 2016; Anderson et al. 2009). Evidence on SSBs is still emerging and suggests that increased prices through sugar taxes are, similarly, an effective fiscal tool to promote health (Guerrero-López et al. 2017). Moreover, taxes on these three groups of products are also an effective policy measure for domestic revenue mobilization and meeting SDGs. However, despite their potential to mitigate the risk factors of consumption of tobacco, alcohol, and SSBs to health and NCDs, taxes on these products are underutilized by policymakers.

The economic justification for taxation of tobacco, alcohol, and SSBs is based on the principle of correcting negative externalities (Pigou 1920) by imposing a tax on a good, which would result in a reduction of consumption and increase in welfare. Moreover, imposing a tax corrects for the information failure in markets of these products, as consumers are misinformed about the full health consequences of their consumption (Chaloupka and Powell 2019). These costs, which consumers impose on themselves but do not correctly internalize, are called "internalities", and are used to make a distinction in the rationale behind "sin taxes" (Herrnstein et al. 1993; O'Donoghue and Rabin 2006).

While tobacco and alcohol can impose both direct externalities (e.g., second-hand smoke, disturbing others by making noise while drunk), and indirect externalities (e.g., medical costs for treating illnesses), the most important externalized costs of consumption of SSBs are indirect externalities. These financial costs associated with treatment of diseases attributed to tobacco, alcohol, and SSB consumption are, at least partly, financed by health insurance, and therefore born by the whole society. In other words, they are the costs of moral hazard (Allcott et al. 2019). Unlike externalities, internalities are born by the consumer. As explained above, they can happen either because of imperfect information or just because the consumer may be depreciating the potential future health costs associated to present consumption. Therefore, levying a tax on tobacco, alcohol, and SSBs would discourage consumption and reduce both negative externalities and internalities, and would increase welfare.

Extensive evidence on the responsiveness of consumption of addictive products to price changes over the last few decades showed that, in contrary to the conventional wisdom, the demand is in fact somewhat responsive in the short run, and more responsive in the long run (Chaloupka and Powell 2019). Most of the available evidence is on the impact of prices on consumption of tobacco products and alcohol, while the evidence on SSBs is still emerging.

Consumption of tobacco products in LMICs is most often more responsive to price than in HICs, with estimates from LMICs ranging between -0.2 and -0.8 , clustering around -0.5 , and in HICs clustering around -0.4 . Evidence, although mostly from HICs, shows that youths are more responsive to tobacco price increases than adults. Economic theory suggests several reasons why this is the case, including limited income, peer effect, and lower addiction level due to a shorter period of consumption since initiation. A few studies have also estimated the impact of tobacco price increase on consumption by gender, but have produced mixed evidence. Moreover, several studies have examined the substitution among tobacco products, particularly among similar products (e.g., between cigarettes, roll-your-own tobacco, and little cigars) as a result of their relative price changes (NCI and WHO 2016). While results from HICs offer the evidence of substitution, the evidence from LMICs is mixed. Finally, as income increases, consumers tend to switch to more expensive products, such as from domestic to international brands (Chaloupka and Powell 2019).

In terms of the responsiveness of different socioeconomic groups, the evidence from both HICs and LMICs has been rather mixed. In the U.S. while more studies find that lower socioeconomic groups are more responsive to tobacco price change than higher socioeconomic groups (Farrelly et al. 2001; Chaloupka 1991; Colman and Remler 2008), some offer mixed evidence (Franks et al. 2007). In other HICs, such as UK

and Australia, evidence also suggests that smokers in higher socioeconomic groups are much less impacted by price change than those in lower groups (Townsend et al. 1994; Siahpush et al. 2009). Findings from LMICs have been more mixed (Chaloupka et al. 2012; Levy et al. 2004). For example, while evidence from Bangladesh (Nargis et al. 2014), China (Verguet et al. 2015; Huang et al. 2015), or Indonesia (Adioetomo and Djutaharta 2005) shows significantly larger responses in lower income groups than among wealthier ones, findings from a few other countries, such as Nepal (Karki et al. 2003), Turkey (Onder 2002), or Thailand (Sarntisart 2003) have been less consistent.

While taxes on tobacco have been widely recognized as both a public health and a revenue generating tool, taxation of alcohol has been mostly used as a revenue instrument, but is increasingly gaining attention among policymakers as a tool for health promotion and disease prevention. There is a general consensus among scholars that increasing prices of alcohol may reduce consumption by youth and alcohol addiction (Chaloupka et al. 2002). Moreover, an increase in alcohol taxes may reduce motor vehicle accident mortality and suicide rates (Son and Topyan 2011). Evidence from HICs suggests that price elasticity ranges from -0.51 to -0.77 , while limited studies from LMICs find it to be around -0.64 (Chaloupka and Powell 2019). Additionally, heavy drinkers are found to be less responsive, with price elasticity of around -0.28 . Consumption of wine and spirits is more elastic (price elasticity between -0.68 and -0.80) than beer (between -0.36 and -0.46), and increase in income is associated with higher increase in alcohol consumption (Wagenaar et al. 2010; Gallet 2007). It has also been documented that alcohol users are more likely to smoke and that, in such cases, focusing on only one policy rather than a synergy would result in much smaller health benefits (Son and Topyan 2011; De Silva et al. 2011). Evidence on the different in response to change in alcohol price of different socioeconomic groups is missing.

Unlike taxation of tobacco and alcohol which have been levied in almost all countries, not as many governments levy a tax on SSBs. As of end of 2018, around 40 countries levy some type of tax on sugary drinks (WCRF 2018). Based on the existing evidence, taxation of SSBs leads to their lower consumption and to substitution to beverages with lower content of sugar (Backholer et al. 2018), with price elasticity clustering around -1.2 (Chaloupka and Powell 2019), and could reduce obesity rate (Escobar et al. 2013). Increasing prices on SSBs has a relatively larger positive impact on consumption in LMICs than in HICs. Evidence from Mexico, Ecuador, Chile, Guatemala, and South Africa finds price elasticity between -1.09 and -1.39 (Chaloupka and Powell 2019). Additionally, in almost all countries, consumption

of bottom-income groups is more price elastic than of the higher-income groups (Sassi et al. 2018). Taxation of SSBs could have a substantial public health impact, while generating much needed revenues. A 2011 study from the US estimated that a national penny-per-ounce SSB tax would reduce consumption of SSBs by 24 percent within four years, and generate USD 79 billion of new tax revenues (Andreyeva et al. 2011). Mexico's SSB tax, which was introduced in 2014, reduced sales of SSBs by 5.5 percent in the first year, and by 9.7 percent in the second year after the implementation (Colchero et al. 2017). Similarly, it has been estimated that the newly adopted SSB tax in the Philippines could generate USD 813 million (0.25 percent of GDP) per year in additional revenues, and USD 627 million (0.19 percent of GDP) in healthcare savings (Saxena et al. 2019).

In addition to their public health objective, excise taxes are also an important source of government revenues. One of the central actions of the 2015 Addis Ababa Action Agenda is domestic revenue mobilization, which has recognized tobacco taxes as a key policy measure to reduce the burden of NCDs and help meet the SDGs (UN 2015a). This argument is supported by a great deal of evidence, including from LMICs, demonstrating that tobacco taxes are a powerful tool for reducing tobacco consumption while providing a source of government revenues (Chaloupka et al. 2012). For example, in South Africa, as a result of the tax increase, the real prices of cigarettes increased by 115 percent between 1993 and 2003, consumption decreased by around 40 percent, while real government revenues increased by almost 150 percent (Van Walbeek 2005). WHO has estimated that a 50 percent increase in taxes on cigarettes in LICs would generate enough additional revenues to finance more than 25 percent of their current government health spending (Stenberg et al. 2010).

Recent study commissioned by the Bloomberg Summers Task Force on Fiscal Policy for Health (Summan and Laxminarayan 2019) simulated health and revenue impacts of different increases of price of tobacco, alcohol, and SSB through tax increase, and found potential health and revenue benefits even in the short run. The study assessed what would happen over a period of 50 years if all countries increased taxes enough to raise prices by 20, 30, 40, and 50 percent (Table 1). The results showed the highest health impact of increased tobacco taxes, with around 11 million saved lives, with additional revenue of US\$ 1.6 trillion in 2016 prices (around 1.3 percent of 2016 global GDP (PPP\$)) if prices increased by only 20 percent. Potential revenue impact of alcohol taxes is the highest, mostly because current taxes are low. Alcohol price increase by 20 percent could generate additional US\$ 8.9 trillion (in 2016 prices), or 7.3 percent of 2016 global GDP (PPP\$). Potential impact of increases taxes on SSBs is relatively lower than on tobacco or alcohol, as consumption is not as widespread

and only a set of products would be affected, and the estimate only captures the impact on body-mass index (BMI), but does not capture other effects, such as reduced obesity. Nevertheless, its potential impact is not negligible.

Table 1. Projected health and revenue impact of tax increase on tobacco, alcohol, and SSBs.

Price Increase via Tax	Tobacco			Alcohol			SSBs		
	Averted Deaths ¹	Gained Years of Life ¹	Tax Revenue Gain ²	Averted Deaths ¹	Gained Years of Life ¹	Tax Revenue Gain ²	Averted Deaths ¹	Gained Years of Life ¹	Tax Revenue Gain ²
20%	10.8	212.0	1.6	9.4	238.7	8.9	0.8	23.7	0.7
30%	16.3	321.4	2.2	13.7	348.7	12.2	1.3	35.0	1.0
40%	21.8	428.6	2.6	17.9	455.0	14.8	1.7	46.5	1.2
50%	27.2	535.7	3.0	21.9	557.8	16.7	2.2	57.8	1.4

¹ In millions; ² in trillions of 2016 USD. Source: The Task Force on Fiscal Policy and Health (2019); Summan and Laxminarayan (2019).

One of the common concerns of policymakers against taxation of tobacco, alcohol, and SSBs is that they may be regressive, by mostly considering only the average ratio of the amount of tax paid and income. However, this measure does not take into account any health benefits of a tax from reduced consumption of unhealthy products. Lower income households most often respond to a price increase by reducing their consumption relatively more than the higher income households (Sassi et al. 2018). Moreover, as different socioeconomic groups can have different prevalence of consumption, the tax burden may be relatively higher in those groups with higher prevalence. As the goal of taxes on tobacco, alcohol, and SSBs is a reduction in prevalence and quantity of consumption, it is therefore important to account for a reduction in prevalence resulting from a tax when evaluating its distributional impact. In other words, in determining whether a tax is regressive or progressive, one needs to know the consumption patterns across income groups and their responsiveness to price (Summers 2018).

The distributional impact of these taxes depends on various factors, including prevalence rates and price elasticities by socioeconomic group, access to healthcare, and other fiscal policies. The potential equity implications of these taxes need to be addressed through other fiscal policy measures, such as direct subsidies or other targeted strategies that would incentivize behavioral change in vulnerable socioeconomic groups. Moreover, the revenue raised through taxes can be used for development spending. When they are used progressively or within a broader tax reform, they can relatively more benefit the poorer households. For example, the Philippines generated an additional US\$ 1.5 billion from increased tobacco taxes

between 2013 and 2015, and used most of this revenue to almost triple the national health insurance coverage for poor families (Nugent et al. 2018; Goodchild et al. 2017). Similarly, Denmark made changes in the income tax code to offset the potential equity impact of the new tax on saturated fats in 2011 (Sassi et al. 2018).

Furthermore, the burden of the tax should be put in the context of a burden of NCD disease (Summers 2018). Given that lower socioeconomic groups bear disproportionately larger burden of NCD disease (IHME 2019), and are, therefore, more likely to die prematurely, the burden of disease is regressive. Moreover, the economic costs associated with these diseases are also regressive, as lower income households are likely to bear relatively higher costs than the wealthier households. Therefore, an excise tax would, in fact, be progressive as the poor households would benefit relatively more through a significant reduction of these costs. For example, a 50 percent increase in cigarette excise taxes in China was estimated to reduce the tobacco-attributed medical costs borne by lower income household by US\$ 6.7 billion (Verguet et al. 2015). Similarly, if cigarette tax in Thailand was increased by 50 percent, it was estimated that, as a result of reduced consumption, the bottom-income group would bear only 6% of the new tax, and would benefit from 58 percent of averted premature deaths (Jha et al. 2012). In Finland, after the government reduced taxes on alcohol in 2003, alcohol-related mortality increased by 16 percent among men and 31 percent among women (Herttua et al. 2008).

Evidence from several countries shows that a tobacco tax is progressive because health benefits from reduced consumption due to tax and price increase more than offset the increase in tax liability, especially for lower socioeconomic groups (Fuchs et al. 2019). Another study compares the burden of excise taxes on tobacco and alcohol in Chile, Poland, and Turkey, and taxes on SSBs in a group of LMICs to assess their distributional impact (Sassi et al. 2018). The tax burden is found to be relatively larger for the bottom-income quintiles in case of tobacco, and for the top-income groups in case of alcohol and SSBs. However, when only households who consume these products are taken into account, the bottom-income groups bear the highest tax burden for all three products.

Indeed, in some countries tax structures are designed in a way to keep the prices of some products at a low level in order to keep them affordable for low-income consumers. While the argument for such a policy is that it is “pro-poor”, in fact it is not as it leads to lower income groups bearing a disproportionate share of the health and economic burden of these products, due to their greater consumption (Bobak et al. 2000). As a result, such tax policy is indeed regressive. However, considering the empirical evidence presented above, even if the current tax is regressive, a tax

increase can be progressive. To the extent that concerns about the impact on the poor persist, they can be addressed by using the additional revenues in ways that benefit the poor, such as expanding health coverage for lower-income households.

The Politics of Taxes on Tobacco, Alcohol, and SSBs: Selected Examples

Commonly, governments' reluctance to commit to a tax increase is due to a lack of evidence on the relevance of these taxes for health and development, low technical capacity of relevant government agencies, limited political commitment, and lack of coordination within the government. In addition, industry opposition and interference play a significant role. As a result, the legislative process is usually slow and often delayed. The industries are very fierce in their campaigns against a tax increase. They use their arguments strategically and present themselves as a very relevant stakeholder, with which they justify the need to be part of the policy dialogue. As a result, their interests often prevail against the public interests. However, it is not a random case that the proponents of the tax increase have successfully challenged the industry influence in the policy formulation (McCambridge et al. 2018). Some examples of successful policy reforms, despite very strong industry opposition, are presented below.

The Philippines had a long history of strong opposition from the tobacco industry to tax increases, and several politicians had close connections to the industry. Things changed in 2010 when Benigno Aquino III was elected as the new president, who, unlike his predecessors, did not accept the campaign contributions from the industry (Madore et al. 2015). Aquino had government reform and poverty reduction high on his political agenda, which included increasing sin taxes. Strong opposition from the industry was expected, and tobacco farmers and factory workers were mobilized to protest the bill. At the same time, most legislators in the Ways and Means Committee in the House of Representatives had known connections to the industry. As a result, the objectives of the proposed reform were strategically formulated around emphasizing that the additional revenues would be used for expanding the national health insurance (PhilHealth) coverage to low-income households and for economic development projects in tobacco growing provinces. Interestingly, empirical evidence on the economic and health impact of smoking, including estimates of the economic cost, already existed in the Philippines, but no policymaker used this evidence in any of the previous attempts to push for a tax increase (Madore et al. 2015).

Despite strong opposition, the bill was passed and signed into Law in 2012, becoming effective in January 2013. A compromise was made with the tobacco industry in terms of the tax rate simplification—instead of an immediate transition

to a unitary system, a gradual move from the existing four-tier to a two-tier system was agreed on, with an implementation of the unitary system in 2017. Additionally, to gain the support for the reform of the alcohol tax, an agreement was made with San Miguel Brewery, which represented 90 percent of the Philippines beer market, to include its popular premium beer brand in the lower of the price tiers of the fermented liquor brands. While distilled spirits were taxed at a uniform rate starting 2013, the two-tier system for fermented alcohol transitioned to the uniform system in 2017. As a result, cigarette taxes increased by 340 percent between 2012 and 2013, resulting in a 48 percent increase in the average price per cigarette pack. The collection of tobacco excise tax revenue in 2013 increased by 114 percent relative to 2012, while alcohol tax collections increased by 38 percent. Most of the additional funds (85 percent of tobacco tax and 100 percent of alcohol tax revenues) were earmarked for health, with 80 percent of the funds being used to increase the PhilHealth enrollment of low-income Filipinos, achieving 100 percent enrollment among this income group. It was reported that smoking prevalence among adults declined from 29 percent in 2012 to 26 percent in 2014, with a highest reduction in the lowest-income group (from 38 to 25 percent) and among adults between 18 and 24 years of age (from 35 to 18 percent) (Madore et al. 2015).

Similarly, Ukraine has a long history of tobacco industry price manipulation and interference in tobacco excise tax policy (Hoe et al. 2020). The goal of tobacco industry lobbying in Ukraine has, for a long time, been keeping tax and price increases at a low level to assure that the changes do not exceed the rate of inflation. However, despite their strong effort, for the first time since 1998, the increase in cigarette tax in 2008 finally outpaced inflation, and despite the 2009 economic recession, which reduced the real affordability of cigarettes by half, the government continued to substantially increase the tax until 2017. This reform was supported by newly elected president Petro Poroshenko, who signed the EU-Ukraine Association Agreement in 2014. As a result, during this nine-year period, the average excise tax increased 20 times and tobacco tax revenues increased 11 times, while smoking prevalence decreased by 35 percent and consumption of cigarettes by 46 percent. Moreover, in 2017, the government adopted a seven-year plan to further increase the specific excise tax by almost 30 percent in 2018 and annually by 20 percent between 2019 and 2024. In proceeding with the proposed reform, the government had three main concerns, including the impacts on revenue collection, the poor, and illicit trade. Extensive empirical evidence was produced and provided to the Ministry of Finance offering arguments and reassurance that these concerns were not justified.

As SSB taxes are relatively new, at least in comparison to taxation of tobacco and alcohol, not as many country examples are available to illustrate the political economy of the issue. That, however, does not mean that the resistance of the SSB industry has not been fierce. One good example is Mexico, where the SSB industry has long had ties with the Mexican government and society, including the former chief executive of Coca Cola Mexico being elected President of Mexico in 2010 (James et al. 2020). There had been attempts before 2012 to introduce the SSB tax in Mexico, but they were not successful. Opponents of the tax, including the SSB industry, sugar cane industry, and retailers used to run aggressive campaigns, calling on the Congress to oppose the tax, arguing that the tax would be regressive, would reduce employment, and would not reduce obesity rates. Finally, in 2012, the supporters, including civil society, politicians, and academics, effectively organized and supported the SSB tax proposal. The proposal also received strong support from the President Enrique Peña Nieto.

As the Ministry of Finance kept the tax plans secret, the opponents of the tax did not anticipate it and were not very active before the President announced the tax. One reason may be that they were relying on their historically strong ties with the government. Once it was sent to the Congress for consideration, the SSB industry began aggressively lobbying against the proposal. However, by the time the opponents managed to organize, the supporters already had messages framed around all negative implications of excessive SSB consumption and produced evidence providing counter-arguments to the anticipated industry arguments. As a result, the House of Deputies and the Senate passed the bill in October 2013 (James et al. 2020).

Scotland presents a case of implementing a minimum price per unit of alcohol, which was a successful policy reform, but not without a fierce opposition. The policy was proposed in 2012 with an objective of reducing consumption and its harmful impact. However, the Scotch Whiskey Association and the European trade associations for spirits and wines challenged it and took it to the EU Court of Justice. They argued that the policy would not be effective in meeting its objective, that it would hurt the poor, lead to illicit trade, and harm businesses (Shona et al. 2014). While the court did not dismiss the case, in December 2015 it requested additional evidence that an alternative policy, such as higher taxes, would not be effective in meeting public health objectives. Based on this evidence, the UK Supreme Court rejected the industry's case in November 2017, and the law came into effect on 1 May 2018.

Based on these examples, it is obvious that passing a tax on tobacco, alcohol, and SSBs is a difficult process and involves many factors. Factors that made a difference and provided support to the Ministry of Finance in proceeding with the reform were: high-level support and strong political will and collaboration between different parts of the Government working in partnership toward a common goal; thorough understanding of the political economy context in the country; available strong empirical evidence providing the counter-arguments to the concerns about the potential impact of the policy; and support provided by civil society and international organizations.

4. Conclusions

As it is becoming increasingly clear that economic prosperity and health are interdependent and that NCDs are a serious obstacle for achieving several SDG targets, fiscal policies targeting people's incentives for healthy behavior are becoming more and more appealing to the policymakers. When properly designed, these policies can improve health and raise much needed revenues, while eliminating the potential equity impact of taxes, thereby supporting the achievement of SDGs. NCDs are disproportionately clustered in lower socioeconomic groups of a society, and are a significant contributor to impoverishment, thereby worsening inequality. Tax policies can avert impoverishment, enhance workers productivity and economic growth by discouraging consumption of unhealthy products and improving diet, thereby contributing to prevention and control of NCDs and reducing the burden, and incentivizing support of human capital development.

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