

Meeting Health Challenges in Developing Asia with Corrective Taxes on Alcohol, Tobacco, and Unhealthy Foods

Chris Lane

Abstract

In developing Asia there is potential for higher corrective taxes to help prevent many non-communicable diseases (NCDs) and contribute revenue. The productivity loss from death and disability from alcohol, tobacco and diets high in sugar-sweetened beverages in purchasing power parity dollars is PPP\$ 879 billion (2 percent of Developing Asia GDP) with close to half these costs arising in China (PPP\$ 431 billion), and another 20 percent in India (PPP\$ 187 billion). Corrective taxes applied to these products can be a powerful tool to reduce harmful consumption. But effective implementation needs to consider tax design, demand responses, distributional consequences, and the use of corrective tax revenues including the costs and benefits of earmarking revenue to the health sector. It is estimated that corrective taxes, primarily on alcohol and tobacco, could raise an additional 0.6–0.7 percent of GDP in revenues, while improving health outcomes and cutting medical costs.

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Executive summary

The motivation for corrective taxes on alcohol, tobacco, and unhealthy foods is to change consumer behavior to deter over-consumption of products that have adverse health and social outcomes. Corrective health taxes should cover two costs at the margin:

- (i) uncompensated social costs (externalities) that result from consumption, such as illness from secondhand smoke and damage from accidental fires (tobacco), vehicle accidents, violence and crime (alcohol), and health costs not borne by the consumer, such as cross-subsidization from higher insurance premiums and higher public spending on health financed from general taxation (all harmful products); and
- (ii) self-imposed costs (internalities) that result from death and disability that occur because of behavior that underweights the future consequences of present consumption, i.e., impatience or time-inconsistent preferences, or because of imperfect information relating to health and nutrition, in particular underestimating the extent of addiction that results from consumption, especially among youth.

For tobacco use and unhealthy diets, estimates indicate that the internalities (self-imposed costs) are significantly higher than the externalities (uncompensated social costs), while for alcohol use the costs are more finely balanced, although estimates of social costs of alcohol vary widely across countries.

Corrective taxes are viewed as an effective tool to reduce or deter harmful consumption of alcohol, tobacco, and sugar-sweetened beverages (SSBs), including as “best buys” for the prevention and control of noncommunicable diseases (NCDs) complementing other harm reduction measures, e.g., regulation and health promotion and information. Corrective taxes also support domestic revenue mobilization. We also discuss the evidence, and potential mitigating actions, for corrective taxes weighing more heavily on low-income groups, encouraging illicit trade, lowering employment, and overstating health gains from substitution from taxed to other untaxed harmful products.

Mortality from NCDs, including heart disease, cancers, and diabetes, has risen rapidly to 77% of all deaths in developing Asia in 2019. Tobacco use, alcohol use, and unhealthy diets are major drivers. In 2019, deaths from tobacco-attributable diseases in developing Asia totaled 5.2 million people, deaths attributable to unhealthy diets another 4.4 million people, and a further 1.2 million alcohol-attributable deaths.

Using the cost-of-illness approach, the annual cost in terms of lost productivity from premature death and disability is estimated to average 2.1% of gross domestic product (GDP) in developing Asia for tobacco, alcohol, and SSB consumption (one element of an unhealthy diet high in added sugars), with medical treatment costs and other social costs boosting these costs further.

Corrective tax revenues in developing Asia on alcohol, tobacco, and SSBs raise, on average, 0.95% of GDP (data for 15 countries) although with considerable variance. For almost all

countries, for most harmful products, corrective taxes collected are far below the productivity loss from death and disability and the social costs.

It is estimated that corrective taxes, primarily on alcohol or tobacco, could raise an additional 0.6%–0.7% of GDP, considering the experience of revenue mobilization efforts, which would significantly reduce but not eliminate the existing gap between corrective tax revenue and costs of internalities and externalities resulting from consumption.

We document corrective tax implementation in developing Asia. We note some progress in raising tobacco taxes, limited progress for alcohol, and widespread experimentation with taxes on SSBs and, to a lesser extent, other unhealthy food products. Significant scope to raise corrective taxes remains.

We also discuss implementation opportunities and challenges for corrective taxes in developing Asia with case studies of tobacco, alcohol, and unhealthy products tax reform; the role for earmarking of corrective taxes; and the role of the International Monetary Fund and World Bank programs.

We conclude that strategies for success can include anticipating producer and consumer responses in tax design, having an effective tax enforcement strategy, and considering expenditure policies and product regulation to reinforce tax policy objectives. An extensive literature provides advice on corrective tax implementation, drawing on the expertise of international organizations, academics, and nongovernment organizations.

The paper is structured as follows: an introductory section discusses the definition of and motivation for corrective taxes; section II summarizes the cost of death, disability, and illness resulting from consumption of unhealthy products (tobacco and alcohol) and unhealthy diets in developing Asia and other uncompensated social costs; section III considers the merits of corrective taxes as a tool to curb and deter consumption of these products and issues faced in implementation of these taxes; section IV surveys the landscape of corrective taxes in developing Asia with a particular focus on the amount of revenue raised compared to the internal and external costs of consumption; section V discusses practical examples of how policymakers have succeeded (or not) in applying corrective taxes; and section VI concludes with broad strategies for success and guidance materials that may help policymakers in implementing corrective taxes.

I. Corrective taxes on harmful products

A. What are corrective taxes?

Corrective taxes are levied to change behavior, to discourage the bad or encourage the good. At the same time, they may raise significant amounts of revenue. For example, in Victorian Britain taxes on alcohol accounted for about one-third of total government revenue, with the behavioral motivation used to justify high taxes (Keen and Slemrod 2021).

Corrective health taxes are defined as those intended to increase the costs of manufacturing, distributing, retailing, and/or consuming health-damaging products (Wright et al. 2017). Corrective taxes are product-specific levied in addition to general consumption taxes, such as value added tax or sales tax, and are usually labeled as excise taxes.

B. Rationale for corrective taxes on harmful products

In theory, corrective taxes should be raised on the marginal unit of consumption to equal the resulting externalities and internalities (under certain assumptions). Assuming that marginal costs are equal to or higher than average costs (a not unreasonable assumption for harmful products), then corrective taxes should be raised at least to cover total costs of externalities and internalities.

The **traditional** or **Pigouvian approach** to setting corrective taxes focuses on externalities arising from consumption such as airborne pollution, secondhand smoke, car accidents from drunk driving, and health costs not borne by the consumer such as higher insurance premiums and higher public spending on health, as well as the loss of tax revenue from premature death. Taxes on a harmful product set equal to the externalities the product's use imposes on others are known as Pigouvian taxes (Pigou 1920).

The **public health approach** to setting corrective taxes aims to maximally discourage consumption of health-harming products to address both externalities and internalities (Cnossen 2010). Under the traditional approach, no corrective taxes are needed for internalities as these are considered by the rational consumer at the time of purchases including for goods known to be addictive (Becker and Murphy 1988). Two motivations support the use of corrective taxes to tackle internalities:

- (i) Consumers apply a higher discount factor to the future consequences of consumption in the present than they would when making decisions between future periods, i.e., when the short-run discount factor is higher than the long-run discount factor, consumers are time-inconsistent or, in common parlance, show a lack of control. This behavior is supported by evidence from laboratory experiments, real world behavior, econometric tests, and the use of self-control devices to aid quitting consumption (Gruber and Koszegi 2004, Gruber and Koszegi 2008, Hunt, Lockwood, and Taubinsky 2019). By contrast, the traditional approach assumes that discount factors are constant over time. Corrective taxation to address this time inconsistency improves welfare (Gruber and Mullainathan 2002).
- (ii) Informational failures result in excessive consumption because of imperfect health and nutrition knowledge, such as underestimating the extent of addiction (Gruber and Mullainathan 2002).

In this paper, we follow the public health approach as these considerations generally dominate the policy-making process and, more pragmatically, it can be difficult to separate internalities from externalities, for example in assessing who bears the burden of additional health care expenses that result from consumption of harmful products.

II. How do alcohol, tobacco, and unhealthy diets contribute to the key health challenges in developing Asia and what are their costs?

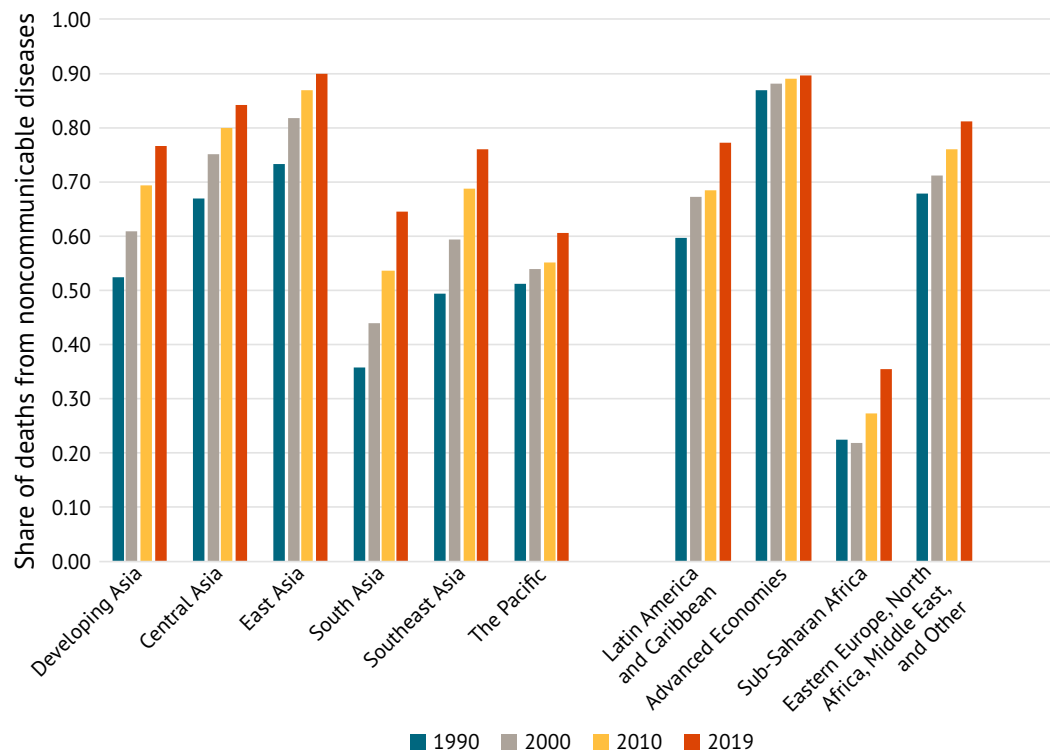
This section highlights the rising burden of NCDs in developing Asia and the contribution of alcohol, tobacco, and dietary factors (notably diets high in sugar-sweetened beverages [SSBs]) to this burden notably in respect of cancers, heart disease, obesity, and diabetes. Consumption of these products results in economic costs from premature death and disability and from medical and other social costs, which are the basis for taxing consumption of these products with product-specific “corrective taxes” or “health taxes”. Hydrocarbon consumption and local industrial pollution also are health harming and carbon taxes can also be classed as health taxes, but are considered separately in the Asian Development Bank’s Fiscal Policy in Developing Asia Project.

A. The rising burden of noncommunicable diseases

The rising burden of NCDs has been described as a global emergency (Nugent and Fottrell 2019). Developing Asia has had a more rapid increase in NCDs than other regions. Between 1990 and 2019, deaths from NCDs increased from an estimated 52%–77% of all deaths, with particularly marked increases in South Asia and Southeast Asia (Figure 1).

All developing Asia regions registered substantial increases of deaths from NCDs in the past 30 years as a share of total deaths. By 2019, the incidence of deaths from NCDs in East Asia (including the People’s Republic of China [PRC]) has risen to a level on par with advanced economies and exceeds levels in Latin America and the Caribbean. Central Asia also exceeds Latin America and the Caribbean, while NCDs in South Asia and Southeast Asia have increased rapidly. These developments are a result of improved health systems which reduced communicable disease mortality and, at the same time, rising incomes supported consumption of tobacco, alcohol, and diets high in processed sugars and fats which are all key risk factors attributable to death and disability from NCDs.

**Figure 1. The rising burden of noncommunicable diseases, 1990–2019
(share of all deaths)**



Notes: Data gaps in East Asia for Taipei, China; and Hong Kong, China.

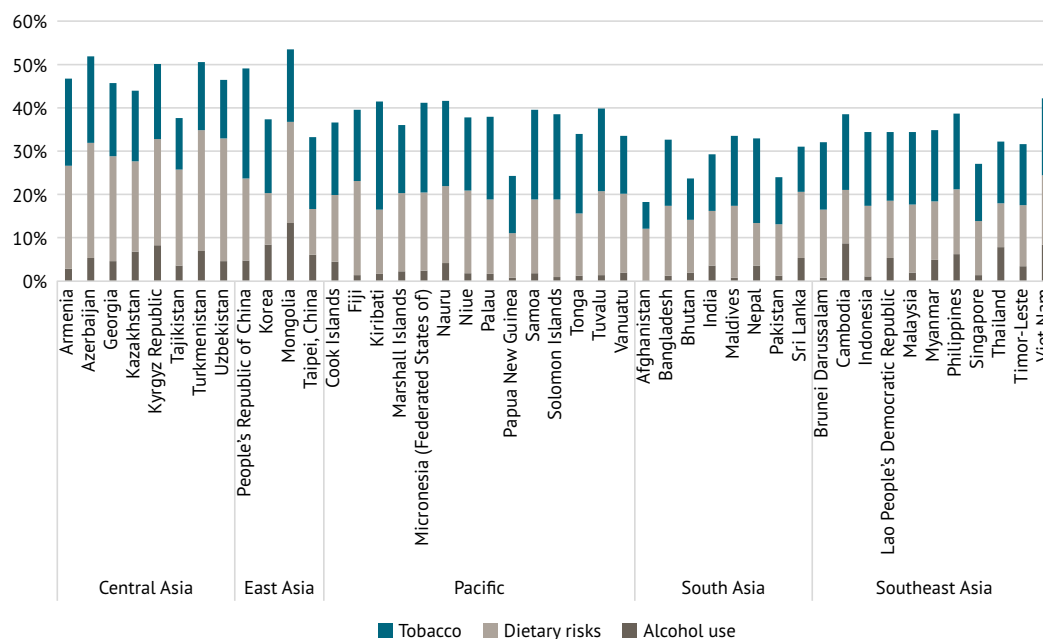
Sources: Institute for Health Metrics and Evaluation and author's calculations.

Across the countries and territories in developing Asia, on average, alcohol, tobacco, and dietary risk factors are linked to more than one third of all deaths (Figure 2) with more than 10 million attributable deaths per year. Tobacco and unhealthy diet risk factors account for the largest shares of deaths (16%–17% of deaths each on average) and alcohol use accounts for about 4% of deaths on average, except in countries where alcohol consumption is prohibited or strongly discouraged (e.g., Afghanistan, Brunei Darussalam, Maldives, and Pakistan).¹ In 2019, deaths attributable to tobacco use totaled 5.2 million in developing Asia, deaths from unhealthy diets were 4.4 million, and a further 1.2 million deaths are attributed to alcohol use.² The risk burden is particularly high in Central Asia and East Asia. NCDs as pre-existing conditions have also elevated the risk of severe coronavirus disease (COVID-19) symptoms (Box 1).

¹ Deaths are attributable to environmental risks, e.g., pollution, behavioral risks; e.g., tobacco use; and metabolic risks, e.g., a cluster of conditions such as high blood pressure, high cholesterol, obesity that lead to strokes, heart disease and strokes. Some deaths may be attributable to more than one risk, while others may have no identified risk factors.

² 2019 Global Burden of Disease database. <http://ghdx.healthdata.org/gbd-results-tool>.

**Figure 2. Developing Asia: tobacco, dietary, and alcohol-attributable deaths, 2019
(percent of all deaths)**



Sources: Institute for Health Metrics and Evaluation and author's calculations.

Box 1. COVID-19 and noncommunicable diseases

Noncommunicable diseases (NCDs) greatly increase the risk of severe coronavirus disease (COVID-19) illness, while treatment of COVID-19 patients has interrupted treatment of noncommunicable diseases. A systematic review shows increased risks of illness from COVID-19 for patients with chronic illnesses such as diabetes, hypertension and other cardiovascular diseases, chronic respiratory illnesses, and chronic kidney and liver conditions.^a A modelling study suggested that one in five people are at an increased risk of severe COVID-19 should they become infected.^b A World Health Organization rapid assessment in May 2020 showed that 75% of countries reported interruptions to NCD services, hitting public health campaigns and NCD surveillance efforts hardest as countries begin to evaluate the consequences to other health programs following the COVID-19 pandemic.^c

^a Z. Nikoloski, A. M. Alqunaibet, R. A. Alfawaz, et al. 2021. Covid-19 and non-communicable diseases: evidence from a systematic literature review. *BMC Public Health* 21(1):1–9. doi:10.1186/S12889-021-11116-W.

^b A. Clark, M. Jit, C. Warren-Gash, et al. 2020. Global, regional, and national estimates of the population at increased risk of severe COVID-19 due to underlying health conditions in 2020: a modelling study. *The Lancet Global Health*. 8(8):e1003–e1017. doi:10.1016/S2214-109X(20)30264-3.

^c Lancet. 2020. COVID-19: a new lens for non-communicable diseases. Lancet editorial (London, England). 2020;396(10252):649. doi:10.1016/S0140-6736(20)31856-0.

The differential burden of risk factors across countries reflects many factors, including the prevalence of communicable diseases and accidents, the amount and pattern of consumption of harmful products, and the depth and breadth of access to health systems with a capacity to identify and mitigate emerging symptoms. The burden also varies significantly by gender: the male:female ratio of mortality in developing Asia is about 5.0 for alcohol-attributable diseases, 2.5 for tobacco-attributable diseases, and about equal for dietary risks principally reflecting gender differences in consumption.

B. The cost of death and disability from harmful products consumption

Death and disability arising from alcohol, tobacco, and unhealthy diets have economic costs arising from lost productivity because of premature death or disability, medical treatment costs, and other social costs, e.g., intimate partner violence, accidents. A part of these costs is borne by the individual (internalities), such as out-of-pocket medical costs, loss of income because of death and disability, while other costs are socialized such as public sector medical costs, and social costs especially arising from alcohol use, e.g., crime, accidents, and policing. The cost of illness approach estimates the direct and indirect costs of illnesses (Box 2).

Box 2. How to estimate the cost of illness

The cost of illness approach estimates direct and indirect costs of illness. The direct cost of medical treatment is estimated from costs of treatment of alcohol-, tobacco-, and dietary-attributable illnesses. The indirect cost of illness is the economic value of lost production, also known as the human capital approach, attributable to (i) years of life lost for each risk factor resulting from deaths in the working age population; and (ii) the years lived with disability from new incident cases attributable to each risk factor (which is calculated as number of new incident cases multiplied by the disability weight and the average duration of the case until remission or death).

We use the human capital approach, which measures lost productivity in terms of lost earnings based on wages. For deaths, the years of life lost prior to retirement age (at 65 years) for each risk factor are valued adjusted for labor force participation rates and survival rates to 65 years old. For the cost of disability, we use disability adjusted life years which assigns a disability weight to the expected duration of disability for new cases of disability in a year again adjusting for labor force participation and life expectancy.^a

^aThe appendix details the methodology and sources used.

Estimates of the annual cost of illness from tobacco, alcohol, and dietary factors are close to 5% of global gross domestic product (GDP):

- (i) The total economic cost of smoking-attributable diseases, including cancers and heart diseases, arising from health expenditures and productivity losses is estimated to be equivalent to 1.8% of global GDP (2012) (Goodchild, Nargis, and Tursan d’Espaignet 2018).

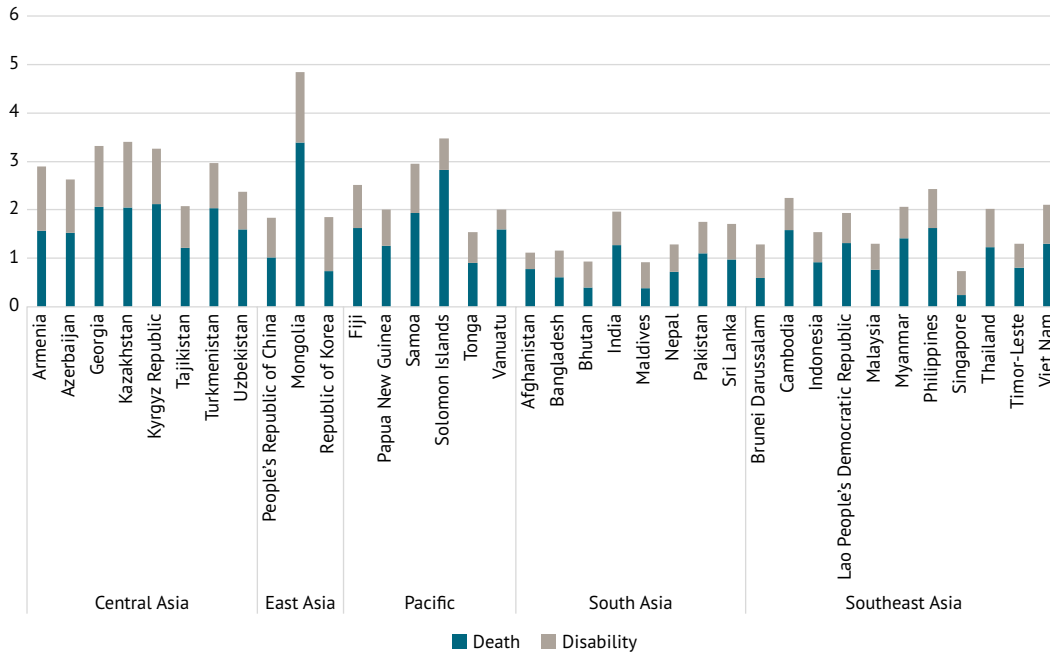
- (ii) The annual economic costs from alcohol consumption, including liver disease, cancers, and road traffic accidents, in middle-income and high-income countries are estimated to be more than 1% of GDP (2009) (Rehm et al. 2019).
- (iii) Obesity and diabetes—key outcomes from unhealthy diets—have estimated annual economic costs of US\$2 trillion (about 2% of global GDP) (Dobbs et al. 2014). Diabetes alone has estimated health care costs alone of \$760 billion (2019) (International Diabetes Foundation. 2019).

In developing Asia, the productivity losses from death and disability constitute a major component of economic costs arising from harmful product consumption. Our analysis of these costs focuses on products where corrective taxes have been widely used to curb harmful consumption and, in most cases, to raise revenue: tobacco, alcohol, and SSBs (sodas). Corrective taxes have not been widely used to raise prices of other unhealthy food products, e.g., foods with high levels of salt, saturated fats, or more broadly products with high levels of added sugar, with some notable exceptions.

The unweighted average productivity loss from death and disability in 2019 from alcohol, tobacco, and diets high in SSBs is 2.1% of GDP in developing Asia. All Central Asian countries have above average losses, Mongolia as well, and some Pacific islands and Southeast Asia countries (Figure 3).³ The loss of productive years from death is typically about 50% higher than that from disability (1.3% of GDP compared to 0.8% of GDP). By comparison the productivity loss is 2.3% in the Group of Seven advanced economy grouping and also 2.3% of GDP in a group of 16 large emerging markets (Lane and Bhardwaj 2021).

³ Death and disability data not available for Hong Kong, China and Taipei, China in IHME Global Burden of Disease database. Data on labor force participation not available for Pacific island microstates (Cook Islands, Kiribati, Marshall Islands, Micronesia, Nauru, Niue, Palau, and Tuvalu).

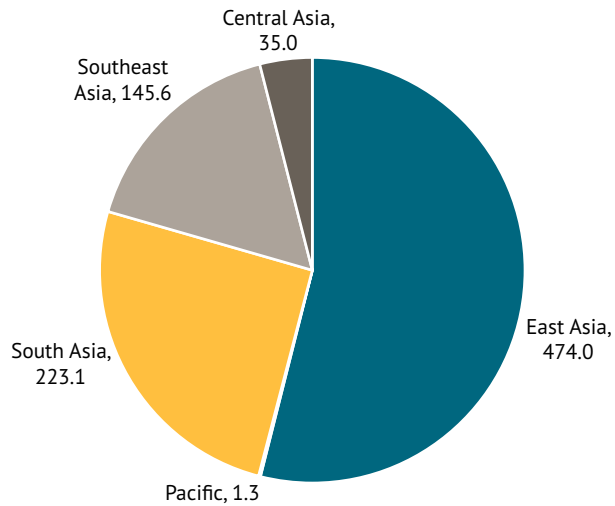
Figure 3. Developing Asia: productivity loss from death and disability: alcohol, tobacco, and diets high in sugar-sweetened beverages, 2019 (percent of gross domestic product)



Sources: Institute for Health Metrics and Evaluation, World Bank World Development Indicators, World Health Organization Life Tables, and author's calculations.

To put these productivity losses into perspective, average and median domestic general government health spending in developing Asia is 3.0 and 2.2% of GDP respectively (compared to the average productivity loss of 2.1% of GDP). Total 2019 costs in purchasing power parity (PPP) dollars are PPP\$ 879 billion with close to half these costs arising in the PRC (PPP\$431 billion), and another 20% in India (PPP\$ 187 billion) (Figure 4).

Figure 4. Developing Asia productivity loss from death and disability attributable to tobacco, alcohol, and dietary factors, 2019 (PPP\$ billion at 2017 constant prices)



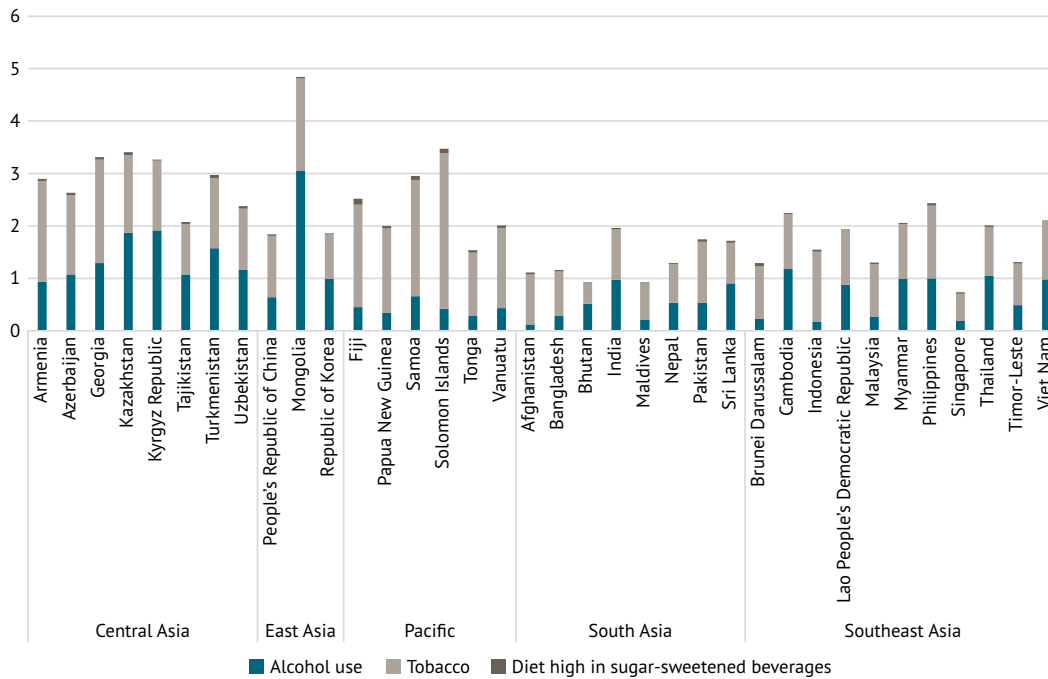
PPP = purchasing power parity.

Sources: Institute for Health Metrics and Evaluation, World Bank World Development Indicators, World Health Organization Life Tables, and author's calculations.

Tobacco use is the largest contributor to productivity loss in 24 of the 36 developing Asia countries for which data is available, averaging 1.3% of GDP (whole sample 1.2% of GDP) and alcohol use is the largest factor in 12 countries averaging 1.4% of GDP (Bhutan, Cambodia, Central Asia excluding the Caucasus, India, Mongolia, the Republic of Korea [ROK], Sri Lanka, and Thailand) and 0.8% of GDP over the whole sample. While the contribution of SSBs to productivity loss is generally small, it is relatively high in some Pacific islands (Fiji, Samoa, and Solomon Islands) which have elevated levels of obesity and diabetes (Figure 5).

The incidence of death and disability in the working age population predominantly falls on males. For example, males account for more than 80% of deaths attributable to alcohol and tobacco, and two-thirds of deaths attributable to SSBs consumption in developing Asia.

Figure 5. Developing Asia: productivity loss by product: alcohol, tobacco, and diets high in sugar-sweetened beverages, 2019 (percent of gross domestic product)



Sources: Institute for Health Metrics and Evaluation, World Bank World Development Indicators, World Health Organization Life Tables, and author's calculations.

In addition to the productivity loss from alcohol, tobacco, and SSB consumption are medical costs resulting from attributable illnesses and other social costs. Estimates for each product in the literature indicate that these costs can be significant although they vary widely according to country circumstances and estimation methodology:

- (i) Average smoking-attributable disease health expenditure is an additional 0.22% of GDP in developing Asia estimated in a global survey using 2012 data,⁴ with significantly higher costs in countries that have high levels of smoking prevalence. At the country level, more recent studies indicate somewhat higher smoking-attributable medical spending including 0.37% of GDP in Bangladesh (2018) (Nargis, Faruque, Ahmed, et al. 2020), 0.35% of GDP in Sri Lanka (2015) (World Health Organization 2017c), and 0.49% of GDP in Viet Nam (2011) (Hoang Anh et al. 2016) equivalent in the latter case to half of total costs.
- (ii) The total gross direct and indirect costs of alcohol (health system cost, out-of-pocket expenditure, and productivity losses) are estimated at 1.8% of GDP in India (Jyani et al. 2019) of which direct costs are 1.0% of GDP. Rehm et al. (2009) estimate health care costs for alcohol-attributable diseases of 0.2% GDP in the ROK (2002).

⁴ Authors' estimates based on Goodchild, Nargis, and Tursan d'Espaignet 2018. *Estimates for smoking-attributable share of total health expenditure in 2012.*

In addition, they find that law enforcement costs and other direct costs account 0.7% GDP. Alcohol-related medical costs are estimated at 0.5% of GDP in Sri Lanka (2015) (WHO 2017c). An Organisation for Economic Co-operation and Development macroeconomic model of the impact of alcohol-attributable diseases estimates GDP will be 1.6% lower in Organisation for Economic Co-operation and Development countries (direct and indirect costs), and 1.4% of GDP lower in Group of Twenty countries with considerable variation across the 48 sample countries (OECD 2021).

- (iii) Consumption of SSBs harms health through three main channels: weight gain, type 2 diabetes, and cardiovascular disease.⁵ Although the evidence on health system costs is limited, especially in developing Asia, the evidence on each of the channels is clear: field experiments and other analyses link additional servings of SSBs to weight gains after controlling for other factors; meta analyses find that one additional serving of SSBs per day was associated with a 13% higher risk of developing type-2 diabetes and a 17% higher risk of coronary heart disease. Moreover, SSBs are major source of added sugar in diets, e.g., an estimated 23% of an average American adult's total sugar consumption.

While the direct and indirect costs of consumption of unhealthy products in developing Asia is high, these products are generally not prohibited or banned but instead, to a greater or lesser extent, are regulated and taxed. However, there are a few notable exceptions:

- (i) Bhutan banned the cultivation, manufacture, distribution, and sale of tobacco products in a policy dating back to 2004 although personal importation is not prohibited.⁶ Research has indicated that, while smoking prevalence is low, it has remained a serious health issue for those who consumed cigarettes in 2008. Also, evidence indicates that illegal tobacco smuggling, including black market sales, because of the sales ban in Bhutan remains robust (Givel 2011). In 2021, some commercial importation was permitted to choke off informal imports and related COVID-19 transmission risks.
- (ii) The sale of e-cigarettes (electronic nicotine delivery systems or ENDS) is banned in 32 countries worldwide including Brunei Darussalam, Cambodia, India, the ROK, Malaysia, Singapore, Sri Lanka, Thailand, and Turkmenistan in developing Asia (WHO 2021a). The reasons for sale bans include lack of evidence on the effects of long-term consumption, ENDS can serve as a gateway for youth to tobacco product consumption, and limited evidence of the efficacy of ENDS as a smoking cessation tool.
- (iii) The sale and consumption of alcoholic beverages is severely restricted or illegal in the Afghanistan, Brunei Darussalam, and Pakistan. Death and disability from alcohol consumption are correspondingly very low in comparison to other countries without alcohol bans.

⁵ This discussion draws from Allcott, Lockwood, and Taubinsky 2019b.

⁶ <https://www.tobaccocontrolaws.org/legislation/country/bhutan/summary>.

III. What are the pros and cons of corrective taxes and other non-tax policy approaches?

A. Arguments for corrective taxes

An effective corrective tax that improves health outcomes relies on a chain of events occurring after application of the tax. First, the tax imposed is passed through to retail prices which, many case studies, show is normally the case, but may be delayed by forestalling, i.e., over-production in advance of a tax increase (WHO 2021b), or occasionally when producers absorb small tax increases by reducing margins. Second, higher prices lead to lower consumption. Empirical studies show that the price elasticity of demand in low-income and middle-income countries is about -0.4 – -0.5 for tobacco products (i.e., a 10% price increase results in a 4%–5% consumption decrease),⁷ -0.64 for alcohol products,⁸ -1.21^9 – -1.4^{10} for sugary beverages (including high-income countries), which suggests that consumption will respond reliably to price increases. Third, reduced consumption of the taxed product is not substituted for by increased consumption of other harmful products. We discuss instances of this substitution in developing Asia in section IV, which can be mitigated by ensuring that harmful close substitutes are also in the tax net.

It is widely recognized that raising corrective taxes is a highly effective way to reduce or deter harmful consumption of alcohol, tobacco, and SSBs, including as “best buys” for the prevention and control of NCDs (WHO 2017a):

- (i) A substantial body of research over many decades and many countries shows that significantly increasing the excise tax and price of tobacco products is the single most consistently effective tool for reducing tobacco use (US National Cancer Institute and WHO. 2016), and the World Health Organization (WHO) Framework Convention on Tobacco Control, ratified by 168 WHO member states, encourages tax measures to reduce demand for tobacco, including tax increases that result in an increase in the sales price of tobacco products and prohibiting or restricting sales of tax and duty-free tobacco products.¹¹
- (ii) The WHO SAFER initiative recommends raising prices on alcohol through excise taxes and pricing policies;¹² a review of 50 studies that examined the impact of taxes and prices on various harms caused by alcohol concluded that a 10% increase in alcohol taxes was associated with a 3.5% decline in all harms associated with alcohol-related disease and injuries, including car crashes, homicide, rape, robbery, and child abuse; and workplace injuries (Wagenaar et al. 2009).

⁷ https://cancercontrol.cancer.gov/sites/default/files/2020-06/m21_4.pdf.

⁸ https://www.who.int/substance_abuse/publications/tax_book/en/.

⁹ Powell, Chriqui, Khan, Wada, and Chaloupka. 2013.

¹⁰ Allcott, Lockwood, and Taubinsky. 2019b.

¹¹ <https://fctc.who.int/publications/m/item/the-who-framework-convention-on-tobacco-control-an-overview>.

¹² <https://www.who.int/news/item/28-09-2018-who-launches-safer-alcohol-control-initiative-to-prevent-and-reduce-alcohol-related-death-and-disability>.

- (iii) WHO guidance on healthy sugar consumption recommends reducing the intake of free sugars to less than 10% of total energy intake (12 teaspoons sugar per day compared to 10 teaspoons sugar in a 12oz soda can) (WHO 2015a) and concludes that taxation of SSBs is an effective intervention to reduce sugar consumption (WHO 2017b). Numerous studies around the world show that SSB taxes have been effective in reducing SSB purchases and dietary intake of free sugars (Escobar et al. 2013, Teng et al. 2021).

Corrective tax revenue will generally increase with a tax rate increase if the price elasticity of demand (sensitivity of demand to tax-induced price increases) is greater than the inverse of the share of all taxes in price. For example, if taxes are 50% of retail price, tax revenue will increase with a small tax increase if the price elasticity is between 0.0 and -2.0 (i.e., $-100/50$) where -2.0 is the critical price elasticity (IMF 2016). As noted in paragraph 22, price elasticities for alcohol, tobacco and SSBs are all well above the critical price elasticity at a 50% tax share. When there are close substitutes to the products with corrective taxes, demand can be very sensitive to price (high price elasticity). For example, this a relevant factor in deciding the tax burden on legal marijuana when the objective is to move consumers out of the existing illegal market with similar or identical products (Leff 2020). Demand may also be very sensitive to tax increases in subnational jurisdictions (cities or states) where consumers can cross-border shop to jurisdictions which do not levy corrective taxes as noted in the case of taxes on sugary beverages levied in some United States cities (Allcott, Lockwood and Taubinsky 2019). Tax design is also an important consideration with respect to revenue impact. Specific taxes are generally recommended for harmful products as they are transparent, easy to administer compared to other tax types, and not subject to price manipulation (Thow and Siu 2021) although ad valorem taxes can capture additional revenues for high price products and have a more progressive incidence. Specific taxes can be based per unit, e.g., per cigarette, on a volumetric basis, e.g., per liter for beverages, or per unit of harmful product, e.g., per gram of sugar or alcohol content which is the recommended approach for most corrective taxes if administratively feasible. The value of specific taxes can be eroded by inflation which can be avoided by regular indexation.

There remains significant revenue potential from corrective health taxes. One recent study identifies a short-term revenue potential benchmark in low-income and middle-income countries of 0.6%–0.7% of GDP from alcohol, tobacco, and SSB taxation covering half of the COVID-19-induced tax revenue shortfall in middle-income countries and all of the COVID-19-induced revenue shortfall in low-income countries (Lane, Glassman, and Smitham 2021). This benchmark comprises of 0.24% of GDP for tobacco (raising excises towards 70% of pack price capped at a 50% post-tax increase), 0.35% of GDP for alcohol (moving from 25th to 75th percentile of cross-country tax take), and less than 0.1% of GDP for SSBs based on recent revenue yields from introducing SSB taxes. Another simulation of tax increases that raise prices of tobacco, alcoholic, and SSBs by up to 50% (with lesser increases where taxes are already high) result in an increase in annual tax revenues of up to 0.7% GDP in upper middle-income countries, 1% of GDP in low-income countries, and 1.2% of GDP in lower middle-income countries (higher estimates are largely because of more ambitious alcohol tax increases) (Lane, Glassman, and Smitham 2021) Increases of

this magnitude could avert 50 million premature deaths worldwide over the next 50 years while raising more than US\$20 trillion in additional revenues (present discounted value) (Task Force on Fiscal Policy for Health 2019).

In practice countries have demonstrated an ability to increase excise revenues in line with the short-term benchmarks discussed in paragraph 25. During 2014–2017, 12 countries increased excise revenues (including fuel) by 0.7%–1.6% of GDP including Barbados, Egypt, Ghana, Moldova, Sri Lanka, and Ukraine (Lane, Glassman, and Smitham 2021). An International Monetary Fund (IMF) study of episodes where tax revenues rise at least 0.5% of GDP each year for 3 years in low-income and middle-income countries found 55 episodes and that increases in excise taxes are the most common tax policy instrument accounting for one quarter of all tax policy actions (Akitoby et al. 2018).

The frequent use of corrective taxes suggests an advantage of administrative simplicity compared to other taxes. This may arise when there are only a few producers and, therefore, relatively few taxpayers as is often the case in tobacco, alcohol, and SSBs markets, or where harmful products are mostly imported, e.g., in small developing states, allowing taxation at the point of importation. However, there are also significant hurdles for tax administration where value chains are complex, where the product is an ingredient in a very large number of products, e.g., salt, or the product has many varieties, e.g., sugar. There are also strong incentives for tax evasion and avoidance for low-volume high-value products, particularly tobacco and alcoholic spirits, which call for strong administration and control measures. These may include excise stamps and more sophisticated track and trace systems, as well as bonded warehouses for products that have not yet been taxed. In addition, effective enforcement penalties are needed to ensure compliance with these administrative controls (IMF 2016).

Corrective taxes have some advantages over regulatory measures as they use the price mechanism to efficiently curb consumption. Compared to an outright ban, a corrective tax approach allows those who derive significant enjoyment to continue consumption, provided they are prepared to pay the tax-inclusive price. Yet, in most cases, taxes and regulations play complementary roles. For example, banning smoking in indoor public places plays an important role in reducing the risk from secondhand smoke, and drink-driving penalties address the risk to others of driving under the influence of alcohol (Keen and Slemrod 2021). Other effective complementary approaches to reducing consumption of harmful products, although largely beyond the scope of this paper, include and are not limited to banning advertising, promotion and sponsorship, health and/or nutrition information on products and packaging, public health information targeted at vulnerable groups including cessation services, age limits for sales, and licensing of producers and retailers.

B. Arguments against corrective taxes

Concerns of governments, producers, and consumers over the impact of corrective taxes are the main barrier to greater use of such taxes. The main arguments put forward are that

(i) taxes have a disproportionate impact on low-income consumers and increase poverty, (ii) revenue (and health) gains are overstated because of increased illicit trade, (iii) taxes will lower employment in the affected sector, and (iv) health gains may be overstated because of shifts in demand to unhealthy substitutes.

The traditional view is that taxes on harmful products are regressive as low-income groups spend a larger share of income on these products. Indeed, corrective taxes will have distributional effects that depend on the level of expenditure by income group, and whether taxes are specific or ad valorem which can vary significantly by product and by country. An additional factor to take into consideration is the extent that corrective taxes deter starting consumption completely which has no standard incidence at all. Concerns about adverse equity effects may be outweighed by the health benefits accrued over time from reduced consumption by low-income groups that are more responsive to corrective taxes than high-income groups, and other pro-poor effects resulting from the use of additional tax revenues.

What is the evidence on tax incidence? Studies using household expenditure data find that corrective tax revenues tend to come disproportionately from higher-income households as prevalence of consumption and expenditure on alcohol, sugary beverages, and, to a lesser extent, tobacco rises with income. Nonetheless, the tax burden as a share of income is often highest for low-income households, especially for tobacco (Sassi et al. 2018). However, low-income consumers including youth have stronger responses to price changes. A seminal study of cigarettes in the United States finds that the benefits of taxation are largest for the low-income groups who smoke the most and have the most price sensitivity, making cigarette taxes much less regressive, and potentially progressive when taking into account the underweighted future costs of premature death (Gruber and Koszegi 2004). In the PRC, the response to price changes of tobacco is five times larger in the bottom income quintile than the top income quintile (Chaloupka, Yurekli, and Fong 2012). This greater responsiveness to price means that low-income consumers reap a disproportionate share of health benefits along with lower out-of-pocket medical spending and extended working lives as demonstrated in a dozen World Bank country studies on the distributional impact of alcohol, tobacco, and SSB taxes (Fuchs 2020). Corrective tax revenues can also be used to mitigate or offset distributional effects by earmarking to pro-poor health services as is the case for tobacco and alcohol taxes in Thailand, the Philippines, and tobacco taxes in Viet Nam.¹³ More broadly, it is important to focus on the progressivity or regressivity of the tax system as a whole rather than on one particular tax measure: in Denmark the introduction of a saturated fat tax in 2011 was accompanied by other reforms to make income tax more progressive (Sassi et al. 2018).

Critics of corrective taxes argue that higher taxes and prices result in increased illicit trade and tax avoidance. However, a review of country experience indicates that taxes and prices have only a limited impact on the illicit market share for cigarettes. Non-price factors such

¹³ WHO. 2015b. *'Sin Tax' expands health coverage in the Philippines*. <http://158.232.12.119/features/2015/ncd-philippines/en/> and WHO. 2016a. *Earmarked tobacco taxes: lessons learned from nine countries*.

as governance status, weak regulatory framework, social acceptance of illicit trade, and the availability of informal trade networks appear to be far more important determinants (Dutta 2019). Accordingly, the strengthening of tax administration and tobacco tax reform should be viewed as mutually complementary activities. In every country that has raised tobacco taxes by a nontrivial amount, consumption fell and revenues rose (US National Cancer Institute and WHO 2016).

The argument that taxes, by reducing sales, causes significant job losses at producers and distributors of tobacco, alcoholic, and sugary beverages needs to be weighed against the new jobs created by the shifting of consumption to other products as well as jobs created by spending corrective tax revenues on other activities. Studies on the overall impact of tobacco control on employment find no net effect or modest gains (US National Cancer Institute and WHO 2016). A computable general equilibrium model simulation for Pakistan of raising the federal excise duty on cigarettes to 70% of the retail price found that declines in tobacco growing and cigarette industry employment would be far outweighed by increased employment in other sectors resulting from a tax-financed increase in investment (Sabir et al. 2021). Nonetheless, it is important to assist workers affected by shifting consumption patterns.

Consideration needs to be given to how consumers react to changing relative prices that result from corrective taxes, which we discuss in more detail in developing Asia case studies. For example, higher prices for cigarettes may lead consumers to trade down to cheaper tobacco products such as bidi cigarettes or roll-your-own tobacco, leading to lower revenues and no improvement in health outcomes, which can be avoided through careful tax design. Also, health taxes on foods containing high levels of salt and saturated fats (junk food) may induce substitution to other unhealthy foods (Cornelson et al. 2014).

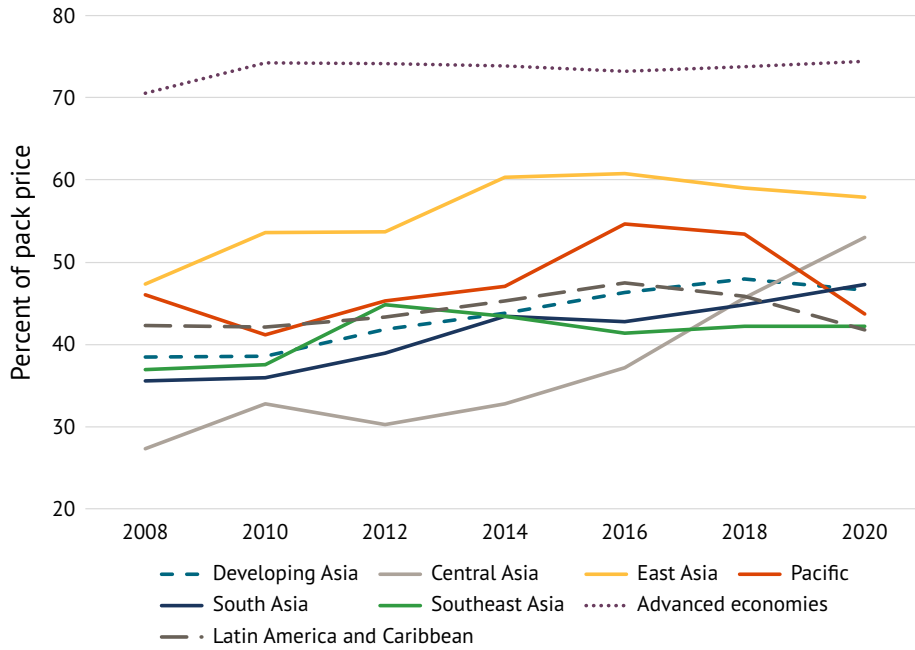
IV. To what extent have corrective taxes been used to tackle health challenges on alcohol, tobacco, and sugar?

This section summarizes corrective taxes levied on tobacco, alcohol, and sugary beverages in developing Asia.

A. Tobacco products

Countries in developing Asia have made some progress in raising corrective taxes on tobacco products over the past decade, with tax rates on cigarettes now above those in Latin America and the Caribbean and approaching rates levied in advanced economies (Figure 6). Taxes as a share of the retail price of the most sold cigarette brand rose from 38% to 47% in developing Asia with Central Asia and East Asia recording the most significant progress. However, this leaves significant room to reach the WHO recommended levels of 75% of pack price for all taxes on tobacco and 70% of price for excise taxes. As a cautionary note, high tax shares may not necessarily impact consumption significantly if ad valorem taxes are used and tiered to protect low-cost production as consumers respond to higher taxes by downshifting to cheaper brands with lower absolute levels of tax.

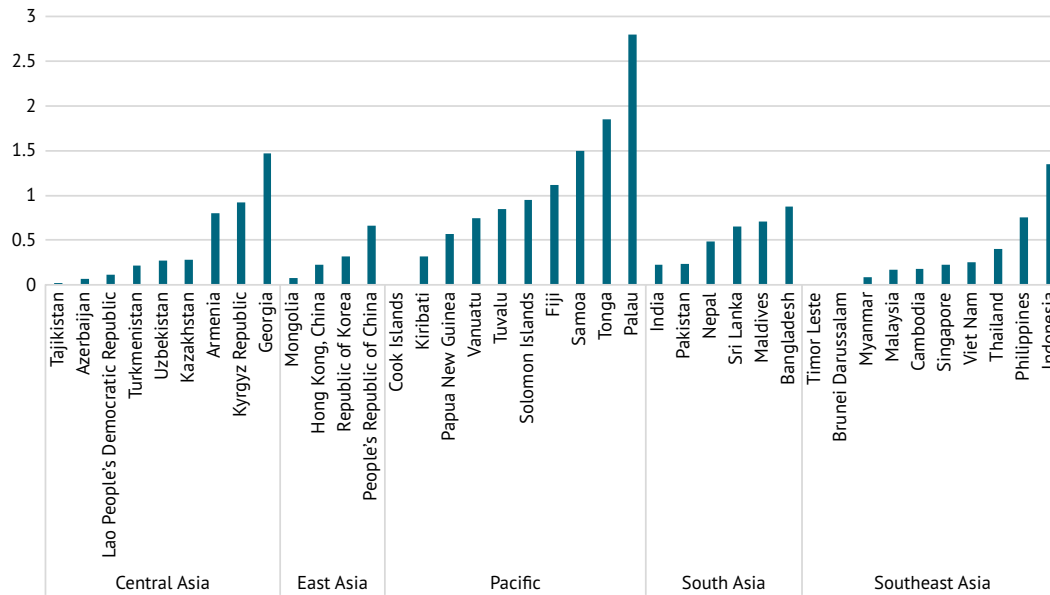
**Figure 6. Developing Asia cigarette taxes on most-sold brand of cigarettes, 2008–2020
(as a percent of pack price)**



Source: World Health Organization. 2021. *Report of the Global Tobacco Epidemic, 2021*.

The yield from tobacco taxes varies greatly across developing Asia reflecting the level and structure of taxes as well as the prevalence of tobacco use with high-performing countries typically having unified taxes across tobacco products, specific excises at relatively high rates and as a share of the retail price (Figure 7). A handful of countries collect greater than 1% of GDP in revenues (Georgia, Fiji, Indonesia, Palau, Samoa, and Tonga).

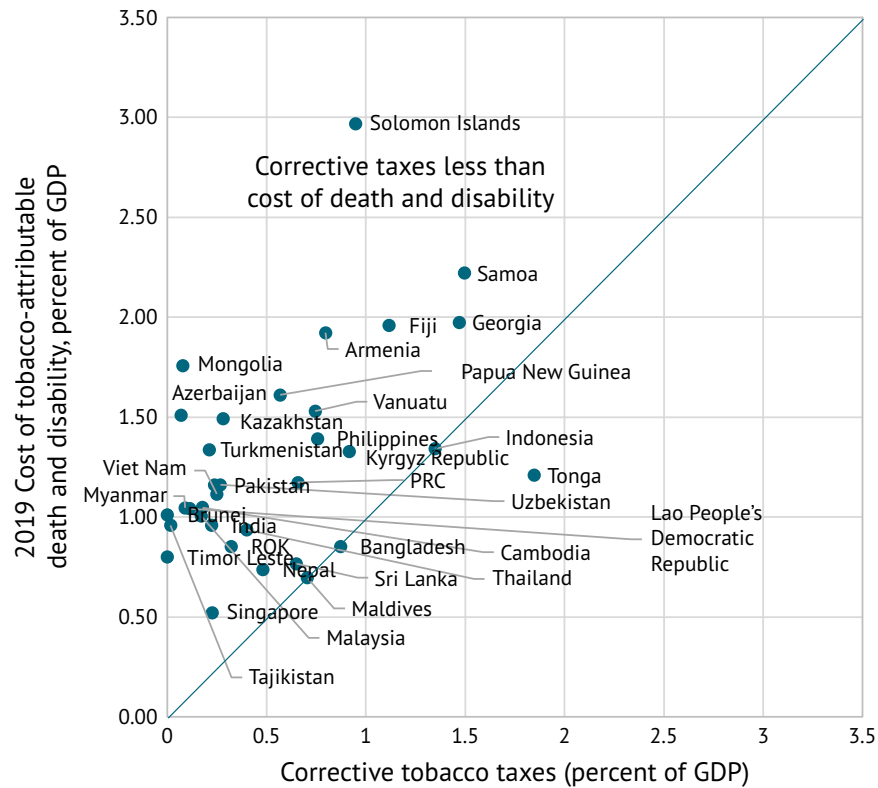
Figure 7. Developing Asia tobacco excise tax yield, 2019 or latest available year (percent of gross domestic product)



Sources: Organisation for Economic Co-operation and Development revenue statistics, World Health Organization World Health Observatory, and authors' country literature search.

Corrective taxes on tobacco are much lower than social costs from tobacco consumption in almost all countries in developing Asia. A useful metric to assess whether corrective taxes on tobacco are set appropriately is to compare the corrective tax yield with the cost of death and disability from tobacco-attributable causes, although this will underestimate tax shortfalls as the social cost of medical treatment is excluded. Across 34 countries in developing Asia for which data is available, 30 countries have higher annual costs from tobacco-attributable death and disability than corrective tax collections, 22 cover less than half of the costs of which 15 cover less than a quarter of the costs (Figure 8). Adding in medical costs that are publicly financed would likely show that all but Tonga, with a population of 105,000 people, levy corrective taxes that are insufficient to cover lost productivity and social costs of consumption. Countries that have particularly low corrective taxes relative to the cost of death and disability include most of Central Asia, Mongolia, Myanmar, Pakistan, Solomon Islands, and Viet Nam.

Figure 8. Tobacco in developing Asia: costs of death and disability productivity loss and corrective tax yield, 2019 or most recent year (percent of gross domestic product)



Sources: Institute for Health Metrics and Evaluation, World Health Organization, World Bank, literature survey of tobacco tax yields (most recent year available), and author's calculations.

Tobacco tax reforms that shift from low, ad valorem, and tiered excises to high, uniform, specific or combined specific and ad valorem taxes could have beneficial results in developing Asia countries with weak excise tax structures and/or low excise tax collections, including, for example, Cambodia, India, Mongolia, Myanmar, Pakistan, and Viet Nam (tax reform literature in these countries is summarized in endnotes).¹⁴

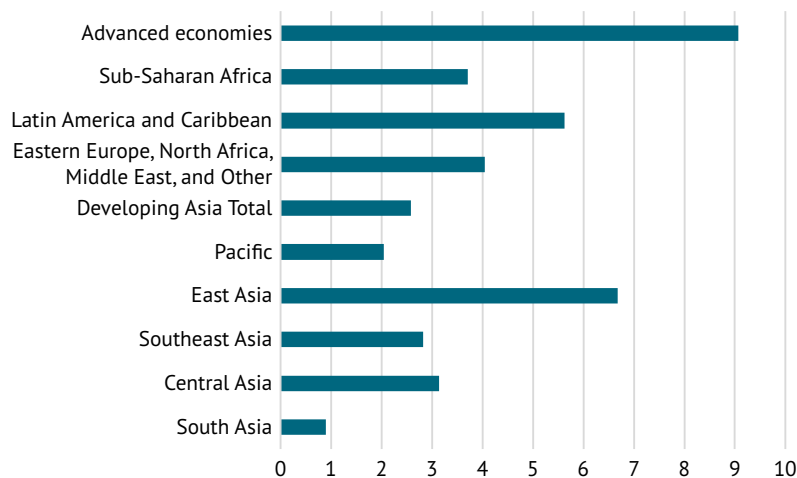
B. Alcoholic beverages

While corrective taxation of alcoholic beverages (beer, wine, and spirits) is widespread, information on tax collections is limited and there are no international benchmarks for appropriate levels of taxation even though the cost of alcohol-attributable death and disability can be significant and higher than that of tobacco in some countries as demonstrated previously.

¹⁴ Reforms in Cambodia and Myanmar are discussed in SEATCA, 2021. For India, refer to John and Dauchy 2021, and Rout and Parhi. 2020. For Mongolia, Ross et al. 2020. For Pakistan, Nargis et al. 2019.

On average, consumption of alcoholic beverages is lower in developing Asia than in other regions, but there are wide intra-developing Asia differences (Figure 9). Per capita consumption of alcohol is highest in the East Asia subregion (the PRC, the ROK, and Mongolia) and lowest in South Asia principally because of religious restrictions (Afghanistan, Bangladesh, and Pakistan).

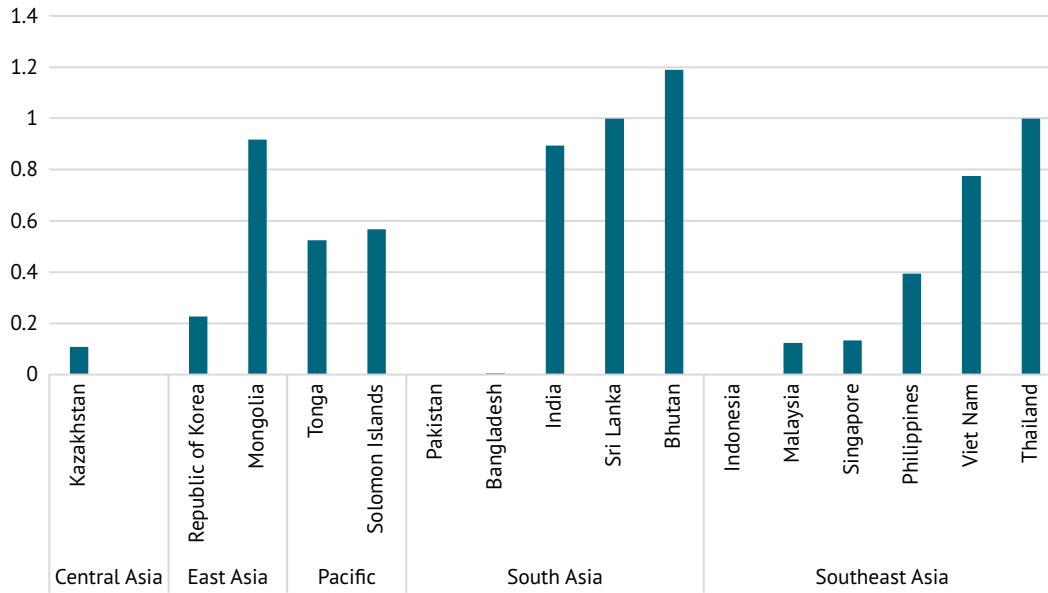
**Figure 9. Regional average pure alcohol consumption, 2018
(liters per capita, aged 15+)**



Sources: World Health Organization, World Health Observatory.

Corrective alcohol taxes for countries with available data also show considerable variation in part linked to levels of consumption (Figure 10). A handful of countries collect close to or above 1% of GDP in revenue as is the case with tobacco (Bhutan, Indi, Mongolia, Sri Lanka, Thailand, and Viet Nam, and) although the number of countries with no data is high.

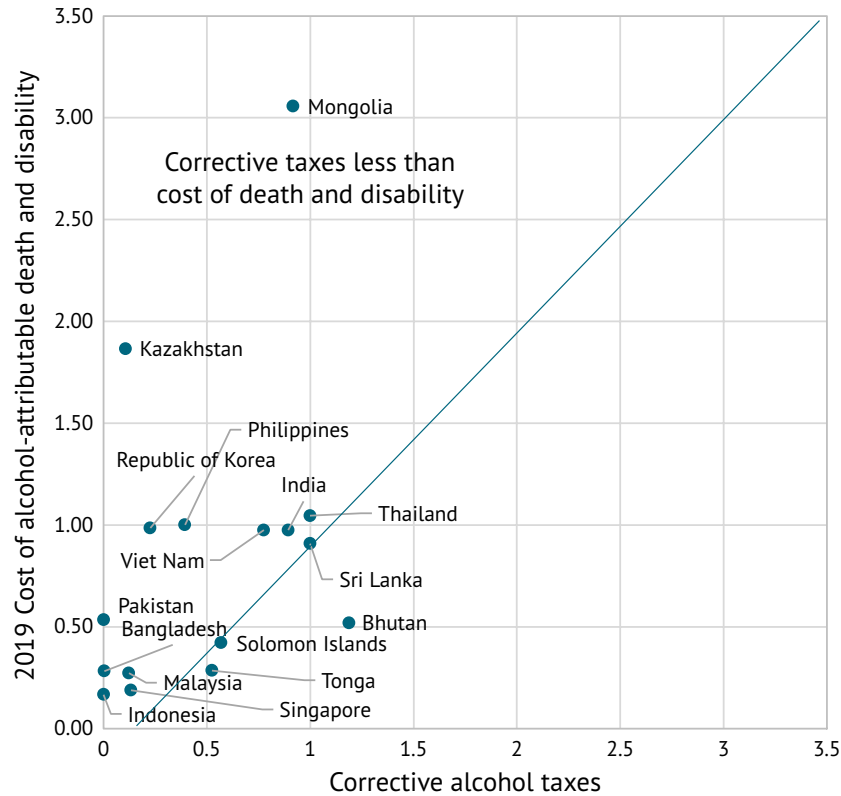
**Figure 10. Alcohol corrective tax collections, 2019 or latest available year
(percent of gross domestic product)**



Sources: World Health Organization, World Bank, and author's literature/web search.

A comparison of corrective tax yields with the costs of lost productivity from death and disability indicates that three quarters of countries with tax data have tax shortfalls (Figure 11). A few countries have large shortfalls because of particularly elevated costs of death and disability (Mongolia and Kazakhstan), while only Bhutan collects corrective taxes significantly greater than productivity loss from death and disability. A more complete comparison considering public medical treatment costs and other externalities, such as crime including domestic violence and car accidents, would undoubtedly signal that much higher corrective taxes on alcohol are warranted across developing Asia.

Figure 11. Alcohol in developing Asia: costs of death and disability productivity loss and corrective tax yield (percent of gross domestic product)



Sources: Institute for Health Metrics and Evaluation, World Health Organization, World Bank, literature survey of alcohol tax yields (most recent year available), and author's calculations.

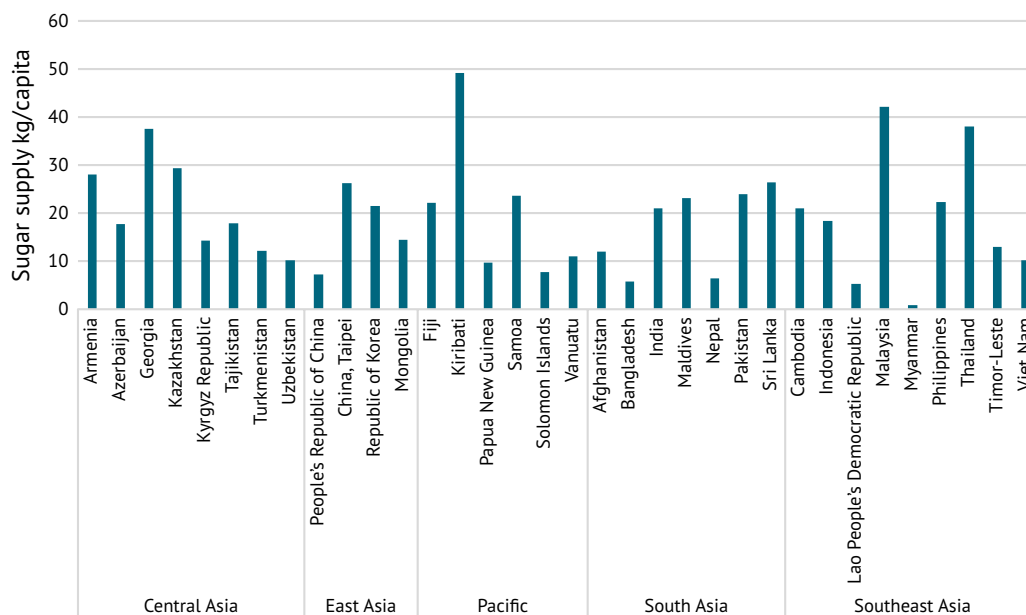
C. Sugar and other unhealthy foods

The scientific rationale for taxing sugar including SSBs is a WHO guideline recommending sugar be limited to less than 10% of total energy intake (50 grams per day of 18.25 kilograms (kg) per year) to help control unhealthy weight gain, dental caries, and secondary diseases such as diabetes (WHO 2015a). Additional health benefits arise from reducing sugar consumption further to below 25 grams per day. The guideline applies to free sugars such as glucose, dextrose, fructose, sucrose, and maltose but not to sugar found naturally in milk and fruits. Based on research evidence, WHO recommends SSB taxes sufficient to raise prices by at least 20% to have meaningful effects on health (WHO 2016b).

Average sugar consumption per capita in developing Asia is low compared to other regions at 19 kg/capita/year, close to the WHO recommended maximum guideline (18.25 kg/capita/year), compared to 30 kg/capita/year in advanced economies and 36 kg/capita/year in Latin America and the Caribbean. However, there is considerable intra-developing Asia variation as well as population groups within countries that have well above average

consumption, e.g., youth. Some Pacific island-countries have particularly elevated levels (Kiribati), as do Armenia, Georgia, and Kazakhstan in Central Asia, and Taipei, China; Sri Lanka; and Thailand (Figure 12).

**Figure 12. Developing Asia sugar supply per capita, 2018
(kilogram sugar supply per capita)**



Sources: Food and Agriculture Organization of the United Nations FAOSTAT Statistical Database.

Taxes on SSBs through 2019 have been introduced in 43 countries and territories worldwide with most introduced in the last decade (World Bank 2020a). In developing Asia, 11 of 14 Pacific member states had an SSB tax in line with a regional road map for addressing NCDs whose financial burdens were assessed to be unsustainable, as well as India, the Philippines, and Thailand (Table 1) (Teng et al. 2021).

There is considerable variation in the application of SSB taxes in developing Asia by type of fiscal instrument and products subject to the tax leaving ample scope to improve tax design. Close to half the jurisdictions apply import tariffs or higher differential excise taxes on imports which will divert consumption to lower-taxed local production and undercut the objective of reducing sugar consumption. The product coverage also varies with some jurisdictions targeting SSBs only risking substitution to sweetened fruit juices, cordials, and powders. Most SSB taxes were ad valorem, with Cook Islands being a notable exception by levying tax on sugar content which provides incentives to producers to reduce sugar content, and hence their tax burden. A few jurisdictions set tiered taxes with higher taxes on higher sugar content products, again providing incentives for product reformulation, e.g., Thailand.

Table 1. Sugar-sweetened beverage taxes in developing Asia

Country	Year of Introduction	Policy Instrument	Type of Measure	Average Effective SSB Tax	Products Subject to the Tax
Cook Islands	2014	Excise tax	Specific, sugar based	82%	Beverages containing added sugars
Fiji	2006	Excise tax	Specific, volume (local) and ad valorem (imported)	51%	Locally produced sweetened beverages
India	2017	General sales tax	Ad valorem	40%	Aerated waters and drinks containing added sugar
Kiribati	2014	Excise tax	Ad valorem	40%	Mineral and aerated waters that contain added sugar, other sweeteners, or flavorings
Marshall Islands	pre-2008	Import duty	Specific, volume (local) and ad valorem	66%	Sugar sweetened soft drinks
Nauru	2007	Import duty	Ad valorem	30%	Imported carbonated SSBs, cordials, flavored milks, sugar-sweetened drink-mix beverages
Niue	2016	Import duty	Ad valorem	80%	Sweetened beverages
Palau	2003	Import duty	Specific, volume	32%	Carbonated soft drinks
Philippines	2018	Excise tax	Specific, volume (local) and ad valorem (imported)	16%–20%	Juices, tea, carbonated beverages, flavored water, energy and sports drinks, powdered drinks not classified as milk, juice, tea, and coffee, cereal and grain beverages
Samoa	1984	Excise tax	Specific, volume based	21%	Soft drinks, both imported and locally produced
Thailand	2017	Excise tax	Specific, tiered and volume based	10%–14%	Artificial mineral water, soda water, carbonated soft drinks without sugar or other sweeteners and without flavor, mineral water and carbonated soft drinks with added sugar or other sweeteners or flavors, and fruit and vegetable juices
Tonga	2013	Excise tax	Specific, tiered and volume based	48% local 96% imported	Soft drinks containing sugar or sweeteners
Tuvalu	2009	Excise tax & import duty	Specific (local) and ad valorem (imported)	43%	Sweetened beverages
Vanuatu	2015	Excise tax	Specific, volume based	108%	Carbonated beverages containing added sugar or other sweeteners including mineral waters and carbonated waters

Sources: World Bank 2020; Teng et al. 2021.

There is also a wide range of effective tax rates (average across local and import tax rates where these differ) although all jurisdictions, except Thailand and the Philippines, levy rates greater than the WHO-recommended minimum of 20% tax-induced price increase (17% effective rate).

There is limited information on SSB tax collections in developing Asia. Tonga's high tax rates returned exceptionally high revenue equivalent to 0.8% of GDP (US\$.8 million) (World Bank 2020b). Yields were lower in the Philippines (0.15% of GDP) and Thailand (0.02% of GDP) although absolute amounts collected were nontrivial at US\$505 million in the Philippines (2018) and US\$90 million in Thailand (2020).¹⁵ In the Philippines, revenues initially fell short of targets by about 50% because of difficulties in differentiating between products with local sugar content (\$0.12/l tax) and those with added high fructose corn syrup (\$0.23/l tax) again highlighting the adverse impact of tax differentiation.

SSB taxes have had a mixed impact in developing Asia. In Thailand, the five-tier excise resulted in product reformulation with sugar content dropping 26% in energy drinks and 18% in fruit juices and the number of beverages meeting "healthier choice" standards rising tenfold between 2017 and 2020. In Tonga, product substitution has been evident from high-taxed imports to lower-taxed domestic production, although surveys show a minority of consumers changing consumption patterns. Nonetheless, experience of relatively high SSB taxes outside the region suggests that they can significantly change consumer behavior: Saudi Arabia, the fourth largest consumer of carbonated drink calories per capita in the world, introduced a 50% ad valorem excise on carbonated drinks and 100% tax on energy drinks in June 2017. Evaluation of the impact shows that carbonated drink prices rose 55% and sales per capita dropped 33% after the introduction of the tax (Alsukait et al 2020).

A few countries in developing Asia have introduced a broader array of corrective taxes on unhealthy food products although it appears too early to evaluate their broader impact (see also case study of Tonga in section V).

V. Implementation challenges in case studies of expanding the use of health-related corrective taxes: what are the strategies for success?

This section discusses some practical examples of how policymakers have succeeded (or have not) in reforming corrective taxes, highlighting the importance of various factors including regional tax policies, domestic political support, the role of state-owned enterprises producing unhealthy products, embedding corrective tax reforms in a broader reform of consumption taxes, experimentation with taxation on unhealthy foods where diet is a major factor in NCDs, and the pros and cons of earmarking (hypothecating) some or all of corrective tax revenues.

¹⁵ Food Navigator-Asia. <https://www.foodnavigator-asia.com/Article/2019/10/16/Sugar-tax-dismay-Philippines-senate-highlights-failure-of-revenue-payout-to-sugar-industry#>; and Utensute, 2021.

A. Advances in tobacco tax reform in Georgia and the Philippines

Georgia illustrates how comprehensive tobacco tax reform can result in a reduction in tobacco consumption while also raising significant excise revenues. Georgia has high smoking prevalence rates of more than 30% (both sexes over 15 years of age). Following a change of government in 2003, aggressive action was taken against illicit tobacco sales which amounted to more than 40% of the market and were reduced to less than 1% by 2010 through strengthened customs enforcement. In 2010, excises on imported and domestic production were equalized (although unfiltered cigarettes had a lower excise). The 2014 Association Agreement with the European Union proved to be an important driver of tobacco tax reform calling for a gradual approximation of Georgia's national legislation with the tobacco control legislation of the European Union (Ross and Bakhturidze 2019). Reforms in 2013 raised specific excises on both filtered and unfiltered cigarettes. In addition, a 5% ad valorem tax was added in 2015 rising to 30% by 2019. These tax measures increased the tax share of cigarettes' retail price about fivefold between 2012 and 2019, while consumption of locally produced tobacco dropped by one-third between 2015 and 2020 (Figure 13) (WHO 2021a) although overall smoking prevalence declined more slowly. Tobacco excise revenues collections of 1.5% of GDP in 2019 were the highest in the developing Asia region (apart from Palau, Samoa, and Tonga) although still fall short of the productivity losses of premature death and disability from tobacco-attributable diseases of 2.0% of GDP and additional public health care costs. Surveys of tobacco consumption in 2017, 2018, and 2019 showed no evidence of increased illicit tobacco consumption after the tax increases (Little, Megan, Hana Ross, George Bakhturidze, and Iago Kachkachishvili 2021).

Figure 13. Georgia: tobacco taxation and consumption, 2012–2021
(tax as share of price and pack sales)



LHS = left-hand side, RHS = right-hand side.

Sources: World Health Organization. 2021. *Report on Global Tobacco Epidemic, 2021*.

In 2012, the Philippines adopted a Sin Tax Reform Act (Republic Act 10351) which significantly altered its tobacco excise tax system, dramatically raising taxes on nearly all cigarettes sold. Large increases of tax and price reduced affordability, leading to a sharp reduction in cigarette sales (down 23% 2012–2016) and smoking prevalence. Tobacco excise tax revenues also rose sharply (171% 2012–2015). 85% of incremental revenue from tobacco was soft earmarked for health, helping to triple the Department of Health’s budget (Task Force on Fiscal Policy for Health 2019). In 2019, a new law further raised tobacco taxes aiming to raise ₱130 billion (US\$2.5 billion) over 5 years with strong political backing from President Rodrigo R. Duterte.¹⁶

B. Slow progress in Viet Nam tobacco tax reform

Viet Nam is an instructive example of a country with a weak tobacco excise tax structure, low excise tax level, and corrective tax revenues (0.25% of GDP in excise tax revenue).¹⁷ Tobacco use prevalence is 23% (both sexes above 15 years old) and the annual costs of death and disability from tobacco use are estimated at 1% of GDP (Figure 5) about four times the current excise tax collections. A 75% special consumption tax is levied on the pre-tax ex-factory price of cigarettes providing opportunities for producers to manipulate pricing and leading to a wide variation of cigarette prices. The tax as a share of retail price is about 35%. Under the current tax structure, if taxes increase the pass-through to retail prices is limited and the impact on consumption is muted by consumers downshifting to cheaper cigarette brands, tending to lend a false veneer of credibility to industry claims that taxes are an ineffective tobacco control mechanism.

Proposals under consideration to add a specific excise of D5,000 per pack to all brands would double excise collections, and over time lead to 1.2 million smokers quitting or not starting, averting 400,000 premature deaths, beginning to reduce the annual toll from tobacco-attributable death and disability while also reducing related medical costs.

An important factor in the political economy of tobacco taxation in Viet Nam is the state-owned tobacco corporation VINATABA, which has a 60% market share including through licensing foreign brands. State ownership contributes to the delay, dilution, or undermining of effective tobacco control measures, including taxation, through high-level engagement of the tobacco industry on tobacco control policies. Similar challenges arise in the Lao People’s Democratic Republic and the PRC (SEATCA 2019).

¹⁶ <https://www.reuters.com/article/philippines-tax-smoking/philippines-duterte-signs-law-raising-taxes-on-tobacco-products-idUSL4N24Q3RO>.

¹⁷ This paragraph draws upon SEATCA. 2021. *Lost Funds: A Study on the Tobacco Tax Revenue Gap in selected ASEAN Countries*.

C. Embedding corrective tax reform in a broader fiscal package

A stand-alone corrective tax reform may have a greater chance of success if it is part of a broader fiscal reform that supports medium-term revenue generation, strengthens debt sustainability, and expands fiscal space for the countries' development agenda. Some examples from developing Asia include the following initiatives:

- (i) In 2020, Bhutan passed a new General Sales Tax Act¹⁸ which simplifies 11 consumption tax rates into a single 7% rate which would result in the reduction of some product prices by eliminating double and triple taxation (tax cascading) and would fill a revenue gap created by India's adoption of a general sales tax which eliminates tax refunds from India. These reforms were supported by the IMF (IMF 2018) and the World Bank, and also provided an opportunity to simplify and increase corrective taxes given offsetting reductions in some other product prices. Differentiated excise taxes on alcohol were raised from 30% to 75% to a single rate of 100%, i.e., 50% of sales price considering high social costs from alcohol consumption referenced in the Bhutan Alcohol Policy and Strategic Framework.¹⁹ A tax on tobacco products was introduced at 100% (previously sale was prohibited but informal untaxed import channels existed). A 20% excise was also applied to sugars, soft drinks, plastic bags, and sheets. The act is scheduled to enter into force in 2022 and provides a good example of wrapping corrective tax changes around a broader consumption tax reform.
- (ii) The IMF and World Bank programs that focus on fiscal reforms provide an opportunity for corrective tax reforms. An IMF study of 55 episodes where tax revenues rise by at least 0.5% of GDP per year for 3 years found that increases in excise taxes are the most common tax policy instrument accounting for one quarter of all tax policy actions (Akitoby et al 2018). A recent study by the Center for Global Development surveyed the IMF and World Bank programs and found 124 policy commitments on the taxation of alcohol, tobacco, and SSBs in 43 countries with more than half relating to tobacco products and one third to alcoholic beverages (Lane, Glassman, and Smitham 2021). Actions mostly focused on raising excise rates, a few changed tax design (e.g., moving to specific taxes from ad valorem taxes) or introduced track and trace systems for tobacco products. Table 2 provides specific examples of program commitments in developing Asia.

¹⁸ <https://www.mof.gov.bt/wp-content/uploads/2020/07/GSTAct2020.pdf>.

¹⁹ National Policy and Strategic Framework to Reduce Harmful Use of Alcohol 2015–2020, 2015.

Table 2. Developing Asia: corrective tax commitments in International Monetary Fund- and World Bank-supported programs, 2017–2020

Country (Year)	Corrective Tax Commitment
Pakistan (2019, International Monetary Fund)	Raise excise and expand base for tobacco excise and introduce an excise on carbonated and uncarbonated drinks, juices, and syrups.
Sri Lanka (2019 International Monetary Fund)	Raise excises and customs duty on alcohol and tobacco.
Fiji (2018, World Bank)	Increase excise taxes on tobacco and alcoholic beverages.
Philippines (2019, World Bank)	Increase excises on tobacco to finance Universal Health Care Law.
Samoa (2018, World Bank)	Approve the Alcohol Control Bill.

Notes: All prior actions are in the International Monetary Fund and World Bank programs.

Source: C. Lane et al. 2021.

D. Tackling noncommunicable diseases with corrective taxes in Tonga

Tonga has elevated risks of NCDs, with 90% of the adult population overweight or obese and more than 40% of local food expenditure on unhealthy products (World Bank 2020b). In response, a national NCD strategy was implemented, including extensive use of corrective taxes building on a 2014 regional Pacific strategy to address the challenge of NCDs.

Specific reforms implemented include:

- (i) tobacco excise doubled between 2013 and 2018 (slightly lower increase for local tobacco);
- (ii) specific excise taxes applied to imported fatty foods (turkey tails, mutton flaps, chicken leg quarters);
- (iii) specific excise taxes applied to imported sugary foods (ice cream, chocolates, biscuits, SSBs) and processed foods (instant noodles);
- (iv) tariffs on imported fruits eliminated; and
- (v) moderate increases in alcohol excises

The corrective taxes had the intended effect of raising prices, and surveys indicated low demand responsiveness to prices of cigarettes (−0.19 – −0.31 depending on income quintile), instant noodles (−0.38 elasticity), and chicken legs (−0.39); and higher responsiveness to SSBs (−0.93), ice cream (−1.38), and mutton flaps (−1.92). However, there was evidence of product substitution to untaxed local ice cream, local instant noodles, and local beverages (including water) as well as lower-taxed local tobacco, highlighting the risks from differential taxation of local and imported production which have the effect of lowering the positive health impact.

Community concerns centered on the lack of healthy alternative foodstuffs for low-income households as well as the uses of the additional tax revenue, which were not allocated to health or health promotion activities. It is likely too early to tell whether the NCD taxes have had a marked impact on health status in Tonga.

E. To earmark or not to earmark?

Policy makers will need to address the question of whether to earmark (or hypothecate) some or all of corrective revenues to a particular program or purpose. Numerous countries earmark some or all corrective tax revenue, including 35 countries earmarking from tobacco taxes, 9 from alcohol taxes, and 10 from SSBs or other harmful products.

Typical reasons for earmarking include offsetting burdens created by the tax, e.g., to compensate low-income groups; to further the health goals of the corrective tax such as funding for tobacco control initiatives; or to make the tax politically more palatable to a particular constituency, e.g., to support tobacco farmers. Earmarking may ensure a continuous regular source of funding that is not subject to annual budgetary review. Conversely, earmarking may lead to rigidities and inefficiency in expenditure, as the spending cannot be reallocated to higher priorities, and may lead to procyclical spending. Earmarking may not lead to durable increases in expenditure, if earmarked tax collection drops or if other budgetary funding is reduced to offset the positive impact of the earmark. A distinction is sometimes made between hard earmarks where earmarked revenue can only be used for a defined purpose, and soft earmarks where there is a more flexible link between revenue and expenditure as is the case in the Philippines where earmarked revenues from corrective alcohol and tobacco taxes must be allocated to health, but priorities can change as indicated in the health budget request (Cashin, Sparkes, and Bloom 2017).

In developing Asia, earmarked corrective taxes have been used with varying degrees of success:

- (i) The 2012 reform of the Philippines alcohol and tobacco excise system, including earmarking a large proportion of excises to the health sector, has been described as “an unqualified success” by WHO (WHO 2016a). Under the reform, 85% of tobacco excises above a 2012 baseline were allocated to the health sector and 15% allocated to tobacco growing provinces as well as 100% of incremental alcohol excise revenue to the health sector. The 85% of the incremental tobacco revenue was allotted to finance universal health coverage, millennium development goals for health, and medical assistance and health enhancement facilities. Actual revenues turned out to be significantly higher than projected and amounted to more than US\$1 billion in 2013, 2014, and 2015. The additional financing for the health sector notably enabled a significant expansion of the Philippine Health Insurance Coverage of the poor, and the health sector share of budget expenditure rose from 6% in 2012 to about 7% in 2017 (Cashin 2020).
- (ii) In Thailand, the Health Promotion Foundation Act of 2001 added a 2% surcharge to alcohol and tobacco excises allocated to the ThaiHealth Promotion Foundation, an autonomous state agency, which has broad responsibility for health promotion activities that are not supported by the Ministry of Public Health. Revenues rose from about \$60 million to about \$120 million a year as excises increased over time. A subsequent analysis of the ThaiHealth Promotion Foundation in 2019 found that: “Some notable ThaiHealth-supported public campaigns are for schools free of sweetened carbonated beverages; alcohol abstinence during three-month

Buddhist lent; and nationwide physical activity. The percentage of people using tobacco decreased from 22.5 percent in 2001 to 18.2 percent in 2014. The annual per capita alcohol consumption decreased from 8.1 litres pure alcohol in 2005 to 6.9 litres in 2014. The percentage of the adult population doing at least 150 minutes of moderate-intensity or 75 minutes high-intensity aerobic exercise per week, increased from 66.3% in 2012 to 72.9% in 2017. A dedicated funding mechanism, a transparent and accountable organization, and the engagement of civil society organizations and other government agencies enabled ThaiHealth to run these campaigns.” (Pongutta et al 2019)

- (iii) In Taipei, China, the Long-Term Care System for disabled patients needing long-term care was reformed in 2017 from an employer-financed insurance system to a tax-financed system with earmarks of 10% of the estate and gift tax and alcohol and tobacco excises, while excise taxes on cigarettes were raised by 270% from \$0.4 to \$1.1 per pack. County governments were also obligated to support the Long-Term Care System. These arrangements were expected to apply until 2026. While the earmarked revenues initially fell short of projections, concerns were also raised that the tobacco excise may prove insufficient as tobacco use prevalence is gradually declining, and the tobacco tax is regressive in nature and may raise the question of unequal allocation of funding responsibilities for long-term care, at least compared to an employer-financed insurance system (Yeh 2020).

VI. Strategies for success

While there is no single proposal for implementing corrective tax reform that would apply to all countries of developing Asia given their unique circumstances, some of the previous examples indicate that durable reforms can be implemented with adequate preparation and consultation either on a stand-alone basis or as a part of broader health sector or revenue mobilization reforms, notwithstanding opposition from producers’ and other lobby groups.

Five key considerations for successful corrective tax strategies are:

- (i) Who will be damaged by the imposition or increase of corrective taxes? Strategies need to anticipate how to deal with how commerce responds; for example, by marshalling best practice advice, successful examples of international experience, and underscoring the health and economic costs that are the rationale for levying corrective taxes.
- (ii) How and by whom are taxes collected? This will depend on industry structure and the nature of the supply chain, and, in parallel, effective enforcement strategies are essential to address rising incentives for noncompliance.
- (iii) How will consumers respond to corrective taxes? Specifically, it is useful to investigate whether there are healthy or unhealthy substitution possibilities that will support or undercut the desired behavior changes and may warrant tailoring corrective taxes to mitigate these impacts.

- (iv) Corrective taxes should be considered alongside expenditure policies with consideration needed on the level and quality of government spending in support of population health and health promotion goals that can help secure political acceptance of reform and mitigating expenditures to protect vulnerable groups.
- (v) Corrective taxes and product regulation are complementary and mutually reinforcing activities calling for close cooperation between finance ministries and health ministries and institutions.

Significant resources exist to support the implementation of corrective tax reforms.

In addition to technical experts at the international financial institutions, the regional development banks, WHO, and alcohol and tobacco control groups, there is a significant amount of technical guidance on corrective tax implementation. Some of the key resources include:

- (i) WHO, Technical Manual on Tobacco Tax Policy and Administration, 2021;
- (ii) IMF, How to Design and Enforce Tobacco Excises, Fiscal Affairs Department, 2016;
- (iii) International Agency for Research on Cancer, Handbooks of Cancer Prevention, Volume 14 Effectiveness of Tax and Price Policies for Tobacco Control, 2011;
- (iv) World Bank, Tobacco Tax Reform at the Crossroads of Health and Development, 2017;
- (v) World Bank, Confronting Illicit Tobacco Trade: A Global Review of Country Experiences, 2019;
- (vi) WHO, Resource Tool on Alcohol Taxation and Pricing Policies, 2017;
- (vii) World Bank, Support for Sugary Drinks Taxes. Taxes on sugar sweetened beverages: Summary of International Evidence and Experiences, 2020;
- (viii) A. M. Thow and E. Siu, Strengthening the Design and Implementation of Health Taxes: Lessons from a Review of the Recent Health, Legal and Economic Literature, 2021 (forthcoming); and
- (ix) Taskforce on Fiscal Policy for Health, Health Taxes to Save Lives, 2019.

A. Key conclusions and takeaways

- (i) Tobacco and alcohol use and unhealthy diets are major drivers of NCDs in developing Asia accounting for 10.8 million deaths annually and millions more years lived with disability. Using the cost of illness approach, the annual cost in terms of lost productivity from premature death and disability is estimated to average 2.1% of GDP in developing Asia for tobacco, alcohol, and SSBs consumption (one element of an unhealthy diet high in added sugars), with public medical treatment costs boosting these costs further. This compares to average domestic general government health spending of 3.0% of GDP in developing Asia.
- (ii) Corrective taxes on alcohol, tobacco, and unhealthy foods are a powerful tool to reduce or deter harmful consumption of alcohol, tobacco, and SSBs yet corrective tax revenues for almost all countries in developing Asia for most harmful products are far below the productivity loss from death and disability and the costs of medical treatment.

- (iii) There is significant potential for higher tobacco taxes in developing Asia: in the 34 countries in developing Asia for which data is available, 30 countries have higher annual costs from tobacco-attributable death and disability than corrective tax collections, 22 cover less than half the costs of which 15 cover less than a quarter of the costs. Alcohol taxes are also low in many developing Asia countries with three quarters of countries with tax data not covering even the death and disability productivity losses with additional substantial social costs arising from externalities (crime, violence, policing). Taxes on SSBs appear effective in reducing consumption in the high-consumption countries with taxes above 20% of the retail price although they are unlikely to generate revenue on the same scale as tobacco or alcohol taxes. SSB taxation is relatively new and research of its health impact will take additional time.
- (iv) It is estimated that higher corrective taxes, primarily on alcohol or tobacco, could raise up to an additional 0.6%–0.7% of GDP of government tax revenue, although country circumstances impact revenue potential.
- (v) There is considerable scope to (a) improve corrective tax design and effectiveness: specific taxes linked to harmful content (alcohol and SSBs), and (b) remove tiering (tobacco), indexation of specific taxes (all products), and uniform taxation of domestic and imported products (all products).
- (vi) Strategies for successful corrective taxes can include anticipating producer and consumer responses in tax design, having an effective tax enforcement strategy, and considering expenditure policy and product regulation alongside tax policy objectives.

Appendix: methodology for calculating the productivity loss from death and disability

We closely follow the approach set out by Goodchild, Nargis, and Tursan d’Espaignet (2018) for calculating the indirect cost from lost productivity from alcohol-, tobacco-, and sugar-sweetened beverages-attributable death and disability. The economic value of lost production from years of life lost to age 65 and years lived with disability is the purchasing power parity gross domestic product (GDP) per worker after adjusting total years of life lost for labor force participation rate by sex and for life expectancy by sex, i.e., an economic cost occurs for death and disability attributable to people in the labor force adjusted for the proportion of each age cohort that are expected to reach the age of 65 using World Health Organization life tables. The purchasing power parity (PPP) indirect costs are expressed as a share of PPP GDP to enable comparisons across countries.

We calculate the value in PPP\$ of labor productivity loss because of death and disability for risk factor r in country i at time t .

Death

D_WAP_{rjit} = deaths in the working age population for risk factor r , gender j , in country i , at time t . Working age population is aged 20–65 years for each 5 year age cohort.

LYL_{rjit} = labor years lost to age 65 at retirement which is calculated as 65 – median age in age cohort for risk factor r gender j , in country i , time t .

We adjust LYL_{rjit} for survival rates by age cohort and gender using World Health Organization survival rates variable L_x . We further adjust the labor years lost for the labor force participation rate, i.e., assuming that deaths occurring to people not in the labor force do not have a productivity loss using the World Bank’s World Development Indicators (WDI) data for labor force participation by gender (employment to population age 15–64 modeled International Labour Organization estimates).

$djLYL_{rjit} = LYL_{rjit} * \text{survival rate factor } r_{jit} * \text{labor force participation } LFP_{jit}$

Value of labor productivity loss is calculated by multiplying adjusted labor years lost by the World Bank’s WDI PPP GDP per worker expressed in constant 2017 PPP dollars. This is scaled as a share of PPP GDP at 2017 constant prices. For simplicity, we do not inflate future labor years productivity value by assumptions on per capita productivity growth nor deflate using a discount rate. All data are in unadjusted 2017 PPP share of GDP.

Disability

We use disability adjusted life years (DALYs) lost for each risk factor r , gender j , in country i at time t . The $DALY_{rjit}$ is calculated as the number of new case incidents multiplied by disability weight multiplied by the duration of disability to death or remission.

We value DALYrjit using the same approach as for LYL using PPP GDP per worker.

All data on death and disability is obtained from the Institute for Health Metrics and Evaluation Global Burden of Disease database at <http://ghdx.healthdata.org/gbd-results-tool>.

All the World Bank's WDI data is obtained from <https://databank.worldbank.org/source/world-development-indicators>.

References

- Akitoby, B., A. Baum, C. Hackney, O. Harrison, K. Primus, and V. Salins. 2018. Tax Revenue Mobilization Episodes in Emerging Markets and Low-Income Countries: Lessons from a New Dataset. *IMF Working Paper* 18/234.
- Allcott, H., B. B. Lockwood, and D. Taubinsky. 2019a. Regressive Sin Taxes, with an Application to the Optimal Soda Tax. *Quarterly Journal of Economics* 134(3).
- Allcott, H., B. B. Lockwood, and D. Taubinsky. 2019b. Should We Tax Sugar-Sweetened Beverages? An overview of Theory and Evidence. *Journal of Economic Perspectives* 33(3), 202–227.
- Alsukait, R., P. Wilde, S. N. Bleich, G. Singh, and S. Folta. 2020. Evaluating Saudi Arabia’s 50% carbonated drink excise tax: Changes in prices and volume sales. *Economics and Human Biology* 38.
- Becker, G. S. and K. M. Murphy. 1988. A Theory of Rational Addiction. *Journal of Political Economy* 96(4), 675–700.
- Cashin, C., S. Sparkes, and D. Bloom. 2017. Earmarking for Health: From Theory to Practice. *WHO Health Financing Working Paper* No 5.
- Cashin, C. 2020. To earmark or not to earmark: allocating revenue from health taxes. Presentation at World Bank Joint Learning Network Webinar.
- Chaloupka, F. J., A. Yurekli, and G. T. Fong. 2012. Tobacco taxes as a tobacco control strategy. *Tobacco Control* 21: 172–180.
- Clark, A., M. Jit, C. Warren-Gash, et al. 2020. Global, regional, and national estimates of the population at increased risk of severe COVID-19 due to underlying health conditions in 2020: a modelling study. *The Lancet Global Health* 8(8):e1003–e1017. doi:10.1016/S2214-109X(20)30264-3.
- Cornelson, L., R. Green, A. Dangou, and R. Smith. 2014. Why fat taxes won’t make us thin. *Journal of Public Health* 37(1), 18–23. doi:10.1093/pubmed/fdu032.
- Crossen, S. 2010. The Economics of Excise Taxation. Andrew Young School of Policy Studies, International Studies Program. Working Paper 10–18. <https://ideas.repec.org/p/ayis/ispwps/paper1018.html>.
- Dobbs et al. 2014. *Overcoming obesity: An initial economic analysis*. The Task Force on Fiscal Policy for Health.
- Dutta, S. 2019. *Confronting Illicit Tobacco Trade: A Global Review of Country Experiences*. World Bank. <https://www.worldbank.org/en/topic/tobacco/publication/confronting-illicit-tobacco-trade-a-global-review-of-country-experiences>.
- Escobar, C. et al. 2013. Evidence that a tax on sugar sweetened beverages reduces the obesity rate: a meta-analysis. *BMC Public Health* 13:1072.
- Fuchs, A. 2020. Are Tobacco and SSB Taxes Really Regressive? World Bank Mimeo.
- Fuchs, A. and Francisco Meneses. 2017. *Are Tobacco Taxes Really Regressive? Evidence from Chile*. Washington, DC: World Bank. <https://openknowledge.worldbank.org/handle/10986/25969>.
- Givel, M. S. 2011. History of Bhutan’s prohibition of cigarettes: Implications for neo-prohibitionists and their critics. *International Journal of Drug Policy* 22(4), 306–310.

- Goodchild, M., N. Nargis, and E. Tursan d'Espaignet 2018. Global economic cost of smoking-attributable diseases. *Tobacco Control* 27:58–64. <https://tobaccocontrol.bmj.com/content/27/1/58/>
- Government of Bhutan. 2015. National Policy and Strategic Framework to Reduce Harmful Use of Alcohol 2015–2020.
- Gruber, J. and B. Koszegi. 2004. Tax Incidence when Individuals are Time-inconsistent: The Case of Cigarette Excises. *Journal of Public Economics* 88:1959–1987.
- Gruber, J. and B. Koszegi. 2008. *A Modern Economic View of Tobacco Taxation*. Paris: International Union Against Tuberculosis and Lung Disease for tobacco;
- Gruber, J. and S. Mullainathan. 2002. Do Cigarette Taxes Make Smokers Happier? *NBER Working Paper* 8872. <https://www.nber.org/papers/w8872.pdf>.
- Hoang Anh, P. T. et al. 2016. Direct and Indirect Costs of Smoking in Vietnam. *Tobacco Control* 25:96–100. doi:10.1136/tobaccocontrol-2014-051821.
- Hunt, G., B. B. Lockwood, and D. Taubinsky. 2019. Should We Tax Sugar-Sweetened Beverages? An Overview of Theory and Evidence. *Journal of Economic Perspectives* 33(3), Summer 2019 pp. 202–227 for sugar-sweetened beverages.
- International Agency for Research on Cancer. 2011. Handbooks of Cancer Prevention, Volume 14, Effectiveness of Tax and Price Policies for Tobacco Control.
- International Diabetes Foundation. 2019. *IDF Diabetes Atlas*. https://diabetesatlas.org/upload/resources/2019/IDF_Atlas_9th_Edition_2019.pdf.
- International Monetary Fund. 2016. *How to Design and Enforce Tobacco Excises*. Washington, D.C.
- International Monetary Fund. 2018. *Bhutan: Staff Report for the Article IV Consultation*. Washington, D.C.
- John, R. M. and E. Dauchy. 2021. *Trends in affordability of tobacco products before and after the transition to GST in India*. doi: 10.1136/tobaccocontrol-2019-055525. Epub 2020.
- Jyani, G., Shankar Prinja, Atul Ambekar, Pankaj Bahugna, and Rajesh Kumar, 2019. Health impact and economic burden of alcohol consumption in India. *International Journal of Drug Policy* 69:34–42.
- Keen, M. and J. Slemrod. 2021. *Rebellion, Rascals, and Revenue: tax follies and wisdom through the ages*. Chapter 8. Princeton University Press.
- Lancet. 2020. COVID-19: a new lens for non-communicable diseases. Lancet editorial (London, England). 2020;396(10252):649. doi:10.1016/S0140-6736(20)31856-0.
- Lane, C., A. Glassman, and E. Smitham. 2021. Using Health Taxes to Support Revenue: An Action Agenda for the IMF and World Bank. *Center for Global Development Policy Paper* 203, Washington, DC.
- Lane, C. and V. Bhardwaj. 2021. Meeting the global health challenge to reduce death and disability from alcohol, tobacco, and sugar-sweetened beverages consumption with corrective taxes. *Center for Global Development Policy Paper* 240, Washington, DC.
- Leff, B. M. 2020. Marijuana taxation: theory and practice. *Boston University Law Review* 101: 915–932.
- Little, Megan, Hana Ross, George Bakhturidze, and Iago Kachkachishvili. 2021. “Analysis of the Illicit Tobacco Market in Georgia in Response to Fiscal and Non-Fiscal Tobacco Control Measures.” *Tobacco Control*, June, tobaccocontrol-2020-056404. <https://doi.org/10.1136/tobaccocontrol-2020-056404>.

- Nargis, N. et al. 2019. A decade of cigarette taxation in Bangladesh: lessons learnt for tobacco control. *Bulletin of the World Health Organization* 97:221–229. doi: <http://dx.doi.org/10.2471/BLT.18.216135>.
- Nargis, N., G. M. Faruque, M. Ahmed, et al. 2020. A comprehensive economic assessment of the health effects of tobacco use and implications for tobacco control in Bangladesh. *Tobacco Control Epub*. doi:10.1136/tobaccocontrol-2020-056175.
- Nikoloski, Z., A. M. Alqunaibet, R. A. Alfawaz, et al. 2021. Covid-19 and non-communicable diseases: evidence from a systematic literature review. *BMC Public Health* 21(1):1–9. doi:10.1186/S12889-021-11116-W.
- Nugent, R., and E. Fottrell. 2019. Non-communicable diseases and climate change: linked global emergencies. *The Lancet*. 394(10199):622–623. doi:10.1016/S0140-6736(19)31762-3.
- Organisation for Economic Co-operation and Development. 2021. *Preventing Harmful Alcohol Use*. <https://www.oecd.org/publications/preventing-harmful-alcohol-use-6e4b4ffb-en.htm>.
- Pigou, A. C. 1920. *The Economics of Welfare*. New York.
- Pongutta, S., R. Suphanchaimat, W. Patcharanarumola, and V. Tangcharoensathien. 2019. Lessons from the Thai Health Promotion Foundation. *Bulletin of the World Health Organization* 97:213–220, doi: <http://dx.doi.org/10.2471/BLT.18.220277>.
- Powell, L. M., J. F. Chriqui, T. Khan, R. Wada, and F. J. Chaloupka. 2013. Assessing the potential effectiveness of food and beverage taxes and subsidies for improving public health: a systematic review of prices, demand and body weight outcomes. *Obesity Review* February; 14(2):110–128.
- Rehm, J., C. Mathers, S. Popova, M. Thavorncharoensap, Y. Teerawattananon, and J. Patra. 2009. Global burden of disease and injury and economic cost attributable to alcohol use and alcohol-use disorders. *The Lancet* 373:2223–33. doi: 10.1016/S0140-6736(09)60746-7
- Ross, H. N. and George Bakhturidze. 2019. Georgia: Controlling Illicit Cigarette Trade. *Confronting Illicit Tobacco Trade: A Global Review of Country Experiences*. Chapter 5. Washington, DC: World Bank.
- Ross, H. N., Vellios, T. Batmunkh, et al. 2020. Impact of tax increases on illicit cigarette trade in Mongolia. *Tobacco Control* 29:s249–s253. doi: 10.1136/tobaccocontrol-2018-054904.
- Rout, S. K., and A. Parhi. 2020. Has tax reforms in India been effective in tobacco control: Evidences on affordability of cigarette after introduction of Goods and Service Tax. *Journal of Family Medicine and Primary Care* 9:5927–32. doi: 10.4103/jfmpc.jfmpc_1169_20
- Sabir, M., W. Saleem, M. A. Iqbal, and N. Aamir. 2021. *Economic Implications of Cigarette Taxation in Pakistan: An Exploration through a CGE Model*. Karachi: Social Policy and Development Centre.
- Sassi, F., A. Belloni, A. J. Mirelman, M. Suhrcke, A. Thomas, N. Salti, S. Vellakal, C. Visauthvong, B. Popkin, and R. Nugent, 2018, Equity impacts of price policies to promote healthy behaviors. *The Lancet* 391:2059–2070. [https://doi.org/10.1016/S0140-6736\(18\)30531-2](https://doi.org/10.1016/S0140-6736(18)30531-2)
- SEATCA. 2019. *Asian State-Owned Tobacco Enterprises: Challenges & Opportunities in Implementing WHO FCTC*. Bangkok.
- SEATCA. 2021. *Lost Funds: A Study on the Tobacco Tax Revenue Gap in selected ASEAN Countries*.
- Task Force on Fiscal Policy for Health. 2019. *Health Taxes to Save Lives: Employing Effective Excise Taxes on Tobacco, Alcohol, and Sugary Beverages*. <https://www.bbhub.io/dotorg/sites/2/2019/04/Health-Taxes-to-Save-Lives.pdf>

- Teng, A. M., W. Snowdon, S. T. Win Tin, M. Genc, E. Na’ati, V. Puloka, L. Signal, and N. Wilson. 2021. Progress in the Pacific on sugar-sweetened beverage taxes: a systematic review of policy changes from 2000–2019. *Australian and New Zealand Journal of Public Health* 45(4).
- Teng, A. M. et al. 2021. *Impact of sugar-sweetened beverage taxes on purchases and dietary intake: Systematic review and meta-analysis*. <http://www.biomedcentral.com/1471-2458/13/1072> and <https://onlinelibrary.wiley.com/doi/pdfdirect/10.1111/obr.12868>.
- Thow, A. M. and E. Siu. 2021. Strengthening the design and implementation of health taxes: lessons from a review of the recent health, legal and economic literature. Paper presented at the Third World Bank Tax Conference.
- US National Cancer Institute and WHO. 2016. The Economics of Tobacco and Tobacco Control. National Cancer Institute Tobacco Control Monograph 21. *NIH Publication No. 16-CA-8029A*. Bethesda, MD: U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute; and Geneva, CH: WHO. <https://cancercontrol.cancer.gov/brp/tcrb/monographs/monograph-21>.
- Utensute, N. 2021. Sugar Sweetened Beverages Tax in Thailand. Presentation at the 11th IMF-Japan High Level Tax Conference for Asian Countries.
- Wagenaar, Alexander C., Matthew J. Salois, and Kelli A. Komro. 2009. “Effects of Beverage Alcohol Price and Tax Levels on Drinking: A Meta-Analysis of 1003 Estimates from 112 Studies.” *Addiction* 104 (2): 179–90. <https://doi.org/10.1111/j.1360-0443.2008.02438.x>.
- World Bank. 2017. Tobacco Tax Reform at the Crossroads of Health and Development. Washington, D.C.
- World Bank. 2019. Confronting Illicit Tobacco Trade: A Global Review of Country Experiences.
- World Bank. 2020a. *Support for Sugary Drinks Taxes: Taxes on Sugar-Sweetened Beverages: Summary of International Evidence and Experiences*. Washington, DC.
- World Bank. 2020b. Using Taxation to Address Noncommunicable Diseases: Lessons from Tonga. Washington, DC.
- World Health Organisation. 2015a. *Guideline on sugars intake for adults and children*. <https://www.who.int/publications/i/item/9789241549028>.
- World Health Organisation. 2015b. ‘Sin Tax’ expands health coverage in the Philippines. <https://www.who.int/news-room/feature-stories/detail/countries-share-examples-of-how-tobacco-tax-policies-create-win-wins-for-development-health-and-revenues>
- World Health Organisation. 2016a. *Earmarked tobacco taxes: lessons learned from nine countries*. Geneva: Tobacco Control Economics Unit, WHO.
- World Health Organisation. 2016b. Fiscal Policies for Diet and Prevention of Noncommunicable Diseases: Technical Meeting Report, 5–6 May 2015.
- World Health Organisation. 2017. *Resource Tool on Alcohol Taxation and Pricing Policies*.
- World Health Organisation. 2017a. *Tackling NCDs: “best buys” and other recommended interventions for the prevention and control of non-communicable diseases*.
- World Health Organisation. 2017b. *Taxes on sugary drinks: why do it?* <https://apps.who.int/iris/bitstream/handle/10665/260253/WHO-NMH-PND-16.5Rev.1-eng.pdf?sequence=1>
- World Health Organisation. 2017c. *Economic Costs of Tobacco and alcohol in Sri Lanka 2015*.
- World Health Organisation. 2021a. *WHO Report on the Global Tobacco Epidemic: Addressing New and Emerging Products*.

- World Health Organisation. 2021b. *WHO Technical Manual on Tobacco Tax Policy and Administration*.
- Wright et al. 2017. Policy lessons from health taxes: a systematic review of empirical studies. *BMC Public Health* 17:583.
- Yeh, M. 2020. Long-term care system in Taiwan: the 2017 major reform and its challenges. *Ageing and Society* 40, 1334–1351.