



THE EFFECTIVENESS OF SUGAR TAX IN CONTROLLING SUGAR CONSUMPTION

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Abstract

The rising consumption of sugar-containing beverages has become a pressing public health concern due to its association with obesity, type II diabetes mellitus, and other chronic diseases. Indonesia faces a particularly alarming trend, ranking among the highest globally in diabetes prevalence and sugar-sweetened beverage consumption. One policy to control sugar consumption is the implementation of a sugar tax on sugar-sweetened beverages (SSBs). This study employs a systematic literature review (SLR) approach to analyze the impact of the sugar tax from economic, social, and political perspectives. Out of 2,719 articles initially screened, 18 relevant articles were selected for analysis. The findings indicate that the effectiveness of the sugar tax depends on the tax rate, implementation strategies, and stakeholder support. Furthermore, the success of this policy requires cross-ministerial coordination, public education, and transparency in revenue allocation. Without a multidisciplinary approach, the sugar tax risks becoming a controversial policy that merely serves as a government revenue source.

Keywords: Diabetes mellitus, Sugar consumption, Sugar tax, Sugar-sweetened beverages (SSBs)

INTRODUCTION

The consumption of sugar-containing beverages has become a significant concern due to its adverse health effects. High sugar intake has been linked to obesity and other chronic diseases such as type II diabetes mellitus, cardiovascular diseases, and certain types of cancer (Malik & Hu, 2022). The global prevalence of obesity has tripled over the past four decades (UNICEF, 2022). Indonesia ranks fifth globally in the number of adults (aged 20-79 years) living with diabetes (International Diabetes Federation, 2025). According to the Ministry of Health's National Health Survey (2018) and projections cited by the International Diabetes Federation (2025), the number of adults with diabetes in Indonesia has increased significantly over the years, from 5.7 million in 2000 to 7.3 million in 2011, reaching 20.4 million in 2024, and is projected to rise to 28.6 million by 2050 (International Diabetes Federation, 2025). Also, Indonesia ranks sixth in global sugar consumption (Muhamad, 2023) and was the third-largest consumer of sugar-sweetened beverages (SSBs) in Southeast Asia in 2020 (BPKN, 2023).

Excessive sugar consumption poses risks not only to adults but also to adolescents. Research indicates that higher consumption of sugary beverages, particularly among young women, may increase the risk of colorectal cancer (Hur et al., 2021). The threats posed by sugar-containing beverages must be effectively mitigated to prevent a decline in the quality of human resources.

The growing popularity of high-sugar beverages is evident from their increasing availability, low prices, and aggressive marketing campaigns. This has serious public health implications, particularly for children and adolescents, who are often targeted by advertising and promotional efforts (UNICEF, 2022). According to the National Socioeconomic Survey (Susenas) conducted by Statistics Indonesia (BPS), at least 47.9 million Indonesians consumed excessive sugar in 2021 (Gemilang, 2024).

One potential strategy to curb the consumption of sugar-containing beverages is the implementation of a sugar tax. This tax falls under the category of "sin tax," aimed at reducing the consumption of goods that have negative health impacts. According to a report published by the University of North Carolina in 2020, 44 countries had implemented a sugar tax (UNC,



2020). These countries span regions including North and South America, Europe, Africa, the Middle East, Southeast Asia, and the Pacific. The widespread adoption of this policy highlights its potential applicability in Indonesia.

From a practical perspective, implementing a sugar tax is relatively straightforward compared to other policy measures aimed at controlling consumption (Popkin & Ng, 2021). This policy directly targets consumers and requires the involvement of fewer government institutions. Compared to other food control policies that necessitate coordination between central and regional government agencies, a sugar tax can be implemented at the national level with minimal institutional complexity.

Several studies have examined the impact of sugar tax implementation from economic, social, and political perspectives. Economically, revenue generated from the sugar tax could be allocated to healthcare services and facilities, particularly for diseases associated with diabetes and excessive sugar consumption (Hambali, 2022). From a social perspective, various stakeholders, including the general public and academic communities, actively participate in discussions on the policy's implementation (Putri et al., 2023). Politically, this policy faces strong opposition from industry players due to the potential decline in sales of sugar-sweetened packaged products (Ahsan et al., 2023).

This paper aims to conduct a systematic review of existing studies and analyze the implementation of the sugar tax from economic, social, and political perspectives. Systematic literature review (SLR) is a systematic and comprehensive process of identifying, evaluating, and analyzing relevant research on a specific topic. This study is expected to contribute to academic discourse and provide a comprehensive understanding of sugar tax implementation in Indonesia. Additionally, this paper aims to offer recommendations on the steps required for effective policy implementation and how to maximize the benefits of this policy.

LITERATURE REVIEW

The Concept of Sin Tax in Public Policy

Individual consumption behavior is currently one of the most significant public health concerns. The consumption of unhealthy food and beverages, coupled with a lack of physical activity, has become a major cause of increased mortality risk due to non-communicable diseases. According to the World Health Organization (WHO), these diseases claim 41 million lives each year (Arnabal, 2021). Unhealthy consumer goods such as tobacco, alcohol, fat, and sugar have become targets of public policy interventions aimed at reducing their consumption levels. These policies are based on the premise that individuals often fail to fully comprehend the consequences of consuming these products, both for themselves and for society. One of the most important measures to mitigate excessive consumption is to increase the price of these products through the imposition of sin taxes.

From an economic perspective, sin tax is a form of indirect taxation imposed on goods or services rather than on companies or individual income. This grants policymakers greater authority in influencing consumer behavior. Sin tax can be applied in two different ways: per unit (defined as a fixed amount for each unit of goods or services sold, such as a fixed rate per kilogram) or ad valorem (imposed on expenditures and set as a percentage of the value added by companies, similar to a value-added tax). In the per-unit approach, the tax is represented as a fixed amount per unit, while in the ad valorem approach, the tax consists of a fixed percentage per unit.

Sin tax serves as a means to generate revenue and create fiscal space. The revenue-generating capacity of sin taxes can help countries increase public spending by creating additional fiscal space, enabling governments to allocate financial resources for public expenditure without reducing other budgetary allocations or disrupting fiscal balance.



The Impact of Sugar Tax Implementation in Other Countries

The imposition of sin taxes has been a primary governmental strategy for reducing excessive consumption of temptation goods for several decades. Although variations exist in its implementation and impact across low- and middle-income countries and high-income nations, evidence has demonstrated that sin tax can significantly influence consumption patterns and population welfare while remaining a financially sustainable program (Miracolo et al., 2021).

Other research findings indicate a decline in the purchase of taxed beverages and a slight increase in the purchase of non-taxed beverages (Fichera et al., 2021). Households have substituted taxed beverages with lower-sugar alternatives (which are not subject to taxation), leading to an overall reduction of 2.2% in the purchase of sugar-sweetened beverages. The study suggests that while sugar tax can moderately alter consumer behavior, a combination of multiple policies is necessary to comprehensively address obesity. Sugar tax alone is insufficient to tackle the complexity of obesity-related issues; a more holistic approach is required, including health education, healthy lifestyle literacy, and further regulations on sugar content in food and beverages.

One developing country that has implemented sugar tax is Mexico, where its application has been considered relatively effective (Sánchez-Romero et al., 2020). To assess the impact of this policy, a survey was conducted among participants, revealing that before the introduction of sugar tax, over 50% of participants were classified as moderate-to-heavy soda consumers, while less than 10% were classified as non-consumers. After the tax was implemented, 43% of the population fell into the moderate-to-heavy consumption category, while the prevalence of non-consumers increased to 14%. Three years after the introduction of the tax on January 1, 2014, the probability of becoming a non-consumer of soda increased by 4.7 percentage points, and the probability of becoming a low-level consumer increased by 8.3 percentage points compared to the pre-tax period. Conversely, the probability of being a moderate and heavy consumer decreased by 6.8 percentage points and 6.1 percentage points, respectively. No significant heterogeneity in tax effects was observed across different income levels, but stronger tax effects were noted among participants with secondary education or higher compared to those with primary or lower education.

However, substantial evidence suggests that individuals exhibit non-neutral behavior that may influence their reactions to sin tax implementation. In an experiment conducted in the United Kingdom, researchers found that individual income levels affected attitudes toward sin tax (Burlacu et al., 2022). The imposition of sin tax, when accompanied by economic slowdowns, can disproportionately impact low-income individuals.

Another study found that the implementation of sin tax, specifically on sugar-sweetened beverages, did not lead to significant changes in overall consumption (Andreyeva et al., 2022). The analysis results indicated that there were product reformulations and reductions in sugar content for taxed beverages. This suggests that sugar tax can effectively increase prices and reduce sales of taxed sugary beverages, although the impact on beverage substitution and overall consumption remains inconclusive.

The Plan for Sugar Tax Implementation in Indonesia

The imposition of excise duty on sugar-sweetened beverages (sugar tax) is one of the measures planned for implementation by Indonesia's Ministry of Finance, specifically through the Directorate General of Customs and Excise. This policy aims to achieve reducing excessive sugar consumption in society, increasing state revenue through excise levies, encouraging producers to reduce sugar content in beverages, and raising public awareness regarding the negative impacts of high sugar consumption (Andriyanto & Mayasari, 2025). Fachrudin (2018) states that sugar-sweetened beverages meet the characteristics and criteria of excisable goods



as stipulated in the Indonesian Excise Law. According to the Indonesian Excise Law, excisable goods are those that require levies due to their specific characteristics: their consumption needs to be controlled, their distribution needs to be supervised, their use may cause negative impacts on society or the environment, and their use requires state levies in the interest of justice and balance.

The initial plan for sugar tax implementation was set for 2023 but was postponed (BPKN, 2023). The Ministry of Finance and the Ministry of Health have been assessing the mechanism for sugar-sweetened beverage excise since 2019. However, economic downturns caused by the COVID-19 pandemic have been cited as reasons for the delay in its implementation. The execution of this policy requires a strong legal foundation.

METHODS

This study employs a qualitative approach in the form of a Systematic Literature Review (SLR). Systematic Literature Review (SLR) is a structured process that facilitates the collection of relevant evidence on a specific topic based on predetermined eligibility criteria to answer clearly formulated research questions, and consists of four fundamental steps: searching (defining keywords and databases), assessment (applying inclusion and exclusion criteria along with quality assessment), synthesis (extracting and categorizing data), and drawing conclusion (Mengist et al., 2020).

The study follows the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework to guide the identification, selection, and analysis of relevant research findings (Page et al., 2021). The literature collection process involves searching bibliographic databases such as Google Scholar, ProQuest, Science Direct, Scopus, and Web of Science using the keywords “sugar tax” or “sugar-sweetened beverage tax” and “Indonesia,” with the final search conducted in March 2025. Following the literature search, screening and selection were carried out using the Covidence application, while Microsoft Excel was used to assist with data extraction and synthesis. The synthesis of findings was conducted narratively, focusing on three main themes: (1) empirical evidence on consumption, health, and revenue impacts; (2) political and socio-cultural factors influencing policy adoption; and (3) policy design aspects. This approach provides an integrated understanding of sugar tax implementation in the Indonesian context.

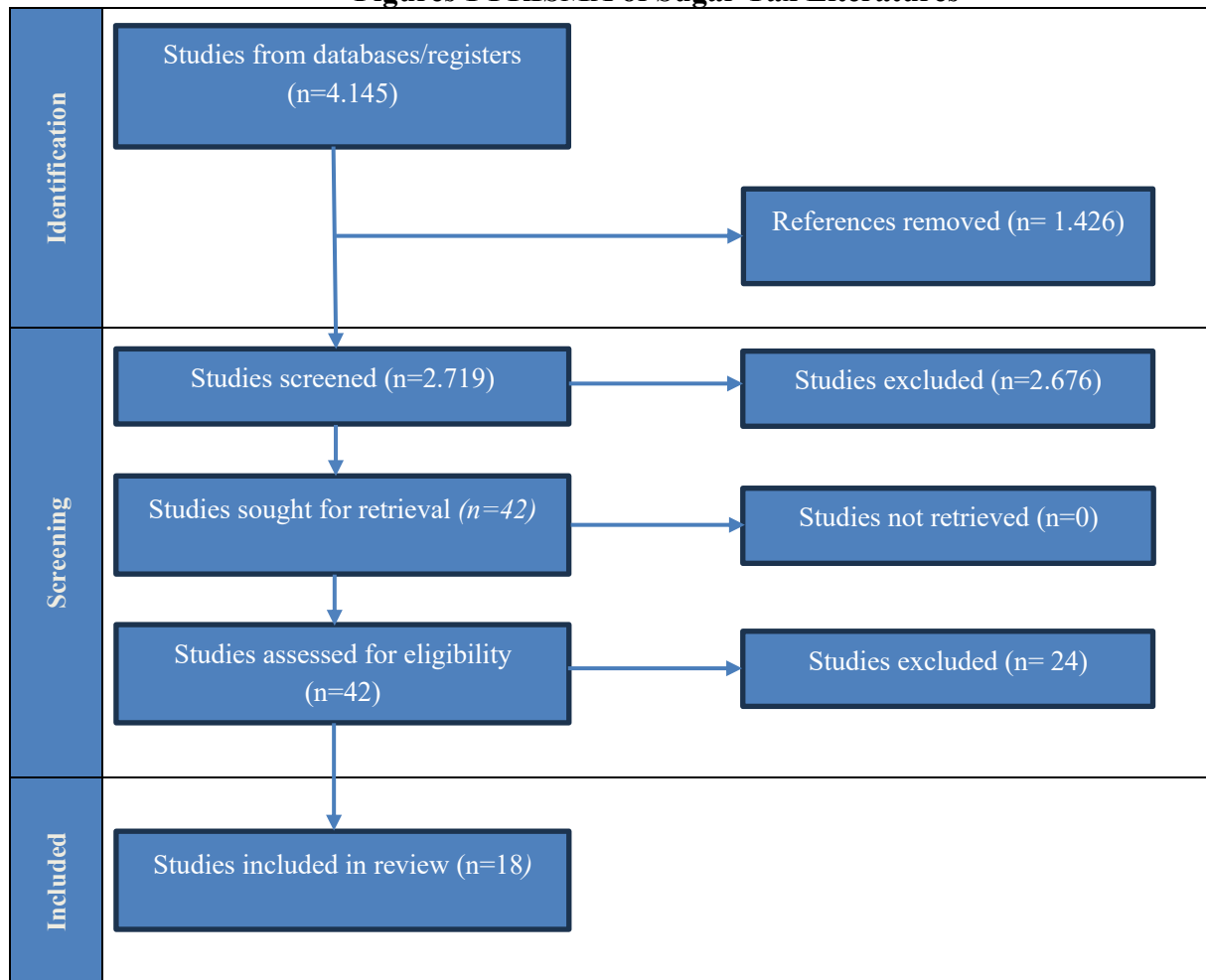
Articles were included if they examined the sugar tax and its impacts, were published as scientific articles or conference papers, preferably discussed the policy discourse or potential implementation of the sugar tax in Indonesia, written in Indonesian or English, and available in full text. Articles were excluded if they did not discuss the sugar tax, were not in the form of articles or conference papers, or focused exclusively on the implementation of sugar tax in specific countries or regions outside Indonesia, or lacked full-text access.

RESULTS AND DISCUSSION

From the initial identification of 4,145 articles, 1,426 were duplicates, resulting in 2,719 articles being initially screened. Subsequently, 42 articles met the eligibility criteria. Of these, 24 articles were excluded due to differing topics, unavailability of full-text papers, irrelevant topics, and unsuitable context, resulting in 18 articles being included in the final selection. The results based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework are as follows:



Figures 1 PRISMA of Sugar Tax Literatures



Sources: Processed from Covidence Output, 2025

The majority of the selected articles were published in Q1-indexed journals (7 articles). Most of them were published in 2023 (6 articles). Regarding journal scope, the majority of the selected articles were published in journals focusing on Health Policy (6 articles), followed by Economics journals (5 articles), indicating a balanced interest between public health and economic perspectives. In terms of research methodology, the majority of studies employed a qualitative approach (14 articles), with 5 of them using a literature review method. Meanwhile, 3 articles adopted a quantitative approach, and 1 article utilized a mixed-method approach. Since the sugar tax is still a proposed policy, a qualitative approach through literature review is considered appropriate to examine its implications comprehensively across various aspects. The distribution of articles based on index, year of publication, and journal scope is illustrated below:



Figures 2. Year, Index and Scope of Articles Included in Extraction Stages



Sources: Processed, 2025

In order to understand the whole idea proposed by the chosen article, we outline a summary of the key points from the extraction of 18 journals. The key findings from the selected studies are summarized below:

Hambali (2022): The sugar-sweetened beverage (SSB) excise policy is appropriate and should be implemented in Indonesia, specifically by imposing excise taxes on the sugary beverage industry. The revenue from this excise tax can be allocated to cover healthcare costs related to diabetes and to improve public health facilities.

Putri et al. (2023): The Ministry of Finance has the most significant influence on the discourse surrounding SSB taxation. Civil society organizations and universities should actively participate in policy change processes by providing evidence-based policy recommendations. Economic actors also contribute to the debate regarding the potential negative impact of taxation on the industry.

Andriyanto & Mayasari (2025): The policy formulation process in Indonesia has been effective and has the potential to positively impact state revenue and reduce SSB consumption. However, this policy may also pose risks, such as increased unemployment and negative consequences for related industries.

Perkasa & Bayumi (2024): If a sugar excise tax is implemented, product prices will moderately increase, consumption of high-sugar beverages will decline, and consumers will shift to healthier alternatives.

Budiyantri & Murni (2021): a tax on sugary beverages can reduce consumption. If this policy is to be implemented in Indonesia, considerations must include policy objectives and achievement indicators, available resources, commitment from implementers, Indonesia's food culture, health literacy, sugar dosage regulations, and stakeholder collaboration.

Ahsan et al. (2023): In the political discourse, arguments in favor of SSB taxation for public health benefits face strong opposition from the industry.



Ahsan et al. (2024): Health tax policies have the potential to significantly contribute to public health. However, low consumer awareness of long-term health risks remains a concern. Bureaucratic complexities and government decentralization hinder the implementation of SSB taxation.

Selvi et al. (2020): The excise tax on sugary beverages can be imposed at the producer and importer levels, with certain exceptions. The tax rate should be adjusted annually to ensure that the excise tax does not solely generate revenue but also effectively reduces sugary beverage consumption.

Siregar et al. (2024): Imposing a tax on sugar-sweetened beverages is an effective strategy to curb public consumption and address public health issues. The emergence of a new government regime creates uncertainty, potentially hindering progress or causing setbacks in the implementation of SSB taxation in Indonesia. The success of this initiative depends on strong political commitment, coupled with strict public and civil society oversight to ensure transparent and accountable policymaking.

Rusdiono (2023): the implementation of excise duties on sugary beverages has been associated with reduced consumption. A decline in consumption is expected to lead to lower rates of sugar-related diseases and contribute to state revenue targets.

Situmorang (2025): Findings indicate a strong correlation between the consumption of sugary beverages and an increased risk of obesity, diabetes, and cardiovascular diseases, imposing a significant economic burden on the healthcare system. To ensure successful implementation in Indonesia, a progressive tax system based on sugar content is recommended, along with phased implementation, adequate public awareness campaigns, and the allocation of excise revenue to public health programs and education.

Darma (2025): The imposition of a sugar tax has demonstrated positive outcomes in reducing sugary beverage consumption and preventing obesity and related diseases. Indonesia could learn from other countries in terms of policy formulation, preparation, implementation, and evaluation.

Peñalvo (2024): SSB taxation schemes have shown positive effects on consumption patterns. Modeling studies suggest that SSB taxation provides health benefits by preventing type 2 diabetes and other cardiometabolic diseases. However, empirical evidence on the impact of SSB taxation remains limited.

Firdaus et al. (2024): SSB taxation is ineffective in reducing the prevalence of non-communicable diseases (NCDs) as consumer preferences have not changed.

Murwendah et al., (2024): The study concludes that additional strengthening strategies may be needed to facilitate policy changes. In the Indonesian context, proactive stakeholders are required to manage potential criticism from various interest groups. The Coordinating Ministry for Economic Affairs is expected to navigate political complexities and stakeholder interests. Support for SSB taxation is likely to increase when policies align with decision-makers, involve inter-ministerial coordination, and gain broad public appeal.

Widarjono et al., (2023): These findings suggest that implementing an SSB tax could effectively curb unhealthy consumption and support funding for health programs targeting obesity and non-communicable diseases.

Sukartini et al., (2023): A low tax/subsidy rate (5%) is ineffective in changing consumer behavior. A tax/subsidy rate of $\geq 15\%$ is necessary to encourage a shift toward healthier food choices. Lifestyle promotion (e.g., nutrition campaigns) should be combined with fiscal policies.

Bourke & Veerman (2018): SSB taxation is effective in reducing obesity and non-communicable diseases, but the health benefits are more pronounced among high-income



groups due to their higher SSB consumption. Indonesia is still in the early stages of nutritional transition, where SSB consumption is concentrated among high-income groups.

Key Findings and Contradictions in Empirical Evidence

Several studies indicate that sugar taxes can reduce the consumption of sugar-sweetened beverages (SSBs) by 9.6-21%, depending on the tax rate applied, while also encouraging product reformulation (Situmorang, 2025). Countries that have implemented higher tax rates, such as Mexico and the United Kingdom, have shown a more significant reduction in consumption compared to countries with lower tax rates (Darma, 2025). Furthermore, research has found that in the long term, reduced sugar consumption contributes to lower obesity rates, type 2 diabetes, and cardiovascular diseases (Peñalvo, 2024). However, some studies highlight that the health impacts only become apparent several years after implementation.

Impact on Consumption and Health

Several studies indicate that a price increase due to taxation (e.g., 20%) can reduce SSB demand by up to 17.5% (Widarjono et al., 2023). Research by Perkasa & Bayumi (2024) found that implementing this tax policy would moderately increase prices, reduce sugary beverage sales, and shift consumer behavior towards healthier products. However, these findings are based on simulation models rather than actual implementation. Empirical studies in Indonesia by Firdaus et al. (2024) suggests that consumer preferences for SSBs are difficult to change due to the deeply ingrained culture of sweet beverages, even with taxation.

Contrasting outcomes of SSB tax implementation have also been observed in other countries. In Mexico, the introduction of an SSB tax (1 peso/liter) reduced consumption by 12% within two years. However, in Indonesia, factors such as product substitution (e.g., traditional sweet beverages) remain unregulated, limiting the tax's effectiveness. Firdaus et al. (2024) concluded that SSB taxation has not effectively reduced the prevalence of non-communicable diseases (NCDs) such as diabetes or obesity. The lack of effectiveness is attributed to:

1. Low tax rates (below consumers' psychological threshold).
2. Absence of complementary policies (e.g., subsidies for healthier products, nutrition education).
3. The industry's reluctance to reformulate products due to minimal incentives.

Regarding the impact of SSB taxation on the consumption of other goods, both substitutes and complementary, Widarjono et al. (2023) explains that the demand for sugar-sweetened beverages such as instant coffee, tea drinks, carbonated beverages, fruit juices, and energy drinks is price elastic. This means that changes in price significantly affect their consumption. In contrast, the demand for manufactured liquid milk and sweetened condensed milk is price inelastic, indicating a limited range of substitutes. In the Indonesian context, sweetened condensed milk is typically used in or combined with specific types of food and drinks, and is rarely replaced by other sweeteners like liquid sugar or syrups.

An analysis of cross-price elasticity among SSB categories reveals that raising the price of SSBs while keeping mineral water prices unchanged may encourage healthier behavior by prompting consumers to switch from sugary drinks to mineral water. Based on these findings, it is advisable to impose taxes across all SSB categories to prevent consumers from simply substituting one sugary drink for another (Widarjono et al., 2023).

Economic Impact and Government Revenue

Sugar taxes serve not only as a public health tool but also as a source of government revenue. In some countries, revenue from these taxes has been allocated to public health programs, educational campaigns, and subsidies for healthier food and beverage alternatives.

Studies from Widarjono et al. (2023) stated, by using the Quadratic Almost Ideal Demand System (QUAIDS) model, the non-milk SSB groups were price elastic. The studies group the SSB into five categories: 1) manufactured liquid milk; 2) sweetened condense milk;



3) instant coffee; 4) tea drinks and fizzy drinks with CO₂; and 5) fruit juices, “health” drinks, and energy drinks. The results showed there is substitute and complementary effects across SSB categories.

Widarjono et al. (2023) reveals that the demand for sugar-sweetened beverages (SSBs) including instant coffee, tea drinks, carbonated soft drinks, fruit juices, “health” drinks, and energy drinks is generally price elastic across various household characteristics. In contrast, the demand for manufactured liquid milk and sweetened condensed milk is price inelastic, suggesting a lack of readily available substitutes. Notably, sweetened condensed milk in Indonesia is typically used in or mixed with specific foods and beverages, and is seldom replaced with alternatives like liquid sugar or syrups. Using estimated price elasticities, the study simulated changes in consumer behavior and found that a 20% price increase in SSBs could lead to an average reduction in demand of approximately 17.5%, indicating a potential decline in overall population level consumption of SSBs.

The SSB tax has the potential to generate up to IDR 3.6 trillion per year in government revenue (Widarjono et al., 2023), although this amount represents only 0.2% of Indonesia's total tax revenue in 2022. This projection comes from 20% ad valorem tax of SSB product based on volumetric tax as per MoF Proposal. However, Andriyanto & Mayasari (2025) warned that SSB taxation could increase unemployment in the beverage industry and related sectors (e.g., sugar production), particularly if no transition schemes are available for small and medium enterprises (SMEs).

In relation to its tax characteristics, Bourke & Veerman (2018) argue that a sugar-sweetened beverage (SSB) tax is not regressive. Their study found that a \$0.30 excise tax on SSBs would result in weight reduction and a decline in the incidence of non-communicable diseases. Although the policy improves health outcomes across all income groups, the greatest health gains are seen among higher-income individuals, as they tend to consume more sugary drinks and face a greater risk of such diseases. Furthermore, the total tax burden is also significantly higher for the high-income group, reflecting their greater consumption levels.

Political and Socio-Cultural Context

Challenges in implementing sugar taxes include resistance from the beverage industry and a lack of political support. Several studies highlight that industry lobbying can influence policymaking, leading to tax rates lower than those recommended by health experts.

Political Dynamics

Putri et al. (2023) found that the Ministry of Finance has been the dominant actor in the SSB tax discourse, while the Ministry of Health has been less involved. According to Siregar et al. (2024), the proposal to implement a tax on sugar-sweetened beverages (SSBs) has been raised since 2012, but it has never materialized due to political rejection, economic instability, and strong industry lobbying. Although the policy was included in the national budgets for 2023 and 2024, it has been postponed and once again faces uncertainty following the change of government after the 2024 presidential election.

Andriyanto & Mayasari (2025) explain that the formulation of Indonesia's SSB was first proposed to the House of Representatives in early 2020, highlighting both public health concerns and revenue potential. Although the proposal was generally well received, its implementation was repeatedly delayed from 2020 to 2023 due to unstable economic conditions, including the impact of the COVID-19 pandemic.

Ahsan et al. (2024) found that SSB taxation policies at the provincial level (e.g., Yogyakarta, Bali) have been hindered by poor coordination between regional and central governments. For example, local governments tend to prioritize local revenue (PAD) over public health objectives. Additionally, election cycles play a crucial role. Budiyananti and Murni



(2021) noted that the SSB tax issue is often avoided during election periods due to its perceived unpopularity.

The latest development, as stated by Andriyanto & Mayasari (2025), is that by 2024, with improving economic growth and strengthened inter-agency coordination, the excise policy was formally included in Presidential Regulation No. 76/2023 and is poised for implementation. The research also mentions that the policy is likely to begin implementation in the second half of 2025.

Socio-Cultural Factors

Sweet beverages, such as iced sweet tea and soda, are deeply embedded in Indonesian social culture. Selvi et al. (2020) reported that 62% of consumers consider SSBs an integral part of their lifestyle, indicating that behavioral change requires a cultural approach. Also, the consumption of sugar-sweetened beverages (SSBs) containing caffeine and sugar has addictive potential due to the combined stimulating effects of caffeine and the sweetness of sugar, which activate the brain's reward centers (Peñalvo, 2024). Type II diabetes and obesity, largely driven by the overconsumption of sugar-laden beverages (Murwendah et al., 2024).

Rusdiono (2023) emphasized that SSB tax advocacy should be accompanied by public education on the risks of diabetes and obesity. Without this, the public is likely to perceive the tax as merely an economic burden rather than a health intervention.

Policy Design and Recommendations

Optimal Tax Rate Structure

Situmorang (2025) recommended implementing a tiered and progressive tax structure based on sugar content, for example beverages containing 5-10g of sugar per 100ml would be taxed at 10%, while those exceeding 10g per 100ml would face a 20% tax rate. Based on Sukartini et al. (2023), a low tax and subsidy rate does not significantly influence consumers to switch from unhealthy to healthy food choices. However, when the tax and subsidy rate is increased to 15%, the resulting price differences clearly impact participants' food choices. The higher the tax and subsidy rate, the more likely participants are to change their preferences. Further studies, including those using a between-subjects design, are necessary to confirm the consistency of these findings. From a policy perspective, this suggests that higher prices are met with rational consumer responses, leading to reduced consumption not only of unhealthy foods but also of costly ones.

In addition, Selvi et al. (2020) emphasized the importance of annual tax adjustments to ensure that the policy remains effective over time. These adjustments would account for inflation, changes in consumer behavior, and industry responses, preventing the tax from losing its intended impact. Without periodic revisions, the tax might become less effective as purchasing power changes or as manufacturers develop new ways to circumvent its effects.

From the perspective of consumers or users of sugar-sweetened beverages, high-income individuals bear a greater tax burden compared to those with lower incomes (Bourke & Veerman, 2018). This is because high-income groups tend to consume sugary beverages more frequently than low-income groups. A study by Bourke & Veerman (2018) found that the reduction in overweight cases among low-income populations was approximately 15,000 cases, whereas the reduction among high-income groups reached 417,000 cases. Meanwhile, in terms of male consumers, the number of reduced overweight cases was around 12,000 and 415,000, respectively.

Allocation of Tax Revenue

Hambali (2022) highlighted Thailand's successful model, where 80% of sugar-sweetened beverage (SSB) tax revenue is allocated to diabetes prevention programs, demonstrating how earmarking tax funds for public health initiatives can maximize policy effectiveness.



In the context of Indonesia, a similar allocation strategy could significantly enhance public health outcomes by directing SSB tax revenue toward targeted interventions, such as:

- 1) Subsidizing Community Health Centers (Puskesmas) for Non-Communicable Disease (NCD) Screening Programs such as:
 - Expanding access to early detection services for diabetes, hypertension, and obesity, particularly in low-income and rural areas.
 - Strengthening preventive healthcare measures by integrating regular screenings into Indonesia's primary healthcare system.
- 2) Funding Nationwide Nutrition Education Campaigns
 - Launching evidence-based public awareness campaigns on social media, television, and digital platforms to educate the population about the health risks of excessive sugar consumption.
 - Integrating nutrition education into school curricula, ensuring that children develop healthier dietary habits from an early age.

By strategically reinvesting SSB tax revenue into these public health initiatives, Indonesia could enhance disease prevention efforts, reduce the economic burden of NCDs, and ensure that the tax serves a broader societal purpose beyond revenue generation.

Complementary Policies

SSB taxation should be accompanied by complementary policies. Experiments by Sukartini et al. (2023) showed that a 15-25% subsidy for mineral water or sugar-free juice increased demand for healthier beverages by 22%. This finding highlights the importance of positive price incentives in encouraging consumers to shift away from sugary drinks.

Additionally, restricting SSB advertisements on television and digital platforms, similar to tobacco regulations should be integrated into the policy framework (Murwendah et al., 2024). This strategy aims to reduce exposure, especially among children and adolescents to the marketing of unhealthy beverages, thereby reinforcing the public health message of the sugar tax policy.

Study Limitations and Future Research Agenda

Methodological Limitations

Bourke & Veerman (2018) used elasticity data from Mexico and New Zealand, making their impact projections for Indonesia less precise. Their study relied on non-specific price elasticity data. Similarly, Widarjono et al. (2023) faced classification limitations by aggregating SSBs under broad categories (e.g., "tea and soda beverages") in the 2021 SUSENAS dataset, complicating product-specific analysis.

Future Research Recommendations

Several issues remain open for future investigation:

- 1) Longitudinal Studies:
Tracking the long-term impact of SSB taxes on NCD prevalence and consumer behavior (e.g., a 5-10-year cohort study).
- 2) Political-Economic Analysis:
Examining the role of beverage industry lobbying in delaying policy ratification (Murwendah et al., 2024).
- 3) Integration of Health and Economic Models:
Employing a multistate life table system (similar to Bourke & Veerman (2018)) to project healthcare cost savings from NCD reductions.
- 4) Enhanced Policy Implementation Monitoring:
Ensuring that tax policies are effectively enforced and that revenue is directed toward public health initiatives.
- 5) Further Research on Social and Economic Impacts:



Future studies should explore how sugar taxes affect household economies and long-term consumption patterns.

6) Stakeholder Collaboration:

Policymakers, researchers, and industry players should collaborate to design policies that effectively balance public health goals with economic sustainability.

CONCLUSION

This study demonstrates that a sugar tax can serve as an effective policy instrument to reduce sugar consumption and improve public health. However, its effectiveness is highly contingent upon factors such as the tax rate, implementation strategies, and support from key stakeholders. In the context of Indonesia, the implementation of a sugar-sweetened beverage (SSB) tax is not merely a fiscal policy measure but part of a broader systemic transformation requiring political commitment and inter-ministerial coordination, particularly among the Ministry of Finance, the Ministry of Health, and the Ministry of Industry. Furthermore, the policy design must incorporate adaptive features such as progressive tax rates, transparency in revenue allocation, and the integration of complementary policies. On the social front, community-based health education and collaboration with religious leaders and public figures are essential to optimize the outcomes of SSB tax implementation. Without a multidisciplinary approach, the potential of the SSB tax as a public health instrument risks being diminished to a controversial source of government revenue.

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