FEBRUARY 2023

DISCUSSION PAPER SERIES NO. 2023-02

Impact Evaluation of DOH's Implementation of Articles 6 and 11 of the Framework Convention of Tobacco Control

Valerie Gilbert T. Ulep, Nina Ashley O. Dela Cruz, Alfredo Jose C. Ballesteros, Alyssa Cyrielle B. Villanueva, and Clarisa Joy A. Flaminiano

CONTACT US:

RESEARCH INFORMATION DEPARTMENT
Philippine Institute for Development Studies

18th Floor, Three Cyberpod Centris - North Tower
EDSA corner Quezon Avenue, Quezon City, Philippines

publications@pids.gov.ph
(+632) 8877-4000

https://www.pids.gov.ph

Impact Evaluation of DOH's Implementation of Articles 6 and 11 of the Framework Convention of Tobacco Control

Valerie Gilbert T. Ulep
Nina Ashley O. Dela Cruz
Alfredo Jose C. Ballesteros
Alyssa Cyrielle B. Villanueva
Clarisa Joy A. Flaminiano

PHILIPPINE INSTITUTE FOR DEVELOPMENT STUDIES

February 2023

Table of Contents

A Systematic Review of the Implementation and Impact of WHO Framework Convention of Tobacco Control Article 6 in the Philippines

Alfredo Jose C. Ballesteros, Nina Ashley O. Dela Cruz, Clarisa Joy A. Flaminiano, Alyssa Cyrielle B. Villanueva, and Valerie Gilbert T. Ulep[1]

Abstract

Many non-communicable diseases (NCDs), while preventable, are caused by modifiable behavioral risk factors which include harmful consumption of alcohol, physical inactivity, tobacco use, and unhealthy diet. Tobacco use has been one of the biggest public health threats linked with NCDs killing more than 8 million people worldwide annually, with 7 million deaths associated with direct tobacco use, and 1.2 million from non-smokers exposed to second-hand smoke. It is estimated that there are 1.3 billion tobacco users globally, 80 percent of which reside in low- and middle-income countries. There are also considerable amounts of economic costs and burden, especially for families, arising from significant expenses for health care in treating tobacco-related diseases, and losses in human capital from morbidity and mortality. Published studies on the impact of the Sin Tax Reform Law in the Philippines remain sparse and therefore warrant a systematic review of the landscape of local evidence available, and this paper examined the impact of tobacco taxation and progress on the implementation of the World Health Organization (WHO) Framework Convention on Tobacco Control (FCTC) Article 6 on tobacco taxation. The systematic search yielded a total of 103 records (17 peer-reviewed articles; 86 gray literature). Upon screening against eligibility criteria, a total of 25 records were included. To capture the breadth of evidence, this review did not exclude studies on the sole basis of quality, hence the review includes a mix of peer-reviewed literature, and both published and unpublished gray literature. The review found that, consistent with the existing literature outside the Philippines, cigarette consumption is price inelastic and responsive to an increase in excise taxes. Consumption is also affected by other determinants such as gender, educational level, and income classification. While illicit trade was found to have increased after implementation of the Sin Tax Reform Law, it was emphasized that there was no direct relationship between illicit trade and excise tax increases given the data and evidence. Lastly, excise taxes generated a dramatic increase in government revenues earmarked for alternative livelihood programs for tobacco farmers and healthcare expenditures.

Keywords: systematic review, sin tax reform, WHO FCTC, tobacco taxation

[1] VGU is a Senior Research Fellow at the Philippine Institute for Development Studies (PIDS). NAD and ACV are the technical consultants for the project CJF is the Project Coordinator for this project. AJB is the Research Assistant for this Project.

1. Introduction

Noncommunicable diseases (NCDs), such as cancer, cardiovascular diseases, chronic respiratory diseases, and diabetes, are considered one of the leading causes of mortality globally and are responsible for over 70 percent of deaths worldwide. Many NCDs, while preventable, are caused by modifiable behavioral risk factors which include harmful consumption of alcohol, physical inactivity, tobacco use, and unhealthy diet. These risk factors result in the incidence of overweight and obesity, raised blood pressure and cholesterol, and eventually disease.[2,3] Ultimately, they lead to economic losses, poor social development, decreased quality of life, and deaths in high-, middle-, and low-income countries. It is also predicted to be a deterrent to poverty reduction in developing countries owing to increased household costs incurred for health care. Vulnerable groups are also at a higher risk of exposure to harmful products, and unhealthy diet exacerbated by limited access to health services which closely links NCDs to poverty as families shoulder financial burden.[4]

Tobacco use has been one of the biggest public health threats linked with NCDs killing more than 8 million people worldwide annually, with 7 million deaths associated with direct tobacco use, and 1.2 million from non-smokers exposed to second-hand smoke. It is estimated that there are 1.3 billion tobacco users globally, and 80 percent of which reside in low- and middle-income countries which are the hardest hit in terms of tobacco-related diseases and deaths. There are also considerable amounts of economic costs and burden, especially for families, arising from significant expenses for health care in treating tobacco-related diseases, and losses in human capital from morbidity and mortality.[5] In 2005, the World Health Organization Framework Convention on Tobacco Control (WHO FCTC) was created and ratified in response to the global tobacco epidemic. This treaty includes demand and supply provisions towards reduction of tobacco products. Demand provisions include price and non-price related measures such as taxation, protection from tobacco smoke exposure, regulation of contents of tobacco products, tobacco labeling and packaging, and tobacco advertising, promotion, and sponsorship. Supply provisions include tobacco licensing and sales to and by minors and protocol to eliminate illicit trade in tobacco products.[6] In order to aid countries that committed to the WHO FCTC in reducing smoking prevalence, MPOWER was launched as a policy package and country level reference that builds on the provisions of the framework and as an integral part of the WHO Action Plan for the Prevention and Control of Non-communicable diseases. As part of their political commitment, countries are encouraged to implement the main principles of MPOWER which are to: "(M) monitor tobacco use, (P) protect people from tobacco smoke, (O) offer help to quit tobacco use, (W) warn about the dangers of tobacco, (E) enforce bans on tobacco advertising and promotion, and (R) raise taxes on tobacco products" (WHO 2020).

---

*VGU is a Senior Research Fellow at the Philippine Institute for Development Studies (PIDS). NAD and ACV are the technical consultants for the project CJF is the Project Coordinator for this project. AJB is the Research Assistant for this Project.

[2] Kassa, M., & Grace, J. 2019. The Global Burden and Perspectives on Non-Communicable Diseases (NCDs) and the Prevention, Data Availability and Systems Approach of NCDs in Low-resource Countries. *IntechOpen.* http://dx.doi.org/10.5772/intechopen.89516

[3] World Health Organization. 2020. Noncommunicable Diseases Progress Monitor 2020. Available at: https://www.who.int/publications/i/item/ncd-progress-monitor-2020. (accessed March 14, 2022)

[4] World Health Organization. 2021. Noncommunicable diseases [Factsheet]. Available at: https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases

[5] World Health Organization. 2020. Tobacco [Fact Sheet]. Available at: https://www.who.int/news-room/fact-sheets/detail/tobacco. (accessed March 14, 2022)

[6] World Health Organization. 2003. WHO Framework Convention on Tobacco Control. Available at: https://fctc.who.int/publications/i/item/9241591013. (accessed March 14, 2022)

The Philippines has been considered to be one of the 15 countries worldwide to have the heaviest burden of tobacco-related ill health. It was estimated that around 87,600 Filipinos die from tobacco-related diseases yearly. Tobacco use also costs the country up to PHP 188 billion worth of healthcare expenditures annually, which is further compounded by economic burden arising from foregone income due to illness and premature death caused by lung cancer, chronic obstructive pulmonary disease, heart disease and stroke.[7] According to the 2009 Global Adult Tobacco Survey (GATS) in the Philippines, there were 13.8 million daily smokers or 29.7 percent of the adult population ages 15 and above, from which 11.7 million were men, 2.1 million were women. It was also found that daily smoking was inversely related to the household wealth index for both urban and rural areas.[8]

Tobacco control interventions in the Philippines date back to the enactment of Republic Act 9211 or the Tobacco Regulation Act of 2003 into a law which is a landmark legislation for tobacco control which includes provisions on health promotion and literacy on the health risks associated with tobacco use, regulation of tobacco advertisements and sponsorships, placement of health warning labels on tobacco products, support for tobacco farmers to cultivate alternative agricultural crops for production, and the creation of an Inter-agency Committee on Tobacco (IAC-Tobacco) to oversee implementation of the law.[9] The Philippines only ratified and became a party to the WHO FCTC in 2005. In 2009, the WHO Western Pacific Region Office (WHO WPRO) released a Regional Action Plan (RAP) for the Tobacco Free Initiative in the Western Pacific. The RAP cites four major indicators to be achieved by 2014: (1) for countries to develop a national action plan and coordinating mechanism, (2) for all parties in the Region to ratify all WHO FCTC protocols, (3) to gather reliable data on adult and youth tobacco use, and (4) reduce the prevalence of adult and youth tobacco use by 10 percent.[10] This action plan influenced lobbying of policies and the development of interventions for tobacco control in the region and the Philippines and since then measures through various forms of legislation, executive orders, and administrative orders were formulated and implemented.

Article 6 of the WHO FCTC on tobacco taxation was implemented in the Philippines through the enactment of Republic Act 10351 or the Sin Tax Reform Law of 2012 which increased the excise taxes on tobacco products with monitoring and an annual increase of excise taxes based on inflation while simplifying the current excise tax systems on alcohol and tobacco products. This current law shifted to a uniform tax system in 2017 where the excise tax rates increased by 4 percent every year starting January 2018. In 2020, RA 11467 was signed and implemented as an upgraded version of the Sin Tax law, increasing excise taxes on alcohol and other tobacco products such as heated tobacco products (HTPs) and electronic nicotine delivery systems (ENDS). In addition, tobacco taxation revenues are earmarked for the government's health programs such as the implementation of universal health coverage and health facilities

[7] Tobacco Control Key Facts and Figures | Department of Health website. Available from: https://doh.gov.ph/Tobacco-Control-Key-facts-and-Figures.
[8] 2009_gats_report_philippines.pdf. Available from: https://www.who.int/tobacco/surveillance/2009_gats_report_philippines.pdf (accessed March 14, 2022)
[9] An Act Regulating The Packaging, Use, Sale, Distribution And Advertisements of Tobacco Products And for Other Purposes, Rep. Act. No. 9211. O.G. (June 23, 2003) (Phil.).
[10] Bellew B., Antonio M., Limpin M., Alzona, L., Trinidad F., Dorotheo, U., Yapchiongco R., Garcia R., Anden A., & Alday J. Addressing the tobacco epidemic in the Philippines: progress since ratification of the WHO FCTC. Public health action, 3(2), 103–108. 2013. https://doi.org/10.5588/pha.13.0006

enhancement programs. [11,12] Furthermore, the Philippines adopted FCTC Article 11 on Health Warning Labels through the enactment of Republic Act 10643 or The Graphic Health Warnings Law in 2014. This law required cigarette and other tobacco product packages to bear highly visible, full-color photographic images that illustrate the health hazards of tobacco use.[13]

Results from the GATS 2015 revealed that tobacco use prevalence among adults ages 15 and above has significantly decreased to 23.8 percent of the adult population (or 16.6 million adults) compared to 2009. This survey ensued briefly after key policy changes both at the national and local levels, such as the national implementation of the Sin Tax Reform Law with incremental increases in excise tax on tobacco products after taking effect from January 2013, and the adoption of the Graphic Health Warnings Law. This was coupled with the National Tobacco Control Study 2011-2016 by the Department of Health in partnership with relevant government agencies and civil society partners to accelerate compliance with the WHO FCTC.[14]

Published studies on the impact of the Sin Tax Reform Law in the Philippines remain sparse and therefore warrant a review of the landscape of local evidence available to assess implementation outcomes after almost a decade since its enactment. To this end, this paper focuses on systematically scoping and synthesizing the body of available local evidence on the impact of tobacco taxation and its iteration of reforms and identifying possible barriers and enablers to the implementation of Article 6 of the WHO FCTC. It should be emphasized that this review gives a broad overview of both empirical studies and existing bodies of evidence in the country about the impact and implementation of WHO FCTC Article 6.

2. Methodology

2.1 Criteria for considering literature

This paper considered all literature on WHO FCTC Article 6 implementation and impact of tobacco taxation regardless of the publication type (e.g., peer-reviewed articles, working and discussion papers, government and non-government reports), date of publication or data collection. All literature that presents Philippine data or context whether in aggregate or disaggregate form were also considered given that these records qualify for the inclusion criteria. Only studies or reports that report data or context on the Philippines were included. The criteria for inclusion and exclusion of literature are shown in **Table 1**.

2.2 Search methods

Journal articles were retrieved using local and international open-access databases such as PubMed, HERDIN Plus, and ScienceDirect. On the other hand, retrieval of grey literature

[11] An Act Restructuring the Excise Tax on Alcohol and Tobacco Products by Amending Sections 141, 142, 143, 144, 145, 8, 131 and 288 of Republic Act No. 8424. Otherwise known as The National Internal Revenue Code Of 1997, as amended By Republic Act No. 9334, and for other purposes. Rep. Act. No. 10351. O.G. (December 19, 2012) (Phil.).
[12] An Act Amending Sections 109, 141, 142, 143, 144, 147, 152, 263, 263-A, 265, and 288-A, and adding a new section 290-A to Republic Act No. 8424, as amended, otherwise known as the National internal Revenue Code of 1997, and for other purposes. Rep. Act. No. 11467. O.G. (January 22, 2020) (Phil).
[13] An Act to Effectively Instill Health Consciousness through Graphic Health Warnings on Tobacco Products, Rep. Act. No. 10643. O.G. (July 1, 2014).
[14] Department of Health/Philippine Statistics Authority/World Health Organization Western Pacific Region Office/Centers for Disease Control. 2015. Global Adult Tobacco Survey Comparison Fact Sheet - Philippines 2009 and 2005. Manila, Philippines: DOH. Available at: https://doh.gov.ph/sites/default/files/publications/GATS-PHL2015-Standalone_Factsheet.pdf. (accessed March 14, 2022)

which includes technical reports, unpublished academic papers, policy briefs, working papers, discussion papers, and conference papers, among others, was facilitated through Google Scholar. Retrieved records were downloaded and duplicates were removed. Screened records were assessed on the basis of title and abstract, and full-text for eligibility using a set of criteria shown in **Table 1**. Screening of records for eligibility was facilitated by two researchers, and a third reviewer resolved the conflicts in screening. Included records were then coded based on the codeset developed by authors shown in Table 3 of Annex A. For the coding software, EPPI Reviewer[15] was used.

Table 1. Eligibility criteria for inclusion and exclusion of literature

	Inclusion criteria	Exclusion criteria
Participants	Philippines, individual (smoker or non-smoker) or household level	International settings
Interventions / Comparisons	Tobacco taxation policy/law; legal structure: price and tax measures, implementation, and challenges	Other tobacco reduction measures aside from taxation or non-fiscal policies
Outcomes	Smoking prevalence; change in tobacco demand or consumption/ expenditure; increase in government revenue	N/A
Database / Literature type	Journal articles; Organizational sources; National / Government documents	N/A
Study design	Qualitative and quantitative studies; national reports; administrative data; policy briefs or notes	N/A

Note: The eligibility criteria were decided by the authors based on the policy objectives of the review.

2.3 Review methods

This review adopted features of the Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA)[16] statement and Systematic Reviews in Health Policy and Systems Research Tool by the WHO Alliance for Health Policy and Systems Research[17]. The review process had seven stages:

1. *Reviewing the literature*. An initial scoping of existing literature was done to refine the review questions and ensure that these have not been answered in a previous systematic review.

[15] Thomas, J., Graziosi, S., Brunton, J., Ghouze, Z., O'Driscoll, P., & Bond, M. Koryakina A (2022). EPPI-Reviewer: advanced software for systematic reviews, maps and evidence synthesis. EPPI-Centre, UCL Social Research Institute, University College London

[16] Page M.J., McKenzie J.E., Bossuyt, P.M., Boutron, I., Hoffmann T.C., Mulrow C.D., et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ Research Methods and Reporting. 2021. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

[17] Alliance for Health Policy and Systems Research. Systematic Reviews in Health Policy and Systems Research [Internet]. 2009. Available from: https://ahpsr.who.int/resources/meeting-report-item/systematic-reviews-in-health-policy-and-systems-research

2. *Formulating review questions*. This process guided the formulation of eligibility criteria and search terms for literature scanning, and further guide the screening and process of data analysis.
3. *Identifying relevant literature*. Using the formulated search terms, various open-access databases and search engines such as ScienceDirect, PubMed, HERDIN Plus, and Google Scholar were scanned. The search terms used for the literature scan are as follows:
    a. ("tobacco") AND ("taxation" OR "tax" OR "Sin tax" OR "Excise Tax") AND ("policies" OR "laws" OR "reforms") AND (Philippines)
    b. ("tobacco") AND ("healthcare") AND ("household") AND ("expenditure" OR "spending") AND (Philippines)
4. Including/excluding studies based on eligibility criteria (**Table 1)**
5. *Assessing the included studies.* All included literature will be subject to full-text screening to properly assess the appropriateness of literature based on the eligibility criteria.
6. *Summarizing and synthesizing the evidence*. All included literature after quality assessment were coded according to themes.
7. *Interpreting the findings.* Based on the existing analysis, inferences for policy practice and findings from the existing body of evidence were generated to answer the review questions.

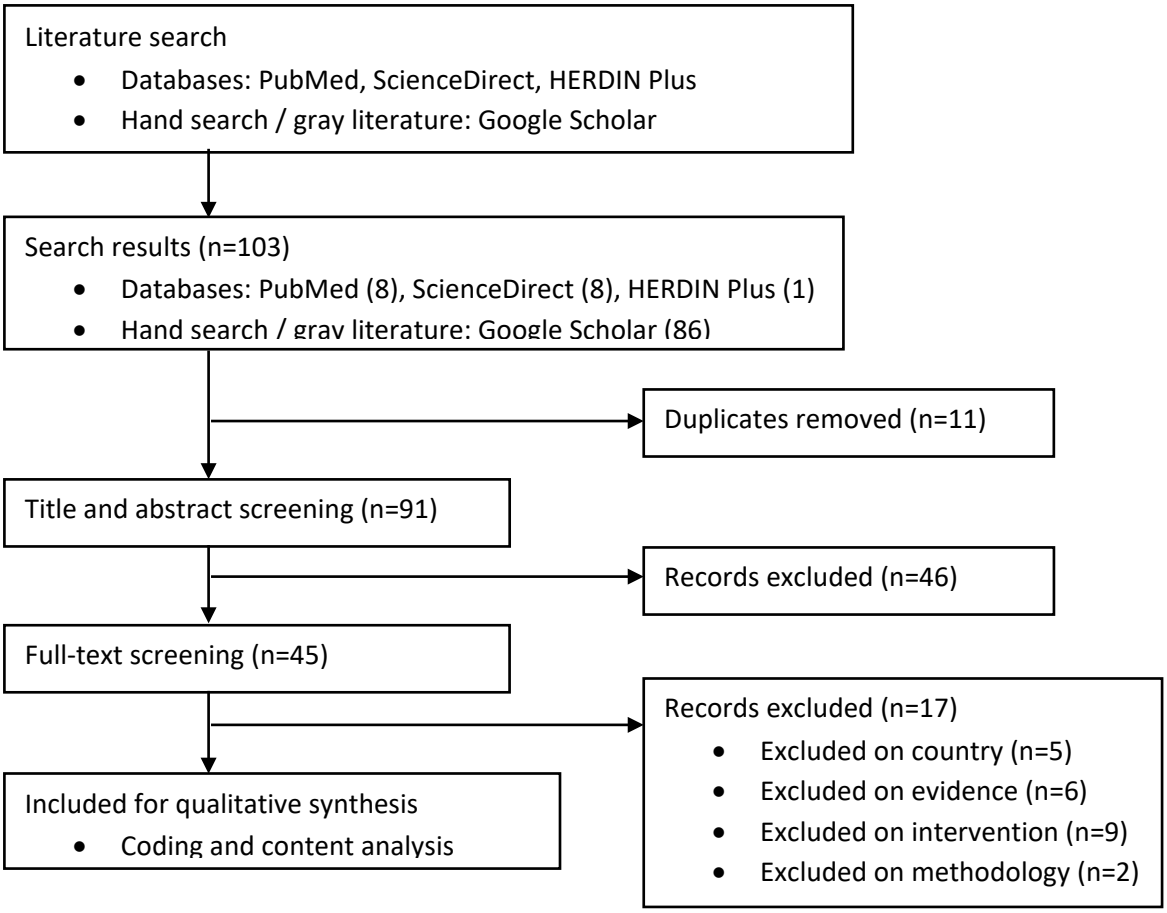
To ensure that the review captures the breadth of evidence available, the review did not exclude studies on the sole basis of quality and does not provide comments on quality issues where relevant. The results were also organized according to key themes and policy questions summarizing key policy lessons and impact along with corroborating evidence. The review specifically considered the impact of taxes and tax measures, and integrating areas of FCTC implementation including both the enablers and barriers to success, challenges and best practices, where available.

3. Results and discussion

The search of bibliographic open-access databases yielded 17 potential articles (PubMed: 8; ScienceDirect: 8; HERDIN Plus: 1). Given the paucity of articles from open-access databases, a hand search of the literature was facilitated to capture grey literature as well, which identified a total of 86 records. A total of 103 records were retrieved. From these, 11 duplicates were removed, where 91 of the records were subjected to screening based on the title and abstract yielding 45 records that were consequently subjected to full-text screening. Upon review of the full-text manuscripts, 17 records were excluded based on intervention (n=9), evidence (n=6), country (n=5), and methodology (n=2). It should be noted that the exclusion on evidence, intervention, and methodology encompasses studies that probed into non-fiscal measures, and lack of focus on tobacco taxation and its effectives and implementation, as well as presentation of data in aggregate with other countries. A total of 25 records were included for subsequent coding and qualitative synthesis.

Due to the paucity of empirical evaluations and heterogeneity of policy outcomes, the study was not able to conduct a meta-analysis. The study then synthesizes the findings of existing literature pertinent to both FCTC Article 6 implementation, and tobacco taxation outcomes. The summary of studies coded and subjected to qualitative synthesis can be found in Table 2.

Figure 1. Flow diagram of systematic review



Note: Author's rendition from review workflow.

3.1. Impact of Sin Tax Law

3.1.1 Tobacco consumption and price elasticity of demand

A study published in 2012 simulated a scenario where a uniform excise tax accounting for 50 percent of the average retail price was found to reduce overall cigarette consumption by almost 34 percent, at the midpoint (-0.51) of the elasticity range (0.15 to -0.87), while also generating substantial revenues by PHP 52.6 billion (Quimbo et al. 2012). Another scenario simulated by the same study where levying a uniform excise tax of 30 pesos per pack would consequently decrease consumption by 46 percent and generate PHP 53.3 billion worth of revenues. Another study conducted in 2018 found the difference in consumption for households which averaged 62 packs of cigarettes in 2009 and purchased less in 2015 at 52 packs. The findings also revealed that cigarette consumption is linked with income where consumption for those within the poorest averages at 24 packs, while the richest is at 62 packs in 2015. The same study also provided empirical evidence on the decrease in household-level cigarette consumption after the imposition of the Sin Tax Reform based on 2015 data. As indicated statistically significant and negative in the difference in differences (DiD) model, which provided substantial evidence that the imposed reform has effectively reduced household cigarette consumption, accounting for up to 70 percent in actual decline, among many other factors and determinants. (Austria and Pagaduan 2018; Austria and Pagaduan 2019). The study by Ho et al. 2018, which also simulated raising cigarette excise tax and anticipated effect on consumption in low- and

middle-income countries (LMICs) in the Asia-Pacific Region found that in 2015, the per capita cigarette consumption of the Philippines is at 42.12 packs ranking 4th highest among Asia-Pacific countries. These simulations also found that given the annual 30.18 percent maximum, and 7.22 percent mean increase in real cigarette retail price, a maximum and minimum decrease of 1,088,283 and 260,351 smokers follow due to price increase, respectively.

Tax was also found to be a strong instrumental variable (IV) as the F-statistic of the reduced form regression which is regressing the endogenous variable on the IV was above the minimum threshold of 10 (Cheng and Estrada 2020). This was found to be consistent with existing literature that socio-economic factors significantly affect smoking probabilities. In terms of other determinants, the same study found that the chance for a female to smoke is 36 percent lower than that of males. It also observed that urban residents were also more susceptible to smoking by 1 percent than rural counterparts. However, this was contrary to another study conducted in Davao which found that smokers in urban areas have a 5 percent higher probability of decreasing cigarette consumption in urban areas compared to rural (Maneja 2016). But given the geopolitical representation, this should be compared and interpreted with caution. Having higher levels of education was also seen to diminish the probability of smoking participation than those who have none to lower levels of formal education (i.e., elementary schooling) similar to the findings from one study where students were less likely to smoke by 18 percent versus unemployed counterparts, while another study concluded that an increase in years of education will decrease the probability of consumption by 0.25 percent. Income was also seen to play a significant role in the chance of smoking where being in the wealthiest was associated with an 8 percent lower chance of smoking than those in the poorest income bracket. This is seemingly comparable to the findings of another study conducted in Davao where a higher probability of decreasing consumption by 40 percent compared to unemployed smokers with a probability of decreasing consumption of only 34 percent was observed (Cheng and Estrada 2020; Austria and Pagaduan 2018; Maneja 2016). Counterintuitively, a study in Iloilo (Moralista 2014) found that respondents of the survey generally increased cigarette consumption after the implementation of the 2012 Sin Tax Reform Law. However, this merits a deeper understanding of the nuances of behavior modification. In terms of household expenditure, a recent aggregate literature review for ASEAN countries noted that cigarette consumption by smokers may tend to sacrifice food consumption, but not as much as non-food expenditures. This causes tobacco consumers to sacrifice consumption for durables, followed by food grains, health and education. Households with tobacco consumers have lower consumption of commodities such as milk, education, clean fuels and entertainment which subsequently affects women and children of the household directly. As such, tobacco consumption is found to have a negative effect on the per capita nutritional intake, and these crowding-out effects were observed to be similar in both low- and high-income households (Akbar et al. 2021). No studies examined captured the crowding-out effects specific to Philippine households with tobacco consumers insofar as this systematic review is concerned.

The impact of cigarette price on consumption was found to be negative and statistically significant with the estimate for overall price elasticity being equal to -0.93 (Austria and Pagaduan, 2018). This suggests that cigarette consumption is price inelastic (i.e., percent decline in demand is less than the percent increase in price), consistent with existing literature. The study estimates also suggest greater responsiveness of cigarette consumption which has become less inelastic from 2009 to 2015. A number of factors may contribute to this such as a permanent increase in cigarette prices owing to the significant increase in excise taxes imposed by the tax reform, which also includes substitutes such as e-cigarettes. The elasticity of

smoking was also found to be dominated by the smoking intensity, which is the number of cigarettes purchased by smokers. This meant that the decrease in consumption by current smokers account for a large portion of the overall decline in the number of users due to the effects of a price increase. The study estimated that the price elasticity of smoking intensity is at -0.841, while smoking prevalence, which is the number of cigarette users, is at -0.130. Hence, the tax reform has reduced the smoking intensity more than the smoking prevalence. In another study, the association of price with lower smoking participation was found to be statistically significant and the resultant prevalence price elasticity of demand was -1.24, which meant a 10 percent increase in price would lead to a 12.4 percent reduction in smoking participation risk (Cheng and Estrada 2020). Nieva (2021) also found that the price elasticity of participation and conditional demand for youth were -0.939 and 00.5474, respectively, which corresponded to the total price elasticity demand of -0.356. An estimate was also conducted by another study which found differential average price elasticities of demand of cigarettes per region for the Greater Manila Area (-1.831538667), North Luzon (-1.334697), Central Luzon (-0.4738555), Southern Tagalog (-0.986879667), Bicol (-1.465848333), Western Visayas (-0.457211), Central Visayas (-0.687576), Northern Mindanao (-0.781839), and Southern Mindanao (-0.675663333). This translates to a variation in the consumers' response to price change per region, and the varying reaction of different consumers according to price categories or sin tax by brand or price segment. This also adds value in terms of prospective subnational or regional policy formulations that are tailor-fit to their context which may subsequently result in a more regulated tax scheduled according to consumer behavior (Valdez 2018).

3.1.2 Cigarette price variation and affordability

In terms of cigarette price variation, Liber et al (2015) conducted a study utilizing a 2011 cigarette and retail survey. Although this study was not able to evaluate price variations in a uniform specific excise tax structure, the study did reveal that the Philippines along with Indonesia had less price variation than observed ad-valorem structures, where the Philippines had much narrower price ranges within brand groups. There was a similar level of price concentration for each brand group where 57 percent of international brand single sticks were sold for PHP 2.00, and 86 percent of domestic brand single sticks were sold for PHP 1.00. This shows that the Philippines had the least expensive cigarettes among the study countries in this group.

3.1.3 Health costs and outcomes

As for direct health outcomes such as smoking-attributable deaths (SADs), a simulation from a study published in 2018 also revealed that increases in excise tax could potentially avert a total of 17.96 million smoking-related deaths in LMICs**,** specifically about 70,477 deaths could be averted in the Philippines (Ho et al. 2018). A uniform specific tax of 30 pesos would, on the other hand, prevent about 4.6 million youth from taking up smoking and avert almost 2.3 million SADs among the youth (Quimbo et al. 2012). Furthermore, this study in 2012 found that over 3.5 million premature deaths in the population at that time could be averted when the price classification freeze is eliminated and a uniform specific tax of PHP 28.30 per pack, which is indexed for inflation, is applied. This also could potentially raise PHP 53.8 billion in excise tax revenues annually. The systematic search, however, did not retrieve any literature on indirect health outcomes such as premature loss of life due to disability and loss of productivity, as well as negative externalities including the economic cost of smoking-attributable diseases.

3.2 Implementation of FCTC Article 6

3.2.1 Policy features of Sin Tax Law according to the FCTC Article 6 Guidelines

The WHO FCTC steered the enactment of the Sin Tax Reform Law with its main features to support increasing tobacco taxes and earmarking of revenues for healthcare financing. This reform imposed different excise tax amounts for various tobacco products depending on the retail price. Following this reform in 2012, incremental increases were introduced where a single tax rate of PHP 30.00 per pack was imposed from 2017, rising 4 percent every year thereafter. Excise tax revenues were also funneled to support the implementation of universal health care and alternative livelihood programs for tobacco farmers. (Craig et al. 2019) In terms of tobacco control implementation, a case study by Amul and Pang (2017) explored FCTC implementation in ASEAN countries including the Philippines adopting the health systems building blocks framework. For features of FCTC Article 6, it reports that only the Philippines has a tracking system that oversees distribution of tobacco products. The country also utilizes tax stamps that are affixed on cigarette products manufactured both locally and internationally that are in the market. The study likewise noted that the effectiveness of tax stamps in enforcing fiscal markings and anti-forestalling measures of Article 6 has yet to be assessed. The paper by Bellew et al. (2013) also documented the progress of the Philippines since the ratification of the WHO FCTC (2005-2012), and it did acknowledge that the Philippines has partially implemented all MPOWER components, except O which is to "offer help to quit tobacco use" and E which is to "enforce bans on tobacco advertising, promotion and sponsorship." It was also remarked that improved taxation policy is deemed to be a promising sign of progress with the passage of the Sin Tax Reform Law. This systematic review, however, was not able to retrieve available literature and studies that document other features of the FCTC Article 6 including enforcement and penalties for non-compliance under tax administration, itemized flow of sin tax law revenues, tax-/duty-free sales, and international cooperation.

3.2.2 Regulation of supply chain, illicit trade, and fiscal markings

Another important feature of the FCTC Article 6 is regulation of the supply chain and preventing illicit tobacco trade given the increase in excise taxes. In 2012, there were estimates suggesting that untaxed cigarettes may account for about 20 percent of overall sales and consumption. This is due to the then absence of tax stamps on most cigarettes and re-importing of cigarettes marked intended for export or sale in duty-free shops, exacerbated by poor monitoring of cigarette production and informal distribution network such as sari-sari stores, street vendors, among others (Quimbo et al. 2012). This was addressed by the implementation of the Internal Revenue Stamp Integrated System (IRSIS) by the Bureau of Internal Revenue in 2014. This facilitates real-time monitoring of distribution and tax payments, where consumers may also check and verify the authenticity of tax stamps and tax payments through a stamp verification app. Before the Sin Tax Law, there was no evidence of sustained increase in illicit trade from 1997 to 2009 (Abola et al. 2016). Illicit cigarette market share dropped by 42 percent from 2003 to 2008 and continuously decreased by 79 percent from 2008 to 2013. However, recent estimates revealed prevalence of illicit trade after increase in excise tax from 2015 to 2018 which may be attributable to efforts by the tobacco industry to increase in tobacco tax and the imposition of the IRSIS (Lavares et al. 2021). The prevalence of illicit trade ranges from 3.3 percent to 42.8 percent of total cigarette consumption, considering the threshold of under-reporting used. In 2017, tax revenue losses ranged from PHP 11.96 billion to PHP 40.0 billion using the under-reporting threshold of 10 percent and 40 percent, respectively (Austria

and Villanueva 2021). It was estimated that illegal cigarette products comprise about 16 percent of the market in 2018. Instances of tax evasion were also cited such as the use of counterfeit tax stamps in 2017, and a scheme requesting smokers to recycle tax stamps in exchange for food. While the study by Lavares et al. (2021) provides preliminary evidence of illicit trade prevalence, it also poses several limitations due to the gap method which compares legal sales and survey estimates of self-reported cigarette consumption. This method is unable to distinguish types of tax avoidance and evasion such as smuggled and counterfeit products. It likewise cannot specifically map out hotspots for illicit trade such as free trade zones and port areas. It recommends further studies to include direct observation of packs consumed by smokers to generate an estimate on the size of illicit cigarette market and information on illicit cigarettes are obtained including brand names and prices. While these studies provide strong evidence for illicit trade, both emphasized that the relationship between an increase in excise taxes, and illicit trade and tax avoidance or evasion cannot be directly correlated (Lavares et al. 2021; Austria and Villanueva 2021).

3.2.3 Sin Tax Law revenues

As for the earmarking of revenues from excise tax collections, Manasan and Parel (2013) remarked that earmarking may have the propensity to cause inefficient budgeting as it may create rigidities in the expenditure allocation process and prevent reallocation as the need arises due to possible shifts in funding priorities. As stipulated in the Sin Tax Reform Law, incremental revenues will be subject to deduction of earmarked allocations, equivalent to 15 percent of revenue, to alternative livelihood programs for tobacco farmers and other economic projects in tobacco-growing provinces; while the remainder after deduction will be dedicated to health expenditures. Areas to be funded include universal health care and health awareness programs (68% of total incremental revenue); medical assistance and health enhancement facilities (17% of total incremental revenue). The Philippine government was also lauded the 2015 Award for Global Tobacco Control by Bloomberg Philanthropies. In the first year alone of implementation, revenue increased from PHP 56.32 billion to PHP 103.38 billion, with a growth rate of 77 percent. Increases in total revenues were also sustained by 10.3 percent and 24.4 percent in 2014 and 2015, respectively. While there was a significant increase in the health budget, it was noted that earmarking is acceptable on both efficiency and political imperatives – with the assurance that allocation rules ensure transparency and accountability (WHO 2016).

Table 2. Summary of studies

Study	Literature Type	Population	Interventions / Comparisons	Data Source	Study Design / Methods (Analysis, Statistical Approach, Model types)
Abola et. al. 2019	Journal Article	Household; individual	Uniform tax system; illicit tobacco trade	FIES (2009), Global Youth Tobacco Survey (2007), GATS (2009)	Discrepancies between survey-based estimates of cigarette consumption and removals
Akbar et. al. 2021	Journal Article	Household	Taxation, crowding out effects in tobacco and household expenditures	Peer-reviewed Literature (Aggregate, ASEAN); the impact of increase in cigarette prices in reducing consumption and expenditure	Literature Review, Descriptive Analysis
Amul and Pang 2017	Journal Article	N/A	FCTC Implementation, Health Systems Building Blocks	WHO Global Health Observatory, FCTC Implementation Database, SEATCA Tobacco Control Atlas (2016), SEATCA FCTC Scorecard	Case Study Analysis: UNDP Human Development Approach (1990), and Health Systems Building Blocks
Austria and Pagaduan 2018	Working Paper	Household	Sin Tax Reform Law of 2012 (Multi-tiered)	FIES (2009, 2015), Monthly Consumer Price Index (CPI)	2SLS (two-stage least squares) GMM (two-step efficient generalized method of moments) estimators Elasticity of Smoking Prevalence and Intensity: 2-part model (logit and probit; OLS) Causal impact: DiD Responsiveness of consumption to prices: Chow's Test

Austria and Pagaduan 2019	Policy Brief	Household	Sin Tax Reform Law	FIES (2009, 2015)	2-part estimation model
Austria and Villanueva 2021	Working Paper	Individual	Tobacco taxation; tax stamps,	GATS (2009, 2015); PSA (adult population data); BIR (cigarette removals)	Gap analysis
Bellew et. al. 2013	Review Article	N/A	WHO FCTC Implementation	Literature on Philippines progress since ratification of WHO FCTC (2005 – 2012)	Literature Review
Cheng and Estrada 2020	Journal Article	Household; individual	Sin Tax Reform Law of 2012 (Multi-tiered)	GATS (2009, 2015)	Price Elasticity: 2-part model (IV-probit; OLS and 2SLS)
Cheng and Estrada 2021	Journal Article		2019 Cigarette excise tax reform	GATS (2015), GBD 2019 (IHME, 2020)	Single cohort model
Craig et. al. 2019	Journal Article	N/A	Impact of WHO FCTC on tobacco control	Semi-structured interview	Expert Group Analysis
Deluna and Maneja	Working Paper	Individual	Sin tax and anti-smoking campaign	Primary data; random sampling survey (2014)	Responsiveness of smokers to tax increase: logit model
Diosana 2020	Journal Article	N/A	Sin Tax Reform Law of 2012 (Multi-tiered)	Literature Search	Case study
Drope et. al. 2014	Journal Article	N/A	Impact of Tobacco taxation on foreign direct investments	Literature Search	Literature Review
Ho et. al. 2018	Journal Article	Individual	Cigarette excise tax impacts	Per capita cigarette consumption aged 15 over (2006, 2015); Gross National Income per capita; Euromonitor International	Simulation: of cigarette consumption: Fixed effects estimates

Lavares et al. 2021	Journal Article	Individual	Effects of tax increases on illicit trade	NNHeS (1998, 2003, 2008, 2013, 2015, 2018)	Gap analysis
Liber et al. 2015	Journal Article	Retailers	Tax structures and effect on cigarette price level	2011 Cigarette Price and Retailer Survey	Price variation: (1) comparison of coefficients of variation; (2) price gap; (3) price point concentration
Ligot et al. 2018	Conference Abstract	Individual	Crowd-sourced tobacco tax price monitoring	Crowd-sourced data (i.e., prices, variant, quantity, tax stamps) at point-of-sale	N/A
Manasan and Parel 2013	Discussion Paper	N/A	Sin Tax Law amendment	Sin Tax Reform measure house bills	Narrative review and evaluation
Moralista and Delariarte 2014	Journal Article	Individual	Sin Tax Reform Law; consumption patterns	Primary data: survey (convenience sampling techniques; Iloilo)	Descriptive Research
Nieva 2021	Working Paper	Individual	Sin Tax Reform Law	Global Youth Tobacco Survey (2004 and 2015)	2-part estimation model
Quimbo et. al. 2012	Report	Individual	Tobacco control policies, Tax increases	GATS (2009); Euromonitor International (aggregate and per capita cigarette sales figures, company and brand shares, and cigarette export and import figures); FAOSTAT (agricultural output and trade data); official government records (employment figures, applied tax rates); Economist Intelligence Unit (historical cigarette price)	Simulation of effects of cigarette tax increases on tobacco-related outcomes (i.e., consumption, tax revenues, number of smokers, smoking-attributable deaths)
Nieva 2021	Working Paper	Individual	Sin Tax Reform Law	Global Youth Tobacco Survey (2004 and 2015)	2-part estimation model

Usui 2011	Policy Note	N/A	Tax Equity	World Bank, World Development Indicators	Unspecified
Valdez 2018	Journal Article	N/A	Sin Tax Reform Law	Euromonitor International (monthly price and volume of cigarettes before and after sin tax implementation)	Fixed effect model; panel regression analysis
WHO 2011	Report	N/A	Fiscal and non-fiscal tobacco control measures	Key informant interviews; tobacco epidemiologic data;	Capacity Assessment
WHO 2016	Report	N/A	Earmarking of tobacco taxes	Desk review of literature and government-acquired data	Case Study

Note: Author's compilation. 2SLS = two-stage least squares; BIR = Bureau of Internal Revenue; CPI = Consumer Price Index; DiD = difference in differences; FAOSTAT = Food and Agriculture Organization Corporate Statistical Database; FIES = Family Income and Expenditure Survey; GATS = Global Adult Tobacco Survey; GBD = Global Burden of Disease; GMM = generalized method of moments; IHME = Institute for Health Metrics and Evaluation; IV = instrumental variable; NNHeS = National Nutrition Health Survey; OLS = ordinary least squares; PSA = Philippine Statistics Authority; SEATCA = Southeast Asia Tobacco Control Alliance; UNDP = United Nations Development Programme; WHO = World Health Organization

4. Limitations

This systematic review poses several limitations: 1) the inclusion of records was not done on the sole basis of quality to ensure that as much data from other literature are captured, and 2) the meta-analysis was not carried out due to the heterogeneity of data and paucity of empirical evaluations. Given the sparse nature of local evidence, the main focus of this systematic review was to capture the breadth of literature and documented evidence available on tobacco taxation and FCTC Article 6 implementation.

5. Conclusions and recommendations

The findings of this systematic review reveal the effectiveness of tobacco taxation in reducing tobacco consumption and expenditure. Consistent with the literature on price and demand elasticities from other countries, cigarette consumption is price inelastic where the percent decline in demand is less than the percent increase in price. Elasticity was also found to be predominantly affected by smoking intensity than smoking prevalence. Smoking probabilities are also affected by other socioeconomic determinants; females are less likely to smoke than males, and urban residents were found to be more susceptible to smoking than rural counterparts. Higher levels of education also diminish the probabilities of smoking participation. While there is strong evidence of the relationship between increasing excise taxes and reduction of consumption and expenditure, future studies should also take into consideration changes in cigarette price affordability over time, and also simultaneously evaluate consumption and affordability. Future studies should also consider an in-depth examination of social factors influencing smoking initiation, intensity, and cessation; and temporal factors including changing attitudes towards smoking (Austria and Pagaduan 2018; Cheng and Estrada 2020).

Illicit trade was also found to have increased after the implementation of the Sin Tax Reform Law in 2012 which may be due to interference by the tobacco industry to circumvent tax increases and tax stamps. This, however, should be interpreted with caution as the existing data and evidence cannot directly correlate the relationship between actual illicit trade and an increase in excise taxes. Future studies may include the utilization of other methods to verify the existing estimates and attempt to conduct direct observation of cigarette consumption which may capture information on brand names and prices of illicit cigarette brands. Studies should also seek to capture non-price determinants for illicit trade to determine the cause, nature, and extent of illicit cigarette trade and market (Lavares et al. 2021; Austria and Villanueva 2021).

The implementation of increased excise taxes led to a dramatic increase in government revenues which are earmarked for alternative livelihood programs, and healthcare financing and expenditures. While this may be the case, it would be valuable to look into the utilization and allocative efficiency of Sin Tax revenues earmarked for these purposes, as well as local government share from tobacco excise tax collections.

This systematic review has drawn lessons regarding the dearth of available literature on tobacco taxation. The review emphasizes the importance of searching systematically for both published and unpublished literature as the latter may be a source of evidence not found in peer-reviewed journals. However, it should be noted that this review sought to capture both peer-reviewed studies and both published and unpublished gray literature so as not to discount available evidence from the latter. In future reviews, and with the potential increase in the body of local

evidence, adopting quality assessment tools is recommended. An example is the study by Guindon et al. (2018) which adopted AMSTAR 2 (Shea et al. 2017) assimilating key attributes for reporting and assessment from this tool in examining the impact of tobacco prices or taxes on tobacco use. Additionally, it is recommended for future reviews to separate implementation and impact assessment studies of tax measures to ensure specificity in screening studies. Moreover, given that peer-reviewed publications for tobacco taxation are sparse, funding agencies should also consider incorporating publication fees in research grant line-item budgets, including other forms of incentives for publishing research in peer-reviewed journals and other modes of research dissemination.

Lastly, in terms of strengthening policy and implementation, timely monitoring of local tobacco consumption and expenditure should be considered to measure effectiveness of Sin Tax Law as the available empirical evaluations relied heavily on the GATS and Global Youth Tobacco Survey, with the most recent data published in 2015. This data may not accurately depict and capture the impact of tax administration measures and implementation of recent reforms in tax structure. Monitoring of sin tax revenues flow and allotment should likewise be considered under the Medium-Term Expenditure Program (MTEP) for UHC 2022-2026 (Department of Health 2022) to ensure which areas of UHC implementation benefit from the incremental revenues such as support for UHC integration sites, improvement of PhilHealth financial risk protection, health systems strengthening, and institutional capacity and operational support, among others. Furthermore, mechanisms for accountability and transparency in revenue earmarks, investments and utilization should be established and maintained.

6. Bibliography

Abola, V., Sy, D., Deniston, R. and So, A. 2019. Empirical Measurement of Illicit Tobacco Trade in the Philippines. SSRN Electronic Journal, 51, pp. 83–96.

Akbar, U., Sari, Y., Marta, J., Satria, D., Adry, M., Putri, D., Yeni, I. 2021. Tobacco Consumption Affect Allocation of Household Expenditure: A Study Literature. Proceedings of the Sixth Padang International Conference On Economics Education, Economics, Business and Management, Accounting and Entrepreneurship (PICEEBA 2020), 179.

Alliance for Health Policy and Systems Research. Systematic Reviews in Health Policy and Systems Research. 2009. Available from: https://ahpsr.who.int/resources/meeting-report-item/systematic-reviews-in-health-policy-and-systems-research (accessed March 14, 2022).

Amul, G.G. and Pang, T.P. 2018. The State of Tobacco Control in ASEAN: Framing the Implementation of the FCTC from a Health Systems Perspective. Asia and the Pacific Policy Studies, 5, pp. 47–64.

An Act Amending Sections 109, 141, 142, 143, 144, 147, 152, 263, 263-A, 265, and 288-A, and adding a new section 290-A to Republic Act No. 8424, as amended, otherwise known as the National internal Revenue Code of 1997, and for other purposes. Rep. Act. No. 11467. O.G. (January 22, 2020) (Phil).

An Act Regulating The Packaging, Use, Sale, Distribution And Advertisements of Tobacco Products And for Other Purposes, Rep. Act. No. 9211. O.G. (June 23, 2003) (Phil.).

An Act Restructuring the Excise Tax on Alcohol and Tobacco Products by Amending Sections 141, 142, 143, 144, 145, 8, 131 and 288 of Republic Act No. 8424. Otherwise known as The National Internal Revenue Code Of 1997, as amended By Republic Act No. 9334, and for other purposes. Rep. Act. No. 10351. O.G. (December 19, 2012) (Phil.).

An Act to Effectively Instill Health Consciousness through Graphic Health Warnings on Tobacco Products, Rep. Act. No. 10643. O.G. (July 1, 2014).

Austria, M. and Pagaduan, J. 2018. Assessing the Impact of the Philippine Sin Tax Reform Law on the Demand for Cigarettes. DLSU-AKI Working Paper Series 2018-03-051.

———J. 2019. The Philippine Sin Tax Reform Law: Is It Effective in Reducing Cigarette Consumption?. Policy Brief AKI Research Grants on Economic Issues. Volume IX, No. 7, 2019. De La Salle University.

Austria, M. and Villanueva, A. 2021. Measuring Illicit Cigarette Trade: The Case of the Philippines. DLSU-AKI Working Paper Series 2021-03-063.

Available from: https://extranet.who.int/ncdsmicrodata/index.php/catalog/254/related-materials (accessed March 14, 2022).

Available from: https://extranet.who.int/ncdsmicrodata/index.php/catalog/874/related-materials (accessed March 14, 2022).

Bellew B., Antonio M., Limpin M., Alzona, L., Trinidad F., Dorotheo, U., Yapchiongco R., Garcia R., Anden A., & Alday J. Addressing the tobacco epidemic in the Philippines: progress since ratification of the WHO FCTC. Public health action, 3(2), 103–108. 2013. https://doi.org/10.5588/pha.13.0006

Cheng, K.J.G. and Estrada, M.A.G. 2020. Elasticity of cigarette smoking demand in the Philippines after the 2012 Sin Tax Reform Act. Preventive Medicine, 134, pp. 106042.

———. 2021. Cost-effectiveness analysis of the 2019 cigarette excise tax reform in the Philippines. Preventive Medicine, 145, pp. 10643.

Craig, L., Fong, G., Chung-Hall, J. and Puska, P.2019. Impact of the WHO FCTC on tobacco control: perspectives from stakeholders in 12 countries. Tobacco Control, 28, pp. S129–S135.

Deluna, R. and Maneja, K. 2015. The Effect of Sin Tax and Anti-Smoking Campaign in Regulating Cigarette Smokers in Davao City, Philippines. Munich Personal RePEc Archive, No. 68801.

Department of Health. 2022. Medium-Term Expenditure Program for Universal Health Care 2022-2026. Manila, Philippines: DOH. Available at: https://doh.gov.ph/sites/default/files/publications/UHC-MTEP-2022-2026.pdf. (accessed April 27, 2022).

Department of Health/Philippine Statistics Authority/World Health Organization Western Pacific Region Office/Centers for Disease Control. 2015. Global Adult Tobacco Survey Comparison Fact Sheet - Philippines 2009 and 2005. Manila, Philippines: DOH. Available at: https://doh.gov.ph/sites/default/files/publications/GATS-PHL2015-Standalone_Factsheet.pdf. (accessed March 14, 2022).

Diosana, J.A.2020. Raising tobacco taxes: The Philippine experience. Asian Pacific Journal of Cancer Prevention, 21, pp. 27–31.

Drope, J. Chavez, J., Lencucha, R. and McGrady, B. 2014. The political economy of foreign direct investment-Evidence from the Philippines. Policy and Society, 33, pp. 39–52.

Guindon, E., Paraje, G., and Chaloupka, F.J. 2018. The Impact of Prices and Taxes on the Use of Tobacco Products in Latin America and the Carribean. Am J Public Health. 2018;108:S492-S502. doi:10.2105/AJPH.2014.302396.

Ho, L.M., Schafferer, C., Lee, J.M., Yeh, C.Y. and Hsieh, C.J. 2018. Raising cigarette excise tax to reduce consumption in low-and middle-income countries of the Asia-Pacific region: a simulation of the anticipated health and taxation revenues impacts. BMC Public Health, 18, pp. 1–9.

Kassa, M., & Grace, J. 2019. The Global Burden and Perspectives on Non-Communicable Diseases (NCDs) and the Prevention, Data Availability and Systems Approach of NCDs in Low-resource Countries. *IntechOpen.* http://dx.doi.org/10.5772/intechopen.89516

Lavares, M., Ross, H., Francisco, A., and Doytch, N. Analysing the trend of illicit tobacco in the Philippines from 1998 to 2018. Tobacco Control, pp. 1–6, 2021.

Liber, A., Ross, H., Ratanachena, S., Dorotheo, U. and Foong, K. 2015. Cigarette price level and variation in five Southeast Asian countries. Tobacco Control, 24, pp. e137–e141.

Manasan, R. and Parel, D. 2013. Amending the Sin Tax Law, PIDS Discussion Paper Series, No. 2013-19, Makati City Philippines: Philippine Institute for Development Studies.

Moralista, R. and Delariarte, C. 2014. Sin Tax Law Its Effect to Consumption Pattern of Liquor Drinkers and Smokers In Calinog, Iloilo. Asia Pacific Journal of Multidisciplinary Research, **2**, pp. 148–152.

Mowery, P. and Pechacek, T. 2018. Differences in African American and White mortality caused by cigarette smoking in the U.S. Tobacco Induced Diseases, 16.

Nieva, F. 2021. How did the youth's demand for cigarette products respond to the Sin Tax Reform Act of 2012?. DLSU-AKI Working Paper Series 2021-08-066.

Page M.J., McKenzie J.E., Bossuyt, P.M., Boutron, I., Hoffmann T.C., Mulrow C.D., et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ Research Methods and Reporting. 2021. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

Quimbo, S., Casorla, A., Miguel-Baquilod, M., Medalla, F., Xu, X. and Chaloupka, F. 2012. The Economics of Tobacco and Tobacco Taxation in the Philippines. Paris: International Union Against Tuberculosis and Lung Disease: ISBN: 979-10-91287-01-2.

Shea, B.J., Reeves, B.C., Wells, G., Thuku, M., Hamel, C., Moran, J., Moher, D., Tugwell, P., Welch, V., Kristjansson, E., Henry, D.A. 2017. AMSTAR 2: a critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both. BMJ. 358:j4008

Thomas, J., Graziosi, S., Brunton, J., Ghouze, Z., O'Driscoll, P., & Bond, M. Koryakina A 2022. EPPI-Reviewer: advanced software for systematic reviews, maps and evidence synthesis. EPPI-Centre, UCL Social Research Institute, University College London

Tobacco Control Key Facts and Figures | Department of Health website. Available from: https://doh.gov.ph/Tobacco-Control-Key-facts-and-Figures.

Usui, N. 2011. Tax Reforms toward Fiscal Consolidation: Policy Options for the Government of the Philippines. Asian Development Bank: ISBN 978-92-9092-409-8.

Valdez, K. 2018. Analyzing Regional Cigarette Consumption Elasticities in The Philippines. Review of Integrative Business and Economics Research, 7, pp. 314–370.

World Health Organization (WHO). 2003. WHO Framework Convention on Tobacco Control. Available at: https://fctc.who.int/publications/i/item/9241591013. (accessed March 14, 2022).

———.2010. Global Adult Tobacco Survey 2009.

———. 2011. Joint national capacity assessment on the implementation of effective tobacco control policies in the Philippines. Available at: https://apps.who.int/iris/handle/10665/44764

———. 2016. Earmarked tobacco taxes. ISBN: 9789241515825. Available from: http://apps.who.int/iris/bitstream/handle/10665/206007/9789241510424_eng.pdf?sequence=1 (accessed March 18, 2022).

———. 2017. Global Adult Tobacco Survey 2015.

———. 2020. Noncommunicable Diseases Progress Monitor 2020. Available at: https://www.who.int/publications/i/item/ncd-progress-monitor-2020. (accessed March 14, 2022).

———. 2020. Tobacco [Fact Sheet]. Available at: https://www.who.int/news-room/fact-sheets/detail/tobacco. (accessed March 14, 2022).
———. 2021. Noncommunicable diseases [Factsheet]. Available at: https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases

Annex A. Codeset for thematic coding and content analysis

Table 3. Codeset for thematic coding and content analysis

Categories	Subcategories
Intervention categories	
Legal tax structure	• Multi-tiered tax system • Uniform tax system
Policy implementation/tax administration	• Regulation of supply chain (authorization and licensing) • Warehouse system or movement of excisable goods and tax payments • Fiscal markings and anti-forestalling measures (i.e., tax stamps) • Enforcement (penalties for noncompliance) • Other transparency and accountability mechanisms
Other indicators of taxation	• Tobacco/cigarette prices/affordability • VAT/import duties
Outcome categories	
Government revenues	• Incremental revenues • Revenues for healthcare financing • Local government share from tobacco excise collections • Incremental revenues utilization
Tobacco consumption or expenditure	• Change in tobacco consumption • Change in tobacco expenditure • Price/consumption elasticities
Health costs/outcomes	• Direct health costs (disease, deaths) • Indirect health costs (premature loss of life due to disability, productivity losses) • Smoking prevalence/smoking-related mortality and morbidity
Other negative externalities	• Economic cost of smoking-attributable disease
Filters	
Country of study	• Philippines
Study design	• Experimental • Non-experimental • Systematic Review • Gray Literature
Population	• Individual • Household

Note: Codeset was adopted from the Framework Convention on Tobacco Control (WHO 2003).

How Does Tobacco Spending Affect Household Expenditures in the Philippines?

Nina Ashley O. Dela Cruz and Valerie Gilbert T. Ulep*

Abstract

Using the Family and Income and Expenditure Survey for three rounds: 2012, 2015, and 2018, the study examines how tobacco spending or consumption affects Filipino household expenditure. It is one of the assessments on the World Health Organization Framework Convention on Tobacco Control Article 6 referring to tobacco taxation, in which for the Philippines is the Sin Tax law. The study finds crowding out effects on expenditures on other goods and services due to tobacco spending, particularly with food, utilities, alcohol, recreation, health, and education. Empirical results further indicate that increase in tobacco expenditure leads to reduction in those expenditure items, especially on health and education which are both significant and consistent over the years.

Keywords: tobacco, tobacco taxation, tobacco spending, household expenditure, Philippines

* VGU is a Senior Research Fellow at the Philippine Institute for Development Studies (PIDS). NADC is a technical consultant for the project. The authors acknowledge the research assistance of Alfred Ballesteros and project coordination of Clarisa Flaminiano.

1. Introduction

Tobacco-related deaths or mortality grows rapidly all over the world with more than 7 million people killed, while 110,000 Filipinos die from tobacco-related diseases every year[1]. In addition, non-communicable diseases persist its increasing prevalence in the Philippines as the major cause of death in the country in 2013. Despite the health consequences of tobacco use, smoking prevalence continues to rise among adults and youth with 23.8 percent (16.6 million adults) and 16 percent of Filipinos consuming tobacco products respectively in 2015 (GATS 2015). To address this tobacco epidemic, tobacco taxes which are said to be the most cost-effective way to curb tobacco demand, are imposed leading to a price increase thereby making it unaffordable. However, the taxes should be adjusted to increase prices greater than one's income growth.

One of the major tobacco measures implemented in the Philippines is the Sin Tax Reform Act of 2012. The provisions and reforms under this comprehensive and reported to be long-overdue law about tobacco and alcohol taxation aim to improve health outcomes and financial sustainability, and advocate for good governance. Republic Act (RA) 10351 or the Sin Tax Reform Act of 2012 increases the excise taxes on tobacco products with monitoring and an annual increase of excise taxes based on inflation. This current law shifted to a uniform tax system in 2017 where the excise tax rates increased by 4 percent every year starting January 2018. In 2020, RA 11467 was signed and implemented as an upgraded version of the Sin Tax law, increasing excise taxes on alcohol and other tobacco products such as heated tobacco products (HTPs) and electronic nicotine delivery systems (ENDS). In addition, tobacco taxation revenues are earmarked for the government's health programs such as the implementation of universal health coverage and health facilities enhancement programs. This major law aligns with the World Health Organization Framework Convention on Tobacco Control (WHO FCTC), the treaty created in response to the global tobacco epidemic. This treaty includes demand and supply provisions for the reduction of tobacco products.

The Philippines has laws and regulations that adapt to the demand and supply provisions promoted by the WHO FCTC. Demand provisions include taxation, protection from tobacco smoke exposure, regulation of contents of tobacco products, tobacco labelling and packaging, and tobacco advertising, promotion, and sponsorship. Supply provisions include tobacco licensing and sales to and by minors and protocol to eliminate illicit trade in tobacco products (WHO 2005). Even before the Philippines became a party to the WHO FCTC in 2005, tobacco control interventions have started in 2003 with RA 9211 or Tobacco Regulation Act of 2003. This law includes regulations on tobacco advertisements, sponsorships, health warnings, education on tobacco's health risks, and support for farmers to consider alternate crops to tobacco. Another law on tobacco control is the Graphic Health Warnings Law in 2014 which regulates the packaging of tobacco products to showcase the health risks of tobacco use or smoking.

Studies on the impact of the Sin Tax law or tobacco taxes locally remain to be limited but most studies have found that increasing the prices of tobacco through excise taxes leads to a decrease in tobacco consumption. In 2012, a study by Quimbo, et al. estimated the impact of tax increases on the demand for tobacco consumption using prevalence data reported in the 2009

[1] The Toll of Tobacco in the Philippines. https://www.tobaccofreekids.org/problem/toll-global/asia/philippines from Global Burden of Disease 2017.

Philippine Global Adult Tobacco Survey (GATS), and per capita sales figures, company and brand shares, and export and import figures. This study conducted simulations eliminating price classification freeze and tiered tax structure, and imposing higher uniform specific tobacco taxes. Their findings suggest that these tax-induced price increases were projected to reduce consumption by nearly 43 percent and over 4 million Filipino smokers to quit smoking, and additionally preventing 4.2 million youths from possibly smoking (Quimbo et al. 2012). Moreover, another study evaluated the impact of sin tax reform on cigarette demand using difference-in-difference analysis accounting for price inelasticities of smoking prevalence and smoking intensity (Austria and Pagaduan 2018). Their findings support the conclusion of other studies such as Cheng and Estrada (2020) that cigarette consumption is price inelastic, but demand has become less inelastic from 2009 to 2015, indicating that cigarette demand is responsive to increasing prices. Household-level cigarette consumption also decreased after the tax reform in 2015 according to their findings. Cheng and Estrada (2020) find that for every 10 percent price increase, there is a 5.6 percent to 11 percent decline in total cigarette demand using an instrumental variable method with 2015 GATS and excise taxes data.

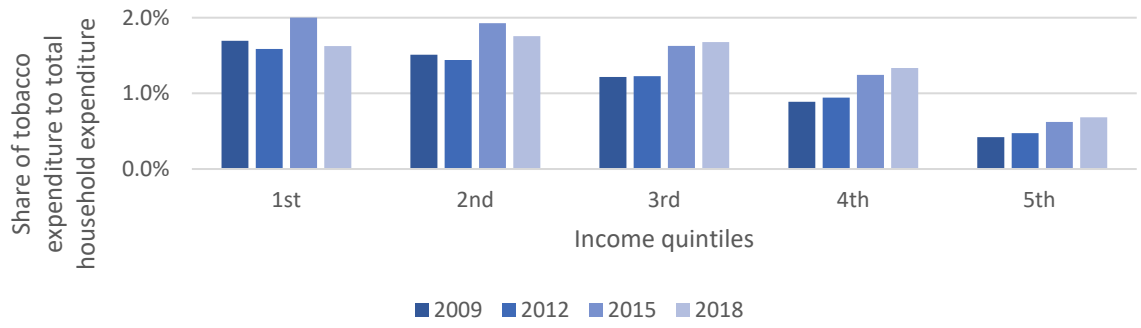
Aside from the effects on smoking prevalence and price elasticities, another impact of price increases due to tobacco excise taxes is the improvement of household spending distributions on welfare items such as food, health, housing, and education. This means that as tobacco expenditure decreases due to high prices, expenditure on food, health, and other welfare items increases and is more prioritized. More investments are transferred to relatively more essential goods and services within households. Nonetheless, average expenditure, as well as the share of tobacco expenditure to household expenditure, is continuously increasing over the years. (Table 1).

Table 1. Average tobacco expenditure (constant prices) and shares of tobacco expenditure

	2009	2012	2015	2018
Average tobacco expenditure (in thousands)	1,165.63	1,647.32	1,731.80	2,021.70
Share of tobacco expenditure (%)	0.83	0.86	1.14	1.24

Source: Author's compilation using data from the Family Income and Expenditure Surveys (FIES) 2009, 2012, 2015, and 2018.
Note: The base year used is 2012 to consider the implementation of the Sin Tax Reform Act of 2012.

Figure 1. Share of tobacco expenditure to total household expenditure by income quintile, 2009-2018



Source: Author's compilation using data from the Family Income and Expenditure Surveys (FIES) 2009, 2012, 2015, and 2018.

Looking into the income classes or quintiles, tobacco expenditure share to total household expenditure is higher among poorer quintiles, however, it has decreased for the first and second quintiles or the poorest 40 percent in 2018 (Figure 1). This slight decrease in tobacco spending can be attributed to the sin tax reforms enacted in 2018. This indicates that the higher prices due to higher taxes imposed caused households to spend on other more important expenditures especially for low-income households. It was also found that daily smoking was inversely related to the household wealth index for both urban and rural areas (WHO 2010).

While a decade of tobacco taxation measures has been implemented in the Philippines, the effect of these interventions has not been examined on tobacco and other household expenditures. The objective of this study is to examine the effects of sin tax reforms on tobacco spending as well as other household expenditure items. Such assessment is important to determine household spending patterns, socio-economic factors that affect tobacco spending, and the crowding-out effect. This study also aims to contribute to the improvement of tobacco taxation measures and policies geared towards addressing impoverishment from health spending, reduction in smoking prevalence, and smoking-related mortality.

2. Tobacco spending and household expenditures

There are two different impacts of tobacco spending on household expenditures: the "crowding out" effect and health spending effects (San & Chaloupka 2016). Crowding out effect means expenditure on other goods and services such as food, utilities, education, and health are reduced due to tobacco spending in a household. This reduction indicates that tobacco spending is negatively associated with household expenditures, while further implies that non-smokers in a household are affected by the magnitude of household spending on tobacco products, which ultimately favors smoking household members. Health spending effects refer to tobacco spending indirectly influencing the augmentation of health expenditure of a household due to the diseases and health risks posed by tobacco consumption.

Many studies utilized existing household income and expenditure surveys to analyze the level of tobacco consumption relative to specific factors such as geopolitical classifications and various smoking activities or events. A study in Turkey by Bilgic and Yen (2014) estimated spending on addictive products such as alcohol and tobacco by using the Sample Selection System (SSS) approach using data from a national household expenditure survey. Their results suggest differences in levels of consumption among rural, urban, and pooled samples for addictive products. The study found that differences in spending on these products may allude to the addictive nature of smoking. Also in Turkey, a study by San and Chaloupka (2016) estimated the Quadratic Conditional Engel Curve (QCEC) to determine household spending patterns and how it affects tobacco consumption. In Pakistan, a study conducted an intertemporal analysis of household tobacco consumption over the implementation phase of FCTC policies (Datta et al. 2019). Specifically, the study estimated the likelihood of four mutually exclusive events in tobacco consumption: (1) no tobacco consumption, (2) smoking only, (3) smokeless only, or (4) dual-use using a multinomial logistic model on Household Economic Survey data. The study probed on the correlation of the economic status of households to tobacco consumption and the changes over time. Their findings revealed a slow decrease in the smoking rate, but an increase in smokeless tobacco use especially among poor and middle-income households. Consequently, these outcomes increased the financial burden on tobacco expenditure among poor and middle-income households more than those of wealthier households.

In China, a study utilized generalized linear mixed models to factor in random effects to assess tobacco consumption on rural household expenditure. This was coupled with a self-rated health status question for both non-smokers and ex-smokers. Findings revealed that households apportion lower budgets to food, health care, clothing, and education in rural China. In terms of self-rated health status, ex-smokers reported an improved or better health status compared to the previous year as a smoker (Li and Supakankunti 2018). In the United States of America, a study by Hawkins, Kull, and Baum (2018) examined cigarette expenditure relative to state tax increases and smoke-free legislation using a quasi-experimental research design through the administration of annual cross-sectional surveys. The study revealed that for every USD 1.00 tax increase for cigarettes, a 1.5 percent-point reduction in cigarette expenditure follows, with an increase of 0.1 percent allocated budget share and USD 10.11 absolute expenditure, the association with the absolute expenditure stronger among smoking households above the poverty level (Hawkins et al. 2019).

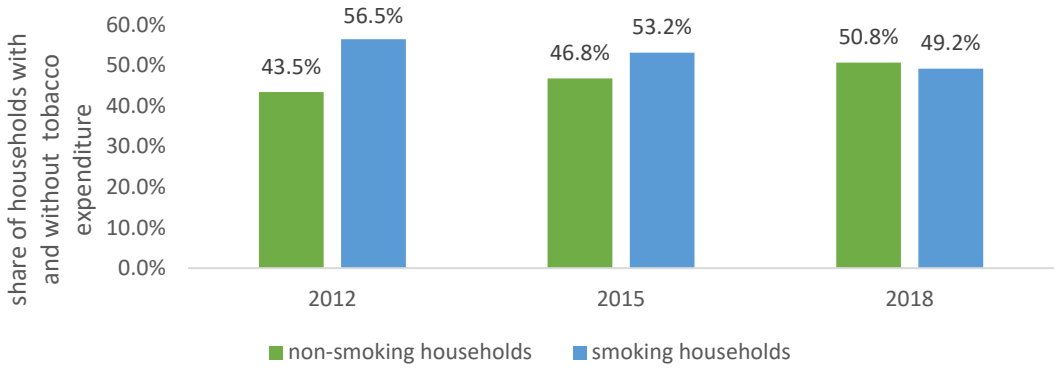
3. Data and methods

3.1. Data: Family Income and Expenditure Surveys (FIES)

The study uses the Family Income and Expenditure Surveys (FIES) 2012, 2015, and 2018 by the Philippine Statistics Authority. FIES 2018 has captured 147,717 sample households, accounting for credible estimates of income and expenditure at the national, regional, provincial, and highly urbanized cities levels. On the other hand, FIES 2012 and 2015 both cover 50,000 sample households with weighting variables provided to uphold national representativeness and generate reliable estimates.

FIES include data on family income, sources of income, family expenditure, and related information influencing the levels and patterns of income and expenditure and are collected in two separate visits to mitigate respondents' memory bias. In terms of expenditure items, FIES 2012-2018 included 18 disaggregations with a reference period of past six months except for food items (disaggregated into 13 subgroups) which used average week consumption and for housing, water, electricity, gas and other fuels, transport, communication, and miscellaneous goods and services which used past month or in some instances, average monthly consumption. In doing the analysis, all expenditure items are included but only 13 expenditures are presented in the findings.

Figure 2. Proportion of households by tobacco status, 2012, 2015, and 2018



Source: Author's calculation using data from FIES 2012, 2015, and 2018.

Following, San and Chaloupka (2016), non-smoking households and smoking households are generated by creating a dummy variable with 1 if the household has a positive amount of tobacco expenditure, and 0 otherwise. The share of households with tobacco expenditure or smoking households is decreasing over the years, from 57 percent in 2012 to 49 percent in 2018, while non-smoking households are increasing (Figure 2). The following table showcases the average shares of expenditure items for non-smoking and smoking households respectively (Table 2). All expenditure items presented positive differences vouching for non-smoking households except for three expenditures such as food, alcohol, and restaurant and accommodation with higher shares among smoking households than non-smoking households. This is consistent with a study in Turkey which found that smoking households spend nearly 8 percent of their monthly budgets on smoking, while those from non-smoking households spend an average of 9 percent more on food, utilities, and housing than those from smoking households (San and Chaloupka 2016). This suggests that smoking households spend more on other expenditure items for leisure like alcohol and restaurant or accommodation and spend less on other essential expenditures like education and housing and utilities. However, shares of health expenditure are lesser among smoking households than its counterpart, though the differences become smaller over the years. Furthermore, this reveals that tobacco spending affects other household expenditure items and the spending patterns among household types.

Table 2. Average shares of expenditure items for smoking and non-smoking households

Expenditure items	2012		2015		2018	
	Non-smoking (%)	**Smoking (%)**	**Non-smoking (%)**	**Smoking (%)**	**Non-smoking (%)**	**Smoking (%)**
Food	40.2	47.6	39.9	46.3	40.9	46.3
Alcohol	0.4	0.9	0.3	0.8	0.4	0.8
Clothing and footwear	2.6	2.4	2.6	2.4	2.8	2.6
Furnishings and maintenance	3.1	2.4	2.7	2.1	2.4	2.0
Health	4.3	3.0	4.3	3.0	3.2	2.1
Housing and utilities	21.3	18.8	20.6	18.1	21.2	18.6
Transport	7.7	6.9	6.1	5.8	6.4	6.1
Communication	2.8	2.4	2.3	1.9	2.2	1.8
Recreation and culture	1.5	1.2	0.9	0.7	0.8	0.7
Education	4.8	3.5	4.4	3.2	3.0	2.2
Durables			2.8	2.2	3.7	3.1
Restaurant and accommodation	7.1	7.2	7.7	7.9	7.5	8.1
Miscellaneous	7.0	6.2	6.6	6.0	6.9	6.3
Other expenditure	4.1	2.8	3.5	2.5	2.7	2.0

Source: Author's calculations using data from FIES 2012, 2015, and 2018.

3.2. Empirical strategy

The study uses the concept of quadratic conditional Engel curve. This is a consumer demand model developed to show patterns of consumption and expenditure behavior complying with the consumer theory and eventually subscribing to welfare analysis (Banks et al. 1997). This demand model usefully predicts tax reform responses through variations of income effects from different goods and services and types of individuals or households.

Due to data constraints on prices for all expenditure items, the study adopts the Quadratic Almost Ideal Demand System to estimate the Engel curve that generates household spending patterns. To conduct the two-stage least squares method with instrumental variables, the equation is as follows:

$$w_i = (\alpha_{1i} + \alpha_{2i}d + \alpha_{3i}q + \alpha'_{4i}a) + (\beta_{1i} + \beta_{2i}d)(lnM) + (\delta_{1i} + \delta_{2i}d)(lnM)^2$$

where w_i = refers to the expenditure share of goods and services *i*;
d = dummy variable if the household is smoking or not;
q = tobacco spending/expenditure;
a = vector of household characteristics (age and sex of household heads, family size);
and *M* = difference between total expenditure and tobacco expenditure.

Since potential endogeneity can arise through *M* (difference between total and tobacco expenditure) and *q* (tobacco spending), two-stage squares instrumental variable method with an endogenous factorial interaction is fitted for the model and uses the total household expenditure as an instrumental variable for *M*. The total household expenditure is considered to be a valid instrument because of the similar approach made by John (2008). Such instrument is also reported to be consistent if utilized for the complete sample of households and the dataset consisted of zero expenditures suggesting that consumption is infrequent (Keen 1986), like in the case of tobacco expenditure.

3.3. Limitations of the study

Meanwhile, no instrumental variable is used for tobacco spending since the option of using data on women ratio is hindered by data availability in the Philippine context. The women ratio is used as a valid instrument because a lower ratio implies decreased tobacco spending (San and Chaloupka 2016). A caveat for this study is looking for an alternative valid instrument for tobacco spending aside from the women ratio. Nevertheless, no endogenous regressors were found after running the model using the aforementioned variables.

4. Results

This section showcases the results of the equation across various expenditure items over the FIES rounds, 2012, 2015, and 2018. The findings highlight household spending patterns considering whether household members are smokers or not. Household demographic variables are also included in the models but not just shown in the results. Moreover, endogeneity issues are resolved using instrumental variable and that the shares of expenditures are not correlated with tobacco expenditure as households differ in smoking status. This implies that the models ran for three rounds are not biased and consistent.

The major findings from the quadratic conditional Engel curves are the following:

- Crowding-out effects exist in smoking households as it depicts different spending patterns than non-smoking households or households without tobacco expenditure.
- Tobacco spending or shares of tobacco expenditure in households significantly affects consumption decisions toward other household goods and services and patterns have been slightly consistent over the years.
- As tobacco expenditure increases, expenditure on other items are reduced and across all years, health and education are significantly reduced.

Crowding-out effects exist on other household expenditures due to tobacco spending as represented by the instrumental variable of total expenditure and interaction terms of household smoking status dummy variable. Tables 3, 4, and 5 present that households with tobacco expenditure have different spending patterns compared to households without tobacco expenditure. This result suggests that households with a member who smokes, adjust their spending patterns to accommodate tobacco expenditures.

Consumption decisions on food, alcohol, clothing and footwear, recreation and education, represented through the dummy variable *d*, are significantly affected by tobacco spending in 2012. Meanwhile, in 2015, tobacco spending has significantly affected household consumption decisions on the same expenditure items but instead of recreation and education, furnishings, and communication expenses. In 2018, consumption decision is quite consistent with 2015 but adding utilities, transport, and durable expenditures are significantly affected by tobacco spending while furnishing expenses are not. The patterns are consistent over the years but consumption decisions on education and health were not affected significantly in 2015.

Reduction in the expenditure of other items increase total tobacco expenditure as represented by *q* variable, particularly for utilities, health, transport, recreation, education, miscellaneous and others in 2012. This is similar to the results for Turkey in 2011 from the San and Chaloupka (2016) study but adding clothing and durable goods and excluding transport and recreation. In 2015, an increase in tobacco spending leads to a decrease in furnishings, transport, and education expenditures. Moreover, food, clothing, utilities, furnishings, transport, communication, and education expenses are reduced due to an increase in tobacco spending in 2018. Health and education expenditures are observed to be affected for all years at 1 percent significance level. Both items are significantly reduced when tobacco expenditures are increased.

Contrary to Bilgic and Yen (2014) who found out that addictive and leisure goods such as alcohol and tobacco are proportional to household size in Turkey, tobacco is negatively proportional to family size and such relationship is statistically significant at 1 percent for all years.[2] This suggests that despite the crowding-out effects on other goods and services, tobacco spending in households is conscious of the needs of household members.

[2] The results on household demographic variables which include family size, are not shown in the regression tables.

5. Discussion

This study supports and is consistent with existing evidence (like in Turkey, China, and Pakistan) on tobacco expenditures relative to other household expenditures using a household survey data set and especially on the results of crowding-out effects and spending patterns.

The two studies set in Turkey, one looking at the spending on tobacco products together with alcoholic beverages (Bilgic and Yen 2014) and the other estimating quadratic conditional Engel curves to determine household spending patterns using household expenditure surveys. Moreover, the study in Pakistan by Datta et al. (2019) and in China by Li and Supakankunti (2018) also use household economic survey data, while considering income classes and population sub-groups such as rural or urban households.

Similarities with the result on tobacco expenditure affecting the spending on other items, the method of San and Chaloupka (2016) are replicated but using three years and crowding-out effects are manifested on food, housing, durable/non-durable items, and education expenditure for two years. Meanwhile, in this study, health and education are affected for all three years while food is impinged in 2018 and utilities for both 2012 and 2018. In addition, households tend to decrease budget shares for food, health, clothing, and education in rural China to consider tobacco expenditures (Li and Supakankunti 2018). This result is more similar to the findings of this study. Bilgic and Yen (2014) also find differences in spending patterns on tobacco and alcohol that might be caused by the obsessive attributes of smoking. In terms of differences in results, Datta et al. (2019) discover an increase in tobacco consumption particularly smokeless tobacco among poor and middle-income households in Pakistan.

Further analysis of the changes in household expenditure shares with consideration of income quintiles can also be explored but the spending patterns can be compromised with the increase in income (San and Chaloupka 2016). It is also ideal to do a similar analysis by Hawkins et al. (2019) but price and tax data are specific by state or certain locations. Such data is not available in the Philippines.

Tobacco control policies or interventions including tobacco tax measures such as the Sin Tax law, which affects one's consumption, seem to hardly affect household spending patterns. However, it is also important to note that the share of smoking households has decreased from 2012 to 2018 by 6.8 percent.

Moreover, food and utilities are always affected by consumption decisions over time by tobacco spending, and health and education expenditures are significantly affected negatively, but with a very small coefficient. This implies that tobacco seems to be an immediate or short-term satisfaction of smoking households which makes it proportional to important expenditures like food as well as addicting goods like alcohol. As the poorest quintiles have greater share of tobacco expenditure, this can also suggest that tobacco spending has greater impact on their welfare, seemingly affordable compared to health and education. This can also be linked with tobacco as a social issue in which poor people as well as less educated have higher smoking rates.

Tobacco taxation measures are one of the important tobacco control interventions that affect the demand behaviour of individuals through rising prices, in accordance with the WHO FCTC. However, any policy interventions on tobacco consumption will continue to have minimal

impacts if individuals within a household continue to smoke or purchase tobacco products regardless of the increasing prices. Hence, it is important to educate and encourage people to lessen tobacco consumption or quit smoking altogether.

There are various health promotion activities that can raise awareness about the harms of tobacco use and smoking risks to individuals within households, schools, and the community. Some of these activities are mass media campaigns towards the youth as well as adults, which are proven to be effective in influencing through depiction of the negative health consequences of smoking especially for low-income smoking households (Durkin et al 2012) and integration of the impacts of household spending in these education campaigns. Such campaign can educate people about the opportunity costs of their spending to allocate their resources towards a healthier lifestyle and eventually avoiding the health risks of smoking.

Table 3. Quadratic conditional Engel curve in 2012

Independent variables	Food	Alcoholic Beverages	Clothing	Utilities	Furnishings	Health	Transport	Communication	Recreation	Education	Miscellaneous	Others
d, dummy variable for tobacco spending	-0.603***	0.059*	0.061*	0.259	-0.012	0.089	-0.246	0.018	0.083**	0.277***	-0.015	-0.011
	(0.199)	(0.031)	(0.036)	(0.204)	(0.053)	(0.157)	(0.165)	(0.039)	(0.039)	(0.103)	(0.081)	(0.127)
q, total amount of tobacco spending	-0.000	0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	0.000	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
log total household expenditure (lnM)	0.019	0.013***	0.009**	0.130***	-0.066***	0.027	-0.021	0.034***	-0.007	-0.032**	0.057***	-0.157***
	(0.025)	(0.002)	(0.004)	(0.025)	(0.007)	(0.018)	(0.021)	(0.005)	(0.004)	(0.012)	(0.010)	(0.017)
square of log total household expenditure $(lnM)^2$	-0.007***	-0.001***	-0.000	-0.005***	0.003***	-0.001	0.002**	-0.001***	0.001***	0.002***	-0.002***	0.008***
	(0.001)	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)
Interaction term: d x lnM	0.104***	-0.007	-0.010*	-0.061*	0.004	-0.018	0.039	-0.004	-0.014**	-0.045**	-0.001	0.004
	(0.033)	(0.005)	(0.006)	(0.035)	(0.009)	(0.027)	(0.028)	(0.007)	(0.007)	(0.018)	(0.014)	(0.022)
Interaction term: $(d \times lnM)^2$	-0.004***	0.000	0.000*	0.003**	-0.000	0.001	-0.002	0.000	0.001**	0.002**	0.000	-0.000
	(0.001)	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
Constant	1.193***	-0.058***	-0.038	-0.669***	0.376***	-0.236**	0.071	-0.251***	0.017	0.087	-0.359***	0.836***
	(0.148)	(0.012)	(0.024)	(0.146)	(0.040)	(0.108)	(0.124)	(0.027)	(0.026)	(0.072)	(0.060)	(0.097)
Observations	40,171	40,171	40,171	40,171	40,171	40,171	40,171	40,171	40,171	40,171	40,171	40,171

Robust standard in parentheses *** p<0.01, ** p<0.05, * p<0.

Source: Author's calculations using data from Philippine Statistics Authority, FIES 2012.

Table 4. Quadratic conditional Engel curve in 2015

Independent variables	Food	Alcoholic Beverages	Clothing	Utilities	Furnishings	Health	Transport	Communication	Recreation	Education	Durables
d, dummy variable for tobacco spending	-1.068***	0.161***	0.083**	0.201	-0.149**	0.261	0.049	0.152***	-0.010	0.060	-0.164
	(0.211)	(0.032)	(0.040)	(0.264)	(0.062)	(0.168)	(0.097)	(0.039)	(0.035)	(0.108)	(0.229)
q, total amount of tobacco spending	-0.000***	0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000	-0.000	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
log total household expenditure (lnM)	0.014	0.009***	-0.001	0.053*	-0.099***	0.063***	0.039***	0.021***	-0.008**	-0.021	-0.087***
	(0.022)	(0.002)	(0.004)	(0.028)	(0.008)	(0.018)	(0.011)	(0.004)	(0.004)	(0.014)	(0.027)
square of log total household expenditure $(lnM)^2$	-0.007***	-0.000***	0.000	-0.001	0.004***	-0.002**	-0.001**	-0.000**	0.000***	0.002***	0.004***
	(0.001)	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
Interaction term: d x lnM	0.176***	-0.024***	-0.014**	-0.052	0.028***	-0.045	-0.011	-0.026***	0.002	-0.008	0.026
	(0.035)	(0.005)	(0.007)	(0.044)	(0.011)	(0.029)	(0.016)	(0.007)	(0.006)	(0.018)	(0.039)
Interaction term: $(d \times lnM)^2$	-0.007***	0.001***	0.001*	0.003	-0.001***	0.002	0.001	0.001***	-0.000	0.000	-0.001
	(0.001)	(0.000)	(0.000)	(0.002)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.002)
Constant	1.208***	-0.034**	0.022	-0.228	0.587***	-0.460***	-0.258***	-0.176***	0.039*	0.040	0.466***
	(0.136)	(0.014)	(0.027)	(0.164)	(0.048)	(0.108)	(0.066)	(0.022)	(0.022)	(0.081)	(0.158)
Observations	41,544	41,544	41,544	41,544	41,544	41,544	41,544	41,544	41,544	41,544	41,544

Robust standard in parentheses *** p<0.01, ** p<0.05, * p<0.

Source: Author's calculations using data from Philippine Statistics Authority, FIES 2015.

Table 5. Quadratic conditional Engel curve in 2018

Independent variables	Food	Alcoholic Beverages	Clothing	Utilities	Furnishings	Health	Transport	Communication	Recreation	Education	Durables
d, dummy variable for tobacco spending	-0.729***	0.102***	0.103**	0.627***	0.002	0.086	0.199**	0.281***	-0.003	0.111	-0.760***
	(0.149)	(0.021)	(0.045)	(0.183)	(0.058)	(0.124)	(0.086)	(0.029)	(0.027)	(0.079)	(0.263)
q, total amount of tobacco spending	-0.000***	0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
log total household expenditure (lnM)	0.137***	0.009***	-0.013**	0.165***	-0.079***	0.011	0.061***	0.037***	-0.008**	-0.085***	-0.214***
	(0.016)	(0.001)	(0.006)	(0.020)	(0.005)	(0.017)	(0.009)	(0.003)	(0.003)	(0.009)	(0.031)
square of log total household expenditure $(lnM)^2$	-0.012***	-0.000***	0.001**	-0.006***	0.003***	0.000	-0.002***	-0.001***	0.000***	0.004***	0.010***
	(0.001)	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Interaction term: d x lnM	0.117***	-0.014***	-0.017**	-0.121***	0.001	-0.015	-0.037**	-0.046***	0.001	-0.015	0.123***
	(0.024)	(0.003)	(0.008)	(0.030)	(0.010)	(0.021)	(0.014)	(0.005)	(0.005)	(0.013)	(0.044)
Interaction term: $(d \times lnM)^2$	-0.005***	0.000***	0.001**	0.006***	-0.000	0.001	0.002***	0.002***	-0.000	0.000	-0.005***
	(0.001)	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.002)
Constant	0.468***	-0.039***	0.092**	-0.918***	0.488***	-0.126	-0.392***	-0.283***	0.042**	0.436***	1.209***
	(0.100)	(0.009)	(0.038)	(0.122)	(0.032)	(0.102)	(0.054)	(0.019)	(0.019)	(0.053)	(0.183)
Observations	147,717	147,717	147,717	147,717	147,717	147,717	147,717	147,717	147,717	147,717	147,717

Robust standard in parentheses *** p<0.01, ** p<0.05, * p<0.1

Source: Author's calculations using data from Philippine Statistics Authority, FIES 2018.

6. Bibliography

Austria, M. and J. Pagaduan. 2018. Assessing the Impact of the Philippine Sin Tax Reform Law on the Demand for Cigarettes. DLSU-AKI Working Paper Series No. 2018-03-051. Available at: https://www.dlsu.edu.ph/wp-content/uploads/2019/03/aki_working_paper_no._2018-03-051.pdf.

Banks J., R. Blundell, and A. Lewbel 1997. Quadratic Engel Curves and Consumer Demand. *Review of Economics and Statistics*. November;79(4):527–39.

Berg C.N., U. Deichmann, Y. Liu, and H. Selod. Transport Policies and Development. *The Journal of Development Studies*. 2017 April 3;53(4):465–80.

Bilgic A. and S.T. Yen. 2015. Household alcohol and tobacco expenditures in Turkey: A sample-selection system approach: Alcohol and tobacco expenditures in Turkey. *Contemporary Economic Policy*. July;33(3):571–85.

Cheng K.J.G. and M.A.G. Estrada. 2020. Price elasticity of cigarette smoking demand in the Philippines after the 2012 Sin Tax Reform Act. *Preventive Medicine*. 134:106042.

Datta, B. K., M. J. Husain, and N.Nargis. 2019. An Intertemporal Analysis of Post-FCTC Era Household Tobacco Consumption in Pakistan. *International Journal of Environmental Research and Public Health*, 16(14), 2532. https://doi.org/10.3390/ijerph16142532

Durkin S., E. Brennan, and M. Wakefield. 2012. Mass media campaigns to promote smoking cessation among adults: an integrative review. *Tobacco Control*, 21, 127-138. doi: 10.1136/tobaccocontrol-2011-050345. PMID: 22345235.

Global Burden of Disease (GBD) 2017. Seattle, WA: Institute for Health Metrics and Evaluation (IHME), University of Washington; 2020. Available from: vizhub.healthdata.org/gbd-compare/

Hawkins S.S., M.Kull M, and C.F. Baum. US state cigarette tax increases and smoke-free legislation in relation to cigarette expenditure across household socio-economic circumstances: a quasi-experimental study. *Addiction*. 2019 April;114(4):721–9.

John, R. M. 2008. Crowding out effect of tobacco expenditure and its implications on household resource allocation in India. *Social Science & Medicine*, *66*(6), 1356–1367. https://doi.org/10.1016/j.socscimed.2007.11.020

Keen, M. 1986. Zero expenditures and the estimation of Engel curves. *Journal of Applied Econometrics*, *1*(3), 277–286. https://doi.org/10.1002/jae.3950010305

Li C., and S. Supakankunti. 2018. The Impact of Tobacco Consumption on Rural Household Expenditure and Self-rated Health Among Rural Household Members in China. *Substance Use & Misuse*. October 15;53(12):1974–83.

Philippines Global Adult Tobacco Survey (GATS). 2015. Centers for Disease Control and Prevention. Available from: https://www.cdc.gov/tobacco/global/gtss/

Quimbo, S., A. Casorla, M. Miguel-Baguilod, F. Medalla, X. Xu, and F. Chaloupka. 2012. The Economics of Tobacco and Tobacco Taxation in the Philippines. Paris: International Union Against Tuberculosis and Lung Disease.

San S. and F.J. Chaloupka. 2016. The impact of tobacco expenditures on spending within Turkish households. *Tobacco Control*. September;25(5):558–63.

World Health Organization (WHO). 2005. WHO framework convention on tobacco control. Geneva: WHO.

———. 2010. Global Adult Tobacco Survey. Available from https://www.who.int/tobacco/surveillance/2009_gats_report_philippines.pdf

Assessment on the Impact and Implementation of Article 11 of the Framework Convention of Tobacco Control in the Philippines

Alyssa Cyrielle B. Villanueva and Valerie Gilbert T. Ulep*

Abstract

In the Philippines, graphic health warning (GHW) labels are replaced every two years with new designs. As a result, it is critical to assess whether the law is accomplishing its goal of reducing cigarette demand and smoking initiation among the youth. The goal of this study is to evaluate the impact of GHW on cigarette packaging, in terms of cigarette demand, number of smokers, and smoking initiation. The potential impact of GHW on smoking demand was evaluated using a discrete choice experiment (DCE) method. Dark-colored packaging and larger pictures on GHWs had a statistically significant influence on reducing cigarette demand by 5 percent, according to the research. We also discover that the GHW will result in a 750,000 reduction in smokers. On the effects on non-smokers, the new dark-colored GHWs reduce the probability of non-smokers to buy cigarettes by 6 percent. However, for both smokers and non-smokers, the gray plain packaging increases cigarette consumption by 10 percent. Therefore, the findings of this study are instrumental in the transition to new GHW or plain packaging designs and will support the advocacy for better tobacco prevention and control measures in the Philippines. Based on our results, we recommend the image of diseases to be large, more graphic, and printed on a dark-colored packaging to reduce cigarette demand and smoking initiation. In addition, the images of the diseases should be easily recognizable, so smokers will be prompted to think that they could also contract the same diseases if they continue their smoking habits.

Keywords: tobacco, graphic health warnings, discrete choice experiment, cigarette demand, cigarette consumption, number of smokers, smoking initiation

* VGU is a Senior Research Fellow at the Philippine Institute for Development Studies (PIDS). ACBV is a technical consultant for the project. The authors acknowledge the inputs and project coordination of Clarisa Flaminiano.

1. Introduction

In the Philippines, tobacco is smoked by 17.3 million people (or 28% of the population). Smoking is more common among men (48%) than among women (9%). Secondhand smoking is present in the homes of 55 percent of teenagers (ages 13-15) and 40 percent of adults. Given that, 87,600 Filipinos die per year (240 per day) from tobacco-related illnesses, one-third of whom are men who were working in their prime years. Each year, the Philippines spends $858 million on medical care to treat smoking-related disease in adults (The Union 2020).

According to the 2015 Global Adult Tobacco Survey (GATS) in the Philippines, 18.7 percent (13.1 million) of adults smoke cigarettes on a daily basis, averaging 11 cigarettes per day. In the previous month, an estimated 21.5 percent of people (3.6 million) were exposed to cigarette smoke in enclosed places at work. The average monthly expenditures for daily cigarette smokers were PHP 678.4. In addition, around 41 percent of respondents noticed cigarette advertisements at stores where cigarettes are sold, while 9.6 percent of individuals noticed cigarette logos on clothing or other goods (DOH 2015).

To combat the tobacco epidemic, the Philippine government implemented a roadmap to tobacco control legislation. The Tobacco Regulation Act of 2003 (Republic Act [RA] No. 9211), an omnibus tobacco control law, and the Inter-Agency Tobacco Committee, which issued the implementing rules and regulations of the Tobacco Regulation Act of 2003, are the two main pillars of tobacco control legislation. The Tobacco Regulation Act of 2003 prohibits smoking in public places, tobacco advertising, promotion and sponsorship, and sales regulations, among other requirements while the implementing rules and regulations are detailed and encompass a broad range of themes on tobacco control. Moreover, the Consumer Act of the Philippines (RA 7394) was implemented to prevent false, deceptive, or misleading advertising in general (Tobacco Control Laws, n.d.).

In 2005, the Philippines signed the World Health Organization (WHO) Framework Convention of Tobacco Control in the Philippines (FCTC) and implemented policies and other measures to comply with the FCTC and the WHO's MPOWER[2] measures. Additionally, the Philippines enacted RA 10351 in 2012 to reform the excise tax and tax structure on tobacco products (Arrazola et al. 2020). To further strengthen tobacco control, a landmark legislation, RA 10643, also known as "An Act to Effectively Instill Health Consciousness through Graphic Health Warnings (GHW) on Tobacco Products," was passed in 2014 in compliance with the WHO FCTC Article 11. This law requires all tobacco products manufactured or imported for sale in the Philippines to carry graphic health warnings, which must include "two components: a photographic picture warning and an accompanying textual warning that is related to the picture." Among other requirements, the law states that graphic health warnings "*must be displayed on 50 percent of the major display surfaces of any cigarette package; it shall occupy 50 percent of the front and 50 percent of the rear panel of the packaging*" (Sec. 6).

[2] "These measures are intended to assist in the country-level implementation of effective interventions to reduce the demand for tobacco, contained in the WHO FCTC. MPOWER - a package of six proven policies to: (i) monitor tobacco use and prevention policies; (ii) protect people from tobacco smoke; (iii) offer help to quit tobacco use; (iv) warn about the dangers of tobacco; (v) enforce bans on tobacco advertising, promotion and sponsorship; and (vi) raise taxes on tobacco" (WHO 2008, p.35).

The law also aims: (i) to eliminate misleading or deceptive numbers or adjectives such as "low tar," "light," "ultra light," or "mild," which express or tend to convey that a product or version is healthier, less hazardous, or safer; and (ii) to promote people's right to health and information (Sec. 3[b]. Every two years, the graphic health warnings are rotated among a maximum of 12 layouts. Themes included stroke, emphysema, impotence, mouth cancer, gangrene, throat cancer, neck cancer, premature birth, and low birth weight in the first set of 12 GHW templates. Pictorial warnings are recognized by the WHO FCTC as a cost-effective way to raise public awareness about the dangers of tobacco use (DOH n.d.). Table 1 below shows the other graphic health warnings and message features of cigarette packaging and labelling in the Philippines.

According to research, graphic health warning labels on cigarette packs have been demonstrated to be effective in reducing tobacco usage. They are more likely to enhance motivation to stop smoking because they are self-reflective on health hazards, are not restricted by reading level, are noticeable, and are more likely to increase motivation to quit smoking. Since images promote learning, memory, and post-message attitudes, they may be an effective educational strategy. Not only have graphic health warnings lowered tobacco use and consumption, but they have also raised smokers' thoughts about cessation. Nonsmokers should be aware of the health consequences of tobacco through the use of graphic health warning labels. This results in a well-informed society that puts pressure on smokers to give up smoking (Layoun et al. 2017).

Senator Aquilino Pimentel III filed Senate Bill No. 2191, despite the measures and regulations that have been passed to control and regulate tobacco production, sale, and usage. To emphasize government-mandated health warnings, the bill mandates the use of plain packaging[3] for both locally manufactured and imported tobacco products introduced into the Philippine market. Plain packaging for all cigarettes and other tobacco products has been found to "lessen" the attraction of tobacco products while enhancing the effectiveness of health warnings in nations where it has been implemented. As a result, overall cigarette demand is reduced (Senate of the Philippines 2019).

Given that, it is critical to assess whether the graphic health warning label intervention was useful in curbing cigarette smoking more than five years since it was implemented in March 2016. Only two research have looked into the effectiveness of GHW. Given that buying cigarettes by the stick is widespread in the Philippines, the first study looked at how effective GHWs are at changing Filipinos' smoking behaviors. The second study, on the other hand, looked at why smokers continued to smoke despite the availability of GHWs. As a result, estimates of the impact of GHWs on cigarette demand, the number of smokers, and non-smoker smoking initiation are needed. Furthermore, it is time to investigate if plain cigarette packaging is more effective in curbing cigarette demand.

This study aims to assess the potential impact of graphic health warnings on smoking demand and identify the enablers of and barriers to the implementation of FCTC Article 11 (graphic health warnings) in the Philippines. In particular, the specific objectives of the study are:

[3] Tobacco packaging that is standardized or "plain" must have a uniform plain color and texture; it must have a standard shape, size, and material; and it cannot have any branding, logos, or other promotional elements on, inside, or attached to the packaging or on individual goods. Only the brand name, product name, quantity of product, and contact information, along with other essential information like as health warnings and tax stamps, may appear on packaging in a standard typeface.

1. To estimate the potential impact of graphic tobacco health warnings (including plain packaging) on smoking demand.
2. To synthesize the bottlenecks and challenges in the implementation of the Graphic Health Warning Law in the Philippines (RA 10643).

Furthermore, the findings of this study will be instrumental in the transition to plain packaging design and will support the advocacy for better tobacco prevention and control measures in the Philippines.

2. Review of related literature

2.1. Theory of graphic health warning

Tobacco packaging is an important part of tobacco marketing because it establishes a direct connection between consumers and manufacturers. Packaging also acts as a gateway to other forms of tobacco advertising. Cigarette packages provide governments with a direct means of connecting with smokers in addition to serving as a marketing platform for the tobacco industry. The primary purpose of warning labels is to communicate the health risks of smoking and to satisfy the government's regulatory responsibility to inform consumers about potentially hazardous commodities. As a result, under Article 11 of the WHO's FCTC, the first international treaty devoted to public health, international standards for tobacco packaging and labeling have been developed. The guidelines were adopted in November 2008 at the third Conference of the Parties (COP3). The Article 11 guidelines are divided into three sections: (i) government-mandated health warnings; (ii) tobacco constituent and emission labeling; (iii) and the removal of deceptive information from the package. The components of effective GHW labels are: (i) pictures depicting the hazardous effects of tobacco use; (ii) occupy at least 50% of the product's main display areas; (iii) put on both the front and back of the box; (iv) messages must emphasize the harmful effects of tobacco use and provide important public health information; (v) GHWs must be rotated regularly; (vi) colors must contrast with the background and text; (vii) cessation advice and a local quitline phone number and/or website must be provided; (viii) messages must be written in the country's primary language(s); (ix) and a source must be identified that recommends the health messages (SEATCA 2010a).

2.2. Graphic health warning in the Philippines

The law mandates that GHWs be present on major display surfaces of tobacco products manufactured and imported for entry into the Philippine market, in compliance with the DOH's templates. Additionally, on an area of not more than thirty percent of the display surface of one side panel, the package must show extra information as prescribed by the DOH, such as "additional health warnings, hotlines or websites for tobacco-related concerns, or recommendations on how to quit smoking" (RA 10643, Sec. 7).

The textual warning "SMOKING KILLS" must be placed on mastercases that carry the logo or trademark of cigarette brands. On inserts and onserts, GHWs must occupy 50 percent of all sides or surface areas that have any type of printing and are shown or visible under usual or customary

conditions of use. Outside packaging and labeling, as well as reams and cartons, must have GHWs on 50 percent of the main display areas, in the same quality, color, and proportion, and in compliance with the DOH's templates and requirements (RA 10643).

The GHWs must be printed in four colors, vivid and realistic, with no border, frame, or other design that effectively reduces the warning's size. The GHWs must be printed on the package in a color that contrasts prominently with the product's background or labels, and the DOH templates must not be altered. The text warning must be in a legible font and cover no more than 20 percent of the GHW area; it must be understandable to a layman and be written in either English or Filipino; and it must be positioned in areas where it will not obstruct the picture. Tobacco makers and/or importers are responsible for all printing costs associated with packaging and labeling. Table 1 below summarizes the Philippine GHW features (RA 10643).

Table 1. Philippine graphic health warnings features

Required	Some Restrictions	Not Required	Uncertain	N/A
Warnings on unit packaging and labeling (e.g. packs)	■			
Warnings on outside packaging and labeling (e.g. cartons)	■			
Warning texts in the principal language(s) of the country	■			
Warnings may not be placed where they may be concealed or damaged when opening the pack	■			
Tax stamps or other required markings may not be placed where they may conceal warnings	■			
Qualitative (descriptive) constituents and emissions disclosures	■			
Ban on display of figures for emission yields (including tar, nicotine, etc.)			■	
Plain or standardized packaging			■	
Prohibition on misleading packaging and labeling		■		

Source: Lifted in full from Tobacco Control Laws database (https://www.tobaccocontrollaws.org/legislation/factsheet/pl/philippines)

Table 1 shows that Philippine GHWs require warnings on packaging and labeling, tax stamps, and descriptive constituents and emissions disclosures. However, prohibition on misleading packaging and labeling are not required. Moreover, there are no stipulations regarding ban on display of figures for emission yields.

The criteria and processes for compliance monitoring, reporting, inspections, and enforcement are outlined in the rules for the GHW law's implementation. The law also establishes the roles and

responsibilities of implementing authorities in ensuring timely and strict compliance with the use of GHW templates, as well as the prohibition of deceptive descriptors, in order to promote people's right to health and information (RA 10643).

The templates for the first set of compulsory graphic health warnings are established by Department of Health Administrative Order No. 2014-0037, as amended by Department of Health Administrative Order No. 2014-0037-A. Administrative Order No. 2014-0037-B contains the second set, while Administrative Order No. 2019-0009 contains the third set (Tobacco Control Laws 2021).

2.3. Bottlenecks and challenges to the implementation of graphic health warnings

The implementation of graphic health warnings to replace current warnings has gained the support of the public mainly due to its proven effectiveness to deter smoking initiation among non-smokers and encourage quitting attempts by smokers. The Indian government supports the strict regulations aimed at reducing tobacco consumption. However, increasing the size of picture-based health warnings in India was difficult. Due to GHW requirements that “85 percent of a cigarette pack's surface be covered in health warnings, up from 20 percent, the tobacco industry has taken the government to court” (Reuters 2016). According to the tobacco industry, the laws are ineffective and would encourage the smuggling of imported cigarettes (Reuters 2016). In Bangladesh, the lack of a production date and the various sizes/forms of smokeless tobacco and bidi packets made measuring GHWs application on all tobacco products extremely problematic (Rahman et. al. 2018).

Following the introduction of pictorial health warnings in Malaysia, the tobacco industry created cigarette packs in a variety of styles and shapes, ostensibly to dilute the effects of the pictorial health warning. Because there is no need for pack size, the tobacco industry can introduce cigarette packs in the style of miniature "lipstick" boxes or "button" packs. As a result of the smaller size of the cigarette packing, the visual warning has been distorted. Another issue was that at the start of the implementation period, shops purposefully displayed the non-pictorial health warning surface at point-of-sale. The tobacco industry took advantage of the specification of outer packaging printing by printing unique graphics at the bottom of a transparent sleeve that would be placed on the cigarette pack. Because smokers can move the sleeve with the design to the top of the pack, the surface of the visual health warning is obscured. Except for all the texts on health messages and graphics of graphic health warnings, there was no specification on the pack's generic colors. The tobacco industry reacted quickly to the prohibition on descriptors by developing packs with varied color coding to identify their product designs and to sensitize customers about the many sorts of product designs that use colors. The tobacco industry used colors and visual design to divert viewers' attention away from the health warnings, diminishing the impact of pictorial health warnings. The tobacco producers extended the border width to minimize the size of the graphic health warning because there was no standard on the thickness of the black border width where the word "WARNING" and the health message text should be written. Governments must continue to strengthen enforcement efforts at all levels to ensure that the tobacco industry adheres to the requirement of visual health warnings (SEATCA 2010b).

2.4. Discrete choice experiment

GHWs have been shown to increase quit attempts among smokers and reduce initial smoking among adolescents. A study in Vietnam employed a discrete choice experimental (DCE) to anticipate the effects of graphic health warnings on cigarette packets, especially in terms of reducing cigarette demand and smoking-related mortality. They created various static models to anticipate the influence of GHWs on reducing smoking-related premature mortality. They discovered that GHWs had a statistically significant impact on lowering cigarette demand (up to 10.1 percent via visuals of lung injury), resulting in a reduction in smoking prevalence in Vietnam. They also discovered that the GHW intervention would avert between 428,417 and 646,098 premature deaths. The potential influence of GHW labeling on lowering premature smoking-related fatalities in Vietnam was shown to be stronger among lower socioeconomic groups (Giang et al. 2016).

In another study, Barrientos et al. (2021) used Mexican data to conduct a DCE with early teens to assess the independent and interactive effects of cigarette packaging and GHW characteristics on cigarette brands' perceived appeal. Their findings revealed that plain packaging or greater GHWs made packs appear less appealing, less intriguing to attempt, and more damaging to participants, with the effect being most obvious when plain packaging is combined with higher GHWs. Plain packaging had the greatest influence on decision in terms of attractiveness (43%), followed by GHW size (19%). The most influential factor in deciding whether or not to try something was the brand name (34%), followed by plain packaging (29%). Brand name had the greatest influence on perceived harm (30%), followed by HWL size (29%). The appeal of cigarettes to early teens appears to be reduced by increasing the size of GHW and applying plain packaging.

Similarly, a DCE design combined with a conditional logit model was used in a study in Vietnam to investigate the relative impact of several attributes of visual health warnings on cigarette packets. According to the DCE model's findings, graphic type is the most relevant attribute, followed by cost and GHW coverage area. The GHW's position was the least essential factor. The image of lung cancer was found to have the largest impact on both smokers and nonsmokers among five visual styles (internal lung cancer image, external damaged teeth, abstract image, human suffering image, and text) (Minh et al. 2016). Similarly, another study in Canada looked at the relative impact of five cigarette packaging attributes—pack structure (e.g., "slims"), brand, branding, warning label size, and price—on perceptions of product flavor, harm, and willingness to try among young females. The multinomial logit analyses found that pack structure was most important to young females' intention to try (46%), judgment of product taste (52%), and judgment of product damage (48%). In trial intent decisions, product taste judgements (29% and 15%, respectively), as well as price and branding were weighted important (23% and 18%, respectively). When considering product hazard, the size and brand of the warning label were weighted heavily (23% and 17%, respectively). According to the findings, standardized cigarette packaging could lower demand and diminish false beliefs about product danger among young females. To maximize influence on purchasing among both smokers and non-smokers, GHWs should be built with these characteristics in mind (Kotnowski et al. 2015).

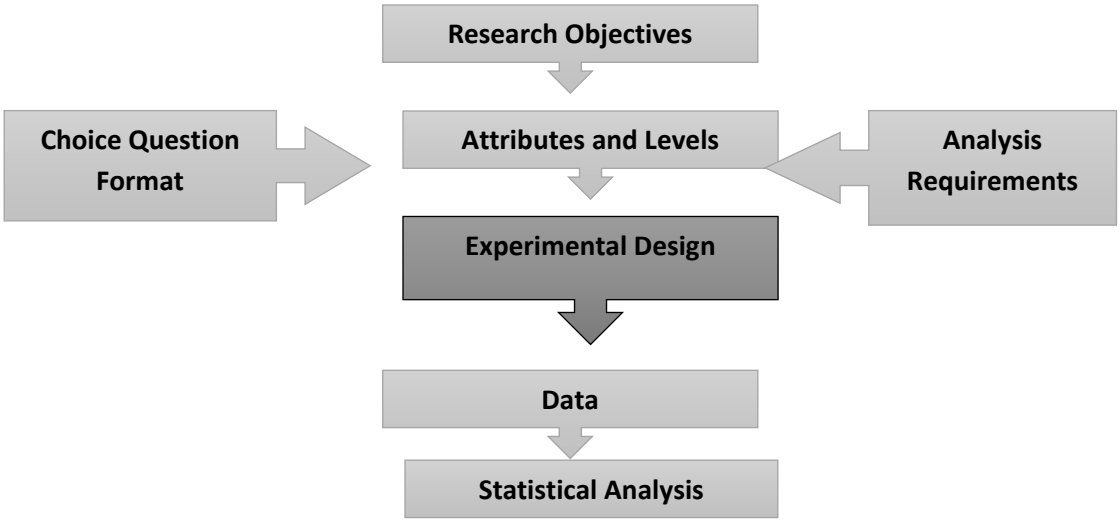
DCE is also used to examine preferences for electronic cigarettes (e-cigarettes) and heated tobacco products (HTPs). To give an example, a DCE was conducted online in Canada to investigate the impact of e-cigarette product attributes on user perceptions and trial intentions. The most critical characteristic impacting participants' intentions to try e-cigarettes (42%) and perceived efficacy as a quit aid was discovered using multinomial logit regression (39%). Both flavor (36%) and health warnings (35%) were found to be significant predictors of product harm perceptions (Czoli 2016).

3. Methodology

3.1. Conceptual framework

Figure 1 below shows the key stages of developing a discrete choice experiment. For the *research objectives*, we identify the object of choice for which preferences will be quantified. In this study, the object of choice is the graphic health warnings on cigarette packs. *Attributes and levels* are the individual features that comprise the research object, among which the survey will elicit tradeoffs. Attributes include features while levels will include possible values, outcomes, and interventions associated with each attribute. The attributes and levels in this study are based on the design of the graphic and text health warning; price band; pack size; variant; and distribution. The *choice question format* describes the presentation of all possible attribute-level combinations to the respondents. The choice questions in this study are combinations of the warning design characteristics. *Analysis requirements* contain information about the model specifications. This study utilizes a conditional logit regression model. The attributes and levels, choice question format, and analysis requirements form the skeleton of the experimental design. *Data* from the experiment are analyzed to predict probabilities to purchase of smokers and probabilities not to purchase of non-smokers. The difference between the two probabilities will give the estimate of reduction in demand for cigarettes (*statistical analysis)*.

Figure 1. Discrete choice experiment stages



Source: Adapted from Johnson et al. (2013).

3.2 Data

To attain the first specific objective of the study, we use a discrete choice experiment on the new graphic health warning designs wherein the graphic image covers 75 percent or 90 percent of the lower half of the front and back of the dark-colored packaging. The current graphic image which covers 50 percent of the lower half of the front and back of the cigarette package is used as a control. In this study, we obtained information from around 2000 smokers collected through a purposive online survey which highlights the discrete choice experiment revealed their preferences for not purchasing cigarettes based on the package, which featured various designs of graphic health warning labels.

For the primary data collection, the research team together with DOH distributed the links to the consent and online survey through various platforms. This includes university websites, national government websites (e.g., Department of Interior and Local Government, Department of Health Websites, Department of Education). An electronic consent form was presented on the screen before the respondents can begin answering the online survey. The survey inclusion criteria are as follows:

- With access to internet/mobile data and laptop/mobile phone
- Smokers AND Non-smokers
- Aged 15-65 years old
- Males, females, LGBTQ+ and refused to reveal their genders
- From major island groups: Luzon, Visayas, Mindanao
- Primary sampling units (subgroups)
    - Urban and Rural
    - Income classification (poor vs non-poor); according to income range

The key variables on demographic, smoking behavior, and discrete choice experiment attributes and levels from the survey are described in Table 2.

Table 2. List of variables

Variable	Definition
Demographics	
Gender	Male or female or LGBTQ+ or refused to reveal their genders
Age	Age of the respondent
City/Province	Location
Area classification	Urban or rural
Tobacco smoking behavior	
Smoking behavior	Smoker, non-smoker, never smoker
Attributes and Levels	
Graphic type	Text/Throat Cancer/Death/Plain
Area covered	50%, 75%, or 90%
Color	White/red, gray, olive green, or dark brown
Position	Middle or Bottom
Variable of interest	
Preferences for not buying cigarette packs based on GHW	Buying cigarette pack A or B or neither

Source: Author's compilation.

For the sample size computation, there is currently no standard for determining the minimum sample size in DCEs. Below is a rule-of-thumb proposed by Johnson and Orme (2010) that will be used to compute the required sample in this study:

$$N > 500c/(t * a)$$

where t is the number of choice tasks, a is the number of alternatives, and c is the number of analysis cells that is equal to the number of levels for any of the attributes with the most levels.

To meet the second specific objective, a review of related literature, government documents, and administrative data is conducted to have an overview of the perceptions and experiences related to the implementation of Article 11 of the FCTC. The review of these documents helps determine the factors to success and failures of the article's implementation as well as policy recommendations to sustain the GHW law.

3.3 Overview of the survey questionnaire

- **Background characteristics:** Age, gender, province, work status, education, income, possession of household items, marital status, tobacco industry involvement.
- **Smoking status:** current smoker, former smoker, or nonsmoker of tobacco products.
- **Tobacco smoking behavior of current and former tobacco smokers:** Patterns of use (daily consumption, less than daily consumption, not at all), former/past tobacco consumption, age of initiation of smoking, consumption of different tobacco products (cigarettes, pipes, cigars, waterpipes, and other smoked tobacco).

- **Cessation of current and former smokers**: Smoking quit attempts, advice to quit smoking by health care provider, method used to try to stop smoking.
- **Economics (current smokers):** Type of tobacco product and quantity bought, cost of tobacco product, brand, and source of tobacco products.
- **Nonsmokers:** curiosity and initiation behavior.
- **Electronic cigarettes:** Awareness, current use, length of daily use, reasons for use, type of product, cost of product, and source of tobacco products. (Electronic cigarettes are classified as electronic nicotine delivery systems (ENDS) which include various products and terminology such as e-cigarettes, vapes, vape pens, e-hookah, e-pipes, and e-cigars.)
- **Perception on health risks and graphic health warning labels:** Knowledge about health effects of smoking tobacco. Noticing and effects of health warning labels on cigarette/tobacco packages in the last 30 days; Noticing graphic health warnings in cigarette packages in the last 30 days; Parts of the graphic health warning packaging that are informative; Initial thoughts or feelings about health warnings; Increased knowledge on the health effects of smoking through the graphic health warnings; and Behavior after seeing the packaging with graphic health warnings.
- **Discrete choice experiment:** Preferred packaging type. The experimental task consists of a series of predetermined choice sets containing images of cigarette packs with graphic health warnings. Ten choice sets will be presented to the respondent. The respondent is given 3 choices: (i) the current GHW label on cigarette packaging; (ii) new graphic health warning package with varying images, area coverage, color, and position; and (iii) neither. He/she should choose the packaging that he/she would purchase. Figure 2 below shows a sample choice set presented to the respondent. The respondent must choose between 3 choices: (i) Current GHW label (graphic image of throat cancer/death, covering 50 percent of the lower half of the front and back of the cigarette package, red packaging); (ii) New GHW label 4 ((graphic image of death, covering 90 percent of the front and back of the cigarette package, located in the middle, green packaging); or neither.

Figure 2. Sample choice set

Cigarette A **Cigarette B** **Neither**

Source: Author's compilation.

3.4 Regression method

A conditional logit regression is utilized to analyze the discrete choices made by around 2,000 participants. The estimated parameter coefficients from the main effects model is used to assess the impact of the graphic health warning on smoking demand. Tweaking the model from Giang et al. (2016):

$$U_i = \alpha X_i + \varepsilon_i \quad (1)$$

where the dependent variable U_i is the utility i to individual denoted by the preference to the choice; X_i is the vector of attribute-levels; and ε_i denotes the error term that is independently and identically distributed (i.i.d).

Using the conditional logit model from Minh et al. (2016), the data is analyzed with the response to the choice question as the dependent variable. This process generates a coefficient for each attribute level, with the missing attribute level's coefficient equaling the negative sum of the included attribute levels' coefficients. The generated coefficients are preference weights, with t-statistic values indicating if preference weights differ significantly from zero (i.e., the mean effect), rather than an omitted attribute. Unlike dummy coding, effects coding indicates the mean effect over all attribute levels, rather than the omitted attribute level (Hensher et al. 2015). The probability of buying cigarette packages with new GHW is imputed as

$$P_{NGHW} = \frac{expexp\,(U_{GHW})}{\sum_{i=1}^{N}(U_i)},$$

and the probability of buying cigarette packages with new health warnings can be imputed as

$$P_{OGHW} = \frac{expexp\,(U_{TEXT})}{\sum_{i=1}^{N}(U_i)}.$$

The difference between the two probabilities indicates the predicted reduction in demand for cigarettes when switching from text-only health warnings to graphic health warnings (Minh et al. 2016).

Model parameters for cigarette smoking in the Philippines were taken from the 2015 Philippine Global Adult Tobacco Survey (GATS) to estimate the impact of GHWs on the reduction in demand for cigarettes. The parameters and assumptions used to evaluate the impact of various GHW labels on reducing the number of smokers are listed in Table 4.

Table 3. Parameters and assumptions from 2015 Philippine GATS

Parameters	Male	Female	Total
Baseline number of cigarette smokers	13,500,000	1,500,000	15,000,000

Source: Author's compilation.

The initial number of smokers in each age and sex group (male, female, aged 15–24, 25–44, and 45 and above) is a product of the original number of smokers in each age and sex group (male, female, aged 15–24, 25–44, and 45 and above) and the reduction in cigarette demand as a result of each GHW (generated through the DCE method).

*Reduction in the number of smokers = Original number of smokers * reduction in cigarette demand because of graphic health warning* (equation 2)

The number of smokers in each age and sex category (male, female, 15-24, 25-44, and 45 and above) is calculated using data from the 2015 Philippine GATS, with the model assuming no additional initiation among those 15 and up.

4. Results and discussion

4.1 Demographic characteristics

The sample population is the respondents from the online survey that the authors have disseminated in cooperation with the Department of Health. The online survey ran from November 2021 until February 2022. Respondents with incomplete or missing responses were excluded from the analysis. Two separate datasets are constructed to analyze smokers and non-smokers. The final dataset for the smoking population is representative of 1,965 smokers while the final dataset for the non-smoking population is representative of 97,427 nonsmokers. Annex Table N shows a comparative breakdown of the demographic characteristics based on age, gender, location, and smoking behavior.

In terms of age group, majority of the respondents are young adults which comprise around 44 percent of the sample. There are more females (76 percent) than males (23 percent) and LGBTQ+ and those who refused to reveal their genders (1 percent) while individuals who come from rural areas comprise 98 percent of the sample.

4.2 Impact of the graphic health warning law on smoking demand and nonsmokers' smoking initiation

The results of the DCE revealed that all the GHW attributes are statistically significant and affect smokers' probability to purchase cigarettes based on a specific packaging (Table 5). A larger area or the bigger size covered by the GHW decreases the individual's preference for the specific cigarette packaging. This is consistent with the evidence discussed by SEATCA (2010a) that larger warnings are more likely to be remembered by smokers, who have been found to connect the size of the warning with the seriousness of the health risk. Similarly, both graphic image designs used in the study decreased the likelihood to purchase the cigarette pack. This is also in line with several research studies showing that images rather than text-only messages are superior in health communications. The images are much more likely to catch people's attention and prompt them to imagine health-related consequences, which leads to appropriate judgements and decisions. Experiments on cigarette pack warnings have also revealed that picture-based warnings are more powerful than text-only warnings in deterring new smokers and encouraging current smokers to quit (SEATCA 2010a). In addition, dark colors decrease the buyer's likelihood to purchase the cigarette packaging. This supports the findings of GfK Blue Moon (2011) that dark-colored packaging is less attractive to consumers. On the other hand, the color gray appeals to consumers

leading them to purchase cigarettes in the specific packaging. Lastly, placing the GHWs in the middle or bottom of the packaging increases the individual's preference to purchase the packaging. Because shelving units sometimes cover the bottom of the box, the literature suggests that warnings placed on the top of the package are more effective in preventing consumption. As a result, the warnings on the bottom of the packets make it less obvious (SEATCA 2010a).

Table 5. Effects of graphic health warning attributes on cigarette packaging preference

Attributes	Smokers (N = 1,965)
	Coefficient (Standard error)
Area	-0.01**
	(0.00)
Graphic image	
Graphic image of throat cancer	-3.06***
	(0.19)
Graphic image of death	-2.62***
	(0.19)
Position	
Middle	56.76***
	(0.87)
Bottom	35.83***
	(0.49)
Color	
Dark olive	-0.13***
	(0.04)
Gray	52.33***
	(0.78)

*p<0.05, **p<0.01, ***p<0.001

Source: Author's Stata calculations using primary survey data.

In comparison to the current graphic health warning design, Table 6 shows the potential impacts of new GHW labels on the reduction in tobacco demand among smokers. The new GHWs in dark brown and dark olive packaging are observed to lessen smokers' demand for cigarettes by 5 percent. This is congruent with the findings of Minh et al. (2016), who reported that GHWs reduced smokers' appetite for cigarettes by 3.8 percent to 10.1 percent. The new GHW labels are expected to have a uniform impact due to the overall visual appearance and message comprehension of the warning brought about by the perception of brown and olive colors. According to an online survey conducted by GfK Blue Moon (2011) in Australia, both colors are deemed the least appealing, have the lowest quality cigarettes, and have the highest perceived health harm. The new GHW in gray packaging, on the other hand, has a positive impact on cigarette consumption. Gray colors appear to be the most appealing of the colors tested, according to GfK Blue Moon (2011). Furthermore, the 5 percent drop in cigarette demand is comparable to the effects of other tobacco regulations, such as tax increases. According to WHO (2014a), in most

low- and middle-income countries, a 10 percent rise in cigarette pricing reduces tobacco usage by around 5 percent (up to 8%).

The study also demonstrates that larger pictorial health warnings are more effective in attracting public attention and disseminating information about the specific consequences of tobacco use. As a result, quit attempts increase while smoking uptake declines (WHO 2014b).

Table 6. Reduction in demand for cigarettes when changing from current to new health warning labels (among smokers)

GHW design	Probability of Purchase (Smokers)
Current GHW label (graphic image of throat cancer/death, covering 50 percent of the lower half of the front and back of the cigarette package, red packaging)	0.6
New GHW label 1 ((graphic image of throat cancer, covering 75 percent of the front and back of the cigarette package, located in the middle, green packaging)	0.55
Reduction in demand for cigarettes when changing from current to new health warning label 1	-0.05
New GHW label 2 ((graphic image of throat cancer, covering 90 percent of the front and back of the cigarette package, located in the middle, brown packaging)	0.55
Reduction in demand for cigarettes when changing from current to new health warning label 2	-0.05
New GHW label 3 ((graphic image of death, covering 75 percent of the front and back of the cigarette package, located in the middle, green packaging)	0.55
Reduction in demand for cigarettes when changing from current to new health warning label 3	-0.05
New GHW label 4 ((graphic image of death, covering 90 percent of the front and back of the cigarette package, located in the middle, green packaging)	0.55
Reduction in demand for cigarettes when changing from current to new health warning label 4	-0.05
New GHW label 5 ((gray packaging, text only)	0.7
Reduction in demand for cigarettes when changing from current to new health warning label 5	0.1

Source: Author's Stata calculations using primary survey data.

Similar to the initial findings that the new GHWs in dark brown and dark olive packaging are observed to lessen smokers' demand for cigarettes by 5 percent, the new dark-colored GHWs

reduce the probability of non-smokers to buy cigarettes by 6 percent (Table 7). This is lower than the prediction of Minh et al. (2016), who reported that GHWs reduced nonsmokers' appetite for cigarettes by 11 to 17.8 percent. However, Minh et al. (2016) primarily focused on the graphic images, while this study also considered other factors such as the area coverage, color of the packaging, and position of the graphic image. Hence, the variation in the impact of GHWs on nonsmokers' initiation. On the other hand, the new GHW in gray packaging, has a positive impact on cigarette consumption. This implies that both smokers and nonsmokers find gray colors appealing, have the highest quality cigarettes, and have the lowest perceived health harm.

Table 7. Reduction in the smoking initiation when changing from current to new health warning labels (among non-smokers)

GHW design	Probability of Purchase (Non-smokers)
Current GHW label (graphic image of throat cancer/death, covering 50 percent of the lower half of the front and back of the cigarette package, red packaging)	0.6
New GHW label 1 ((graphic image of throat cancer, covering 75 percent of the front and back of the cigarette package, located in the middle, green packaging)	0.66
Reduction in smoking initiation when changing from current to new health warning label 1	-0.06
New GHW label 2 ((graphic image of throat cancer, covering 90 percent of the front and back of the cigarette package, located in the middle, brown packaging)	0.66
Reduction in smoking initiation when changing from current to new health warning label 2	-0.06
New GHW label 3 ((graphic image of death, covering 75 percent of the front and back of the cigarette package, located in the middle, green packaging)	0.66
Reduction in smoking initiation when changing from current to new health warning label 3	-0.06
New GHW label 4 ((graphic image of death, covering 90 percent of the front and back of the cigarette package, located in the middle, green packaging)	0.66
Reduction in smoking initiation when changing from current to new health warning label 4	-0.06
New GHW label 5 ((gray packaging, text only)	0.7
Reduction in smoking initiation when changing from current to new health warning label 5	0.1

Source: Author's Stata calculations using primary survey data.

Based on the values in Tables 6 and 7, the reduction in the number of smokers is calculated by Equation (2). The potential impact of GHW labeling on reducing the number of smokers in the Philippines is shown in Table 8. The GHW intervention is expected to result in the cessation of smoking by 750,000 smokers. All the new GHW label designs in dark brown and dark olive colors with larger images of diseases employed in this investigation yielded the same outcome.

Table 8. Potential impact of graphic health warning labels on reduction of the number of smokers

	GHW Label 1	GHW Label 2	GHW Label 3	GHW Label 4
Reduction in the number of smokers	750,000	750,000	750,000	750,000

Source: Author's Stata calculations using primary survey data.

4.3 Review of the bottlenecks and challenges in the implementation of the graphic health warning law in the Philippines (RA 10643)

TPackSS (Tobacco Pack Surveillance System Cigarette Health Warning Label Compliance) collected cigarette packs in Manila in November 2016. Compliance with the health warning label policy was also assessed in Cebu City and Davao City. Compliance with warning position, warning size, and warning label elements criteria was tested on a sample of 83 distinct cigarette packs that displayed the GHWs specified by the Philippines. Only 77 percent of respondents met the three core GHW standards, according to the findings. The effectiveness of GHWs in the Philippines can be improved by exposure to GHW best practices.[22] The health departments must look into research that suggests that warnings are more effective when they are larger and include graphics. Furthermore, reports on country experience overwhelmingly support the positive impact of larger-picture warnings.

The fraction of never-tobacco-users who are susceptible to tobacco use is steadily increasing, which is concerning. In addition, the number of people who use smokeless tobacco has fluctuated over the years. Although the Department of Education (DepEd) published a comprehensive tobacco control program during this time, the proportion of students who were informed about the dangers of tobacco use in school decreased significantly. Hence, the curriculum should be reviewed, and the potential for using graphic health warning templates as educational resources should be explored. Incorporate tobacco control and prevention within the DepEd curriculum, particularly by employing Graphic Health Warning templates as educational resources to underline the negative health effects of smoking.[23]

At the local government level, the Graphic Health Warning Law (Republic Act No. 10643) must be strictly enforced to ensure its effectiveness. Multisectoral collaboration is also critical in enforcing this legislation, and implementation is not primarily the responsibility of the health

[22] TPackSS. 2016. TPackSS: Tobacco Pack Surveillance System Cigarette Health Warning Label Compliance Philippines – 2016. https://globaltobaccocontrol.org/sites/default/files/2021-05/tpackss_PHI_wv2_final.pdf

[23] Department of Health. 2019. 6th Global Youth Tobacco Survey G Department of Health Epidemiology Bureau COUNTRY REPORT : PHILIPPINES, 2019. https://doh.gov.ph/sites/default/files/publications/2019GYTS_CountryReport_122721.pdf

sector, as it is with other tobacco control programs. As a result, the W in MPOWER measures calls on government units to "W: Warn about the dangers of tobacco" in order to promote tobacco control policies and programs in the Philippines.[24]

On a national scale, the government units must: (i) enforce Republic Act 10643, also known as the Graphic Health Warnings Law; (ii) use graphic health warnings to inform the public about quitlines and referral centers for tobacco addiction therapy; and (iii) increase the visibility of tobacco's risks in health centers and facilities by posting posters and warnings; and (iv) create counter-advertising for SHS.

Another issue is that the public becomes desensitized over time to images illustrating the detrimental effects of tobacco use. Thus, GHWs must be replaced on a regular basis as smokers, particularly teenagers, get desensitized. Even though the GHWs are frightening, if you see the packs on a daily basis, the GHWs will lose their impact after a while. Every two years, the graphic health warnings are rotated among a maximum of 12 templates so that the public will be reminded of the dangers of smoking with the release of a new GHW (Jaymalin 2019).

A study by Aseo et al. (2016) examined the effectiveness of GHWs' impact on Filipinos' smoking habits given that buying cigarettes by the stick is common in the Philippines. Using survey data and focus group discussions from 402 smokers in Quezon City, the results show that the biggest factor associated with the intention to quit smoking is thinking about the harms of smoking. Smokers who are more terrified of vivid health warnings are more concerned about the risks of smoking. They believe they are at risk of contracting the diseases represented in the images. The graphic warnings on cigarette packets were viewed by a majority of consumers. However, some of them claimed that they did not pay attention to the images and simply discarded the packs. Some respondents claimed that the images frightened and disgusted them to the point where they would rather throw the packs away than look at them.

These smokers started at the age of 19 and got hooked, so smoking has been a lifelong habit for them. Some of them began smoking as early as five years old. The majority of those surveyed (51.7 percent) indicated they were persuaded to start smoking. Surprisingly, the majority of them – 52.5 percent – did not live in a family with another smoker. In their households, they are the only smokers. Their peers had the most influence on their smoking behavior, with 60.5 percent following the lead of their classmates and 19.8 percent following the lead of coworkers.

The survey results also show that warnings played a significant influence in reducing respondents' smoking habits. Around 42 percent of individuals who had already changed their behavior said the warnings had a significant impact on their decision, while 28.7 percent felt the warning had a minor impact. Despite these findings, graphic health warnings trail television as the dominant source of smoking-related information (Aseo et al. 2016). As a result, GHWs should be reinforced with television-based education on the dangers of smoking.

[24] GATS. 2016. Global Adult Tobacco Survey: Country Report 2015. https://cdn.who.int/media/docs/default-source/ncds/ncd-surveillance/data-reporting/philippines/gats/phl-country-report-2015-gats.pdf?sfvrsn=77f9946b_2&download=true

Arda et al. (2021) investigated why smokers continued to smoke despite the availability of GHWs using survey data obtained from adult males with at most a high school education from a barangay in Cavite. The respondents answered that because of their "inability to resist the urge to smoke" and their "disbelief" in GHWs, they found them "ineffective." Furthermore, they claimed that because they had not personally observed or knowledge of the GHW disease state represented, respondents saw GHWs as "a scam aimed to scare people," "unrealistic," and "untrue." This is especially true for rare conditions like gangrene and emphysema. Diseases involving the heart and lungs, which are "more familiar," generated better GHW believability reactions. The importance of including a cognitive dimension into GHW policy to prevent nicotine addiction and raise its impact on smoking cessation assistance, especially among similar cohorts, was highlighted in their study. Preliminary evidence that presenting "more recognizable" diseases, rather than primarily "scary" visuals, may help GHWs achieve their health literacy aim (Arda et al. 2021). The findings from the two surveys highlight the importance of not just changing the graphic images in the templates every two years, but also determining which diseases have the greatest impact on a smoker's decision to quit. To maximize the purpose of GHWs, the Department of Health (DOH) may consider employing images that are relatable and recognizable to smokers.

5. Conclusion

This research has contributed to the growing body of knowledge about the impacts of GHWs. The findings suggest that dark-colored GHWs with larger images of diseases had a significant impact on reducing cigarette demand, the number of smokers, and nonsmokers' initiation in the Philippines. Gray-colored packaging, on the other hand, appeals to both smokers and nonsmokers. Gray cigarette packaging has a positive impact on cigarette consumption and may encourage nonsmokers to start smoking. More research on the impact of GHWs labels, utilizing advanced models and datasets derived from face-to-face interviews and focus group discussions, could give more data and evidence for the effective implementation of the GHW law in the Philippines. In addition, research on the relative importance of GHW characteristics must be conducted to further understand how the attribute impact the attractiveness, the interest of trying, and the harm perception of cigarettes.

6. Bibliography

Arda J.R., A.G. Jeanjaquet, N.J. Pasia, J.D.M. Rafael, and D.S. Rita. 2021. Why Do Graphic Health Warnings Fail: An Explanatory Case Study on the Persistence of Smoking Behavior among Male Adult Smokers in a Rural and Low-Income Setting in the Philippines. https://archium.ateneo.edu/cgi/viewcontent.cgi?article=1014&context=hs-faculty-pubs (accessed on March 21, 2022).

Aseo K., A. Braganza, E. Calvelo, M. Cinco, M. Danao, J. Doctor, S. Montes, D. Quililan, M. Reyes, D. San Juan, A. Silvestre. 2016. Do graphic health warnings on cigarette packs work? https://seatca.org/do-graphic-health-warnings-on-cigarette-packs-work/#:~:text=Generally%2C%20graphic%20health%20warnings%20have,smoking%20behavior%20of%20the%20respondents (accessed on March 21, 2022).

Aurelio J.M. 2018. DOH told to ensure cigarette packs have new graphic warnings. http://newsinfo.inquirer.net/972594/doh-told-to-ensure-cigarette-packs-have-new-graphic-warnings (accessed on March 21, 2022).

Arrazola R.A., L.M. Dutra, E. Twentyman, A.B. Seidenberg, R. Hemendez-Gonzales, I.B. Ahluwalia. 2020. Association of tobacco control policies with cigarette smoking among school youth aged 13–15 years in the Philippines, 2000–2015. *Tobacco Prevention & Cessation* 6:35. https://doi.org/10.18332/tpc/122441

Czoli C.D., M. Goniewicz, T. Islam, K. Kotnowski, and D. Hammond. 2015. Consumer preferences for electronic cigarettes: results from a discrete choice experiment. *Tobacco Control* 25(e1):e30-36.

Barrientos-Gutierrez I., F. Islam F, Y.J. Cho, R.G. Salloum, J. Louviere, E. Arillo-Santillan, L.M. Reynales-Shigematsu, J. Barnoya, B. Saenz de Miera Juarez, J. Hardin, J.F. Thrasher. 2021. Assessing cigarette packaging and labelling policy effects on early adolescents: results from a discrete choice experiment. *Tobacco Control* 30:505-514.

Department Of Health (DOH). n.a. Graphic health warnings in the Philippines. https://doh.gov.ph/Graphic-Health-Warnings-in-the-Philippines#:~:text=This%20landmark%20legislation%20requires%20all,is%20related%20to%20the%20picture (accessed on March 21, 2022).

———. 2015. Philippines global adult tobacco survey: Executive summary 2015. https://doh.gov.ph/sites/default/files/publications/GATS-PHL2015-Executive_Summary.pdf (accessed on March 21, 2022).

GfK Blue Moon. 2011. Market research to determine effective plain packaging of tobacco products. https://www.health.gov.au/sites/default/files/market-research-to-determine-effective-plain-packaging-of-tobacco-products.pdf (accessed on March 21, 2022)

Giang K.B., L.H. Chung, H.V. Minh, V.D. Kien, V.V. Giap, N.D. Hinh, N.M. Cuong, P.D. Manh, H.A. Duc, J. Yang. 2016. Relative importance of different attributes of graphic health warnings on tobacco packages in Viet Nam. *Asian Pacific Journal of Cancer Prevention* 17(sup1):79-84.

Institute for Health Metrics and Evaluation (IHME). 2020. Global Burden of Disease 2017. http://vizhub.healthdata.org/gbd-compare/ (accessed on March 21, 2022).

Hensher D.A., J.M. Rose, W.H. Greene. 2005. *Applied choice analysis.* Cambridge: Cambridge University Press.

Johnson R, Orme B. Sample size issues for conjoint analysis. 2010. In: Orme B (editor). *Getting started with conjoint analysis: strategies for product design and pricing research.* Madison: Research Publishers.

Kotnowski K., G. Fong, K. Gallopel-Morvan, T. Islam, D. Hammond. 2015. The impact of cigarette packaging design among young females in Canada: Findings from a discrete choice experiment. *Nicotine & Tobacco Research* 18(5):1348-1356.

Layoun N., P. Salameh, M. Waked, Z. Aoun Bacha, R.M. Zeenny, E. El Hitti, I. Godin, M. Dramaix. 2017. Motivation to quit smoking and acceptability of shocking warnings on cigarette packages in Lebanon. *Patient Prefer Adherence* 11:331-342 https://doi.org/10.2147/PPA.S122877

Minh H.V., C.L. Hong, G.K. Bao, D.M. Duc. 2016. Potential impact of graphic health warnings on cigarette packages in reducing cigarette demand and smoking-related deaths in Vietnam. *Asian Pacific Journal of Cancer Prevention* 17(sup1):85-90.

Rahman M., S. Patwary, A. Islam, F. Zaman, M. Mohiuddin. 2018. Implementation of graphic health warnings in Bangladesh—current status and challenges. *Tobacco Induced Diseases* 16(1):218.

Reuters. 2016. Supreme Court Says Tobacco Industry Should Follow Stringent Package Warning Rules. https://www.newindianexpress.com/business/2016/may/04/Supreme-Court-Says-Tobacco-Industry-Should-Follow-Stringent-Package-Warning-Rules-932648.html (accessed on March 21, 2022).

Jaymalin, M. 2019. DOH to issue new graphic health warnings against smoking. *Philippine Star.* October 21. https://www.philstar.com/headlines/2019/10/21/1961949/doh-issue-new-graphic-health-warnings-against-smoking (accessed on March 21, 2022).

Johnson F.R., E. Lancsar, D. Marshall, V. Kilambi, A. Mühlbacher, D. Regier. 2013. Constructing experimental designs for discrete choice experiments: Report of the ISPOR conjoint analysis experimental design good research practices task force. *Value in Health* 16(1):3-13.

Republic Act 10643 (RA 10643). The graphic health warnings law. Manila, Philippines: Congress of the Philippines.

Senate of the Philippines. 2019. Koko wants plain packaging for all cigarettes sold in PH. https://legacy.senate.gov.ph/press_release/2019/0301_prib1.asp

Southeast Asia Tobacco Control Alliance (SEATCA). 2010a. Simplifying the WHO FCTC Article 11 Guidelines: Evidence-based best practices. https://seatca.org/dmdocuments/Article11.pdf (accessed on March 21, 2022).

———. 2010b. Implementing Pictorial Health Warnings in Malaysia: Challenges and Lessons Learned. Nonthaburi: SEATCA.

The Union. 2020. Tobacco control in the Philippines: The tobacco epidemic. https://theunion.org/our-work/tobacco-control/bloomberg-initiative-to-reduce-tobacco-use-grants-program/tobacco-control-in-philippines#:~:text=The%20Tobacco%20Epidemic,hand%20smoke%20in%20their%20homes (accessed on March 21, 2022).

Tobacco Control Laws. n.a. Legislation by country: Philippines. https://www.tobaccocontrollaws.org/legislation/country/philippines/summary (accessed on March 21, 2022).

———. 2021. Legislation by country: Philippines summary. https://www.tobaccocontrollaws.org/legislation/country/philippines/summary (accessed on March 21, 2022).

World Health Organization (WHO). 2008. MPOWER: A policy package to reverse the tobacco epidemic. https://www.afro.who.int/publications/mpower-policy-package-reverse-tobacco-epidemic (accessed January 20, 2022).

———. 2014a. Tobacco taxation fact sheet. https://www.euro.who.int/__data/assets/pdf_file/0007/250738/140379_Fact-sheet-Tobacco-Taxation-Eng-ver2.pdf (accessed on March 21, 2022).

———. 2014b. How large pictorial health warnings on the packaging of tobacco products affect knowledge and behaviour. https://www.euro.who.int/__data/assets/pdf_file/0006/276558/How-large-pictorial-health-warnings,-Evidence-Brief-Eng.pdf (accessed on March 21, 2022).

7. Annex

Table 9. Demographic characteristics of survey respondents

Characteristic	Number of respondents	Proportion
Age		
(15-24 years old)	44,180	44%
(25-44 years old)	40,082	40%
(45-64 years old)	15,082	15%
(65 years old +)	48	0%
Gender		
Male	22,815	23%
Female	75,525	76%
LGBTQ+ and refused to reveal their genders	1,052	1%
Area		
Urban	1,666	2%
Rural	97,726	98%
Smoking behavior		
Smoker	1,965	2%
Non-smoker	97,427	98%

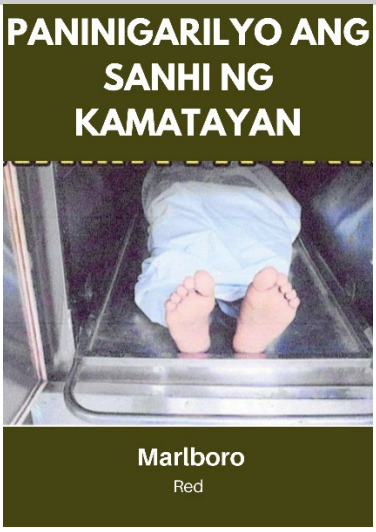
Source: Author's Stata calculations using primary survey data.

Table 10. New GHW labels described in Tables 6 and 7

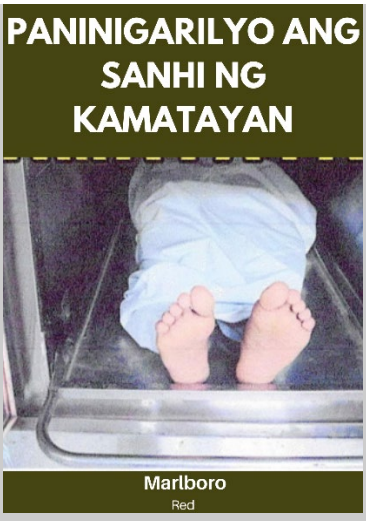
GHW design	Image
Current GHW label (graphic image of throat cancer/death, covering 50 percent of the lower half of the front and back of the cigarette package, red packaging)	
New GHW label 1 ((graphic image of throat cancer, covering 75 percent of the front and back of the cigarette package, located in the middle, green packaging)	

New GHW label 2 ((graphic image of throat cancer, covering 90 percent of the front and back of the cigarette package, located in the middle, brown packaging)

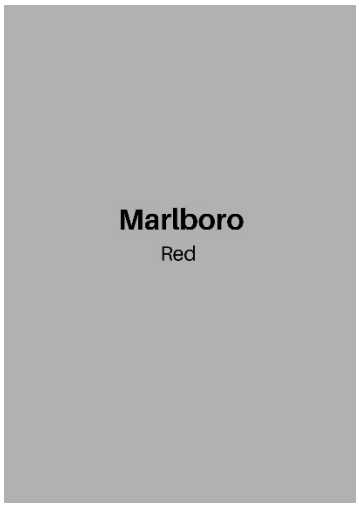
New GHW label 3 ((graphic image of death, covering 75 percent of the front and back of the cigarette package, located in the middle, green packaging)



New GHW label 4 ((graphic image of death, covering 90 percent of the front and back of the cigarette package, located in the middle, green packaging)



New GHW label 5 ((gray packaging, text only)



Source: Author