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More on the Positive Fiscal and Health Effects of Increasing Tobacco Taxes in Nigeria

Corné van Walbeek, Adedeji Adeniran, and Iraoya Augustine

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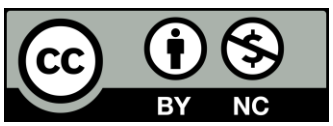

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Summary

Nigeria is faced with substantial economic and health burdens caused by tobacco smoking. The economic burden of smoking accounts for approximately 1.3 per cent of Nigeria's GDP. In terms of its health impact, 4.9 per cent of all deaths in 2019 were attributed to smoking-related diseases. The thousands of Nigerians that die annually from tobacco-induced diseases are no longer able to contribute productively to the economy. Tobacco taxation is one very effective mechanism for reducing the burden of smoking. This paper measures and benchmarks the economic gains and the number of lives that could be saved through increased tobacco taxation in Nigeria. Should the government of Nigeria increase the excise tax to 240 Naira per pack (together with an ad valorem tax of 50 per cent of the CIF/ex-works price), our model predicts that, over 30 years, nearly 150,000 premature deaths could be avoided. This is in addition to the more than 150 per cent increase in government revenue that would also result. The model indicates that the larger the increase in the excise tax, the greater would be its fiscal and public health impact.

Keywords: tobacco, tax, tax modelling, Nigeria.

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Introduction

The Nigerian health system spends about 526.4 billion Naira (NGN) annually (equivalent to approximately US$1.71 billion in 2019) in health care treatment for illnesses caused by tobacco smoking (Adeniran, Akanonu, Castradori, Onyekwena, Rodriguez Cairoli, Casarini, Pichón-Riviere, Palacios and Bardach, forthcoming). Also in 2019, nearly 30,000 deaths were attributable to smoking, which represented around 4.9 per cent of all deaths. This burden corresponds to more than 230,000 disability-adjusted life-years (DALYs) per year (Adeniran *et al*. forthcoming). Higher taxes on cigarettes have proven to be the most effective measure in reducing smoking and its associated burdens, especially among the youth and smokers who are poor (International Agency for Research on Cancer 2011 and WHO 2019). Despite this, tax rates on tobacco products in Nigeria are comparatively low (ICTD 2020).

The excise tax on cigarettes sold in Nigeria consists of a specific and ad valorem component (i.e. a tax charged as a percentage of the price). The ad valorem component has been levied at 20 per cent of the cost, insurance and freight (CIF) value for a long time. In 2018 a specific rate of NGN1 per cigarette (equivalent to NGN 20 per pack of 20 cigarettes) was introduced. In 2019, the specific tax rate was increased to NGN2 per stick (i.e. NGN40 per pack of 20 sticks), while in 2020, the specific rate increased to NGN2.90k per stick (i.e. NGN58 per pack of 20 sticks) (Ocheneyi 2018). The implementation of the specific tax was mandated by the ECOWAS Directive CIDIR.1.12.17 (ECOWAS 2017). The Directive, which was passed in December 2017, indicated that each country should have a specific tax on cigarettes at the equivalent rate of US$0.40 per pack by the end of 2020, and an ad valorem tax of at least 50 per cent of the CIF or production value. The ad valorem component of the excise tax currently does not meet the requirements of the ECOWAS directive, since it was only 20 per cent in 2020 (ICTD 2020; Tesche and Van Walbeek 2020). While the WHO recommends that the excise tax burden should be at least 70 per cent of the retail price, Nigeria's excise tax burden is only 25 per cent of the average retail price. A significant increase in the taxation of tobacco products is required in order to reduce the economic and health burden associated with tobacco smoking in Nigeria.

1 Simulating the fiscal and health impact of increases in the tobacco tax

1.1 The TETSiM model

The tobacco excise tax simulation (TETSiM) model focuses on the economic aspects of a potential tax change. Akanonu, Ishaku and Onyekwena (2019) provide a detailed description of the model. The technical details are not repeated here, although in the following paragraphs we provide a non-technical review of the model.

The TETSiM model describes the tobacco market in the base period, and then allows the user to change the tax rate and a number of parameters to see how the market is likely to change. The important parameters at the outset are the retail price, consumption, and the excise tax structure. The model can account for different market segments. In the case of Nigeria, five market segments were defined, namely premium, mid-price, and economy cigarettes (all domestically produced), imported cigarettes, and illicit cigarettes.

Given that the effects of the tax change go beyond economic aspects, a module of the model, which considers the health implications of the tax change, was introduced in this

study. Two approaches, both based on rules of thumb, but with strong empirical support, are used. The first approach considers the relationship between the quantity of cigarettes smoked and the number of deaths. Jha (2020) estimated that, in the US and Canada, every million cigarettes smoked was associated with one tobacco-related death (Jha 2020). In the UK about 1.3 tobacco-related deaths were associated with every million cigarettes smoked.

This rule of thumb allows one to estimate the immediate impact of a decrease in cigarette consumption. For example, if aggregate cigarette consumption decreases by 100 million cigarettes because of some intervention, and we assume one tobacco-related death for each million cigarettes smoked, 100 premature deaths will be prevented this year. If the intervention permanently decreases cigarette consumption by that amount, it will prevent 100 premature deaths each year for many years, even decades.

The second approach is based more explicitly on smoking prevalence. The epidemiological literature indicates that the number of years that people smoke is a much better predictor of morbidity and mortality than the number of cigarettes that they smoke (Jha 2020). For example, if person A smokes five cigarettes a day for 40 years and person B smokes 20 cigarettes a day for 10 years, they have both smoked the same number of cigarettes over their smoking 'careers'. However, person A runs a substantially higher risk of tobacco-related morbidity and mortality than person B. The length of smoking is a much better predictor of a person getting a smoking-related disease than the intensity of smoking. Thus, when smokers quit smoking, they experience much better health outcomes than smokers who simply reduce their daily consumption.

A reduction in total cigarette consumption implies a combination of a reduction in smoking prevalence (i.e. the number of people who smoke) and a reduction in smoking intensity (i.e. the number of cigarettes smoked by continuing smokers). The quitters get the real health benefit, while smokers who simply reduce their consumption obtain a very small health benefit.

It is generally accepted that approximately half of smokers will die prematurely because of smoking-related diseases (Doll *et al*. 2004; Fagerström 2002). Smokers who quit smoking will not avoid all tobacco-related mortality, because not all the damage can be undone. However, quitters face a substantially lower risk of premature death and disability than continuing smokers (subject, of course, to age and/or whether they have already contracted a smoking-related disease). In order to account for this reduced, but not disappearing, risk, the user of the TETSiM model can set a parameter which indicates the probability of premature death for smokers who have quit. This fraction will, by necessity, be less than 0.5 (since 0.5 is the presumed proportion of continuing smokers who are expected to die prematurely from smoking).

The number of premature deaths avoided by the tobacco-control intervention is not determined in a particular year, but over the lifetime of the cohort of smokers. For example, if an intervention reduces the smoking prevalence by one percentage point, it implies that there will be 1.07 million fewer smokers in Nigeria (given that there are 107 million adults in Nigeria). Of these 1.07 million people, about half (i.e. 503,500) would have died prematurely from a tobacco-related disease. Of the 503,500 ex-smokers who would have died prematurely, some will die prematurely in any case, because of the harm that has been done over an extended period. If we assume that this is 20 per cent for Nigeria, it means that 20 per cent of the 1.07 million, i.e. 214,000, will die prematurely, but that 289,500 (= 503,500 – 240,000) premature deaths will be averted. These averted premature statistical deaths will happen over the full lifetime of the cohort of quitters.

1.2 The model parameters and modelling scenarios

Many of these parameters used in this model are 'fixed', informed by published studies, and the experience and intuition of the model developers. The 'fixed' parameters include the price and income elasticities, and the parameters linking consumption with health outcomes. These parameters typically do not change over time, and if they do, they typically change very slowly. Some inputs are time-dependent. These include the total adult population, smoking prevalence, per capita GDP, retail prices, and the composition of the market.

For this report, the TETSiM for Nigeria has been reprogrammed from the model that was reported on in Akanonu, Ishaku and Onyekwena 2019. The model is different in appearance from the version used in that paper, but the underlying logic is the same. The input sheet also requires the user to set the parameters, and to impose different hypothesised excise tax structures and levels. For example, the user can set different values for the specific and the ad valorem taxes. The model allows the user to look simultaneously at four different scenarios. It also allows the user to pre-empt the tobacco industry's responses to the tax changes, and to include these in the model. For example, the user can change the CIF or ex-works[1] amount, or the magnitude of the margin. Experience from other countries has shown that, where a company has significant market power, as is the case with British American Tobacco in Nigeria, the industry often increases the retail price by more than the increase in the excise tax, in order to make up for the loss of sales volume. This is called 'overshifting'. The user can include this industry behaviour in the model by increasing the margin.

For the different tax scenarios, we assume in all four cases that the ad valorem tax increases from 20 per cent to 50 per cent of the CIF or ex-works value, in line with the ECOWAS directive. International best practice and the WHO'S FCTC (Framework Convention on Tobacco Control) Article 6 Guidelines clearly indicate that increasing the specific component in a mixed system is the appropriate (best practice) approach to increasing the excise tax burden on cigarette products. Thus, for each of the four tax scenarios, we increase the specific tax amount from the current level of NGN58 per pack to, respectively, (1) NGN80 per pack, (2) NGN120 per pack, (3) NGN180 per pack and (4) NGN240 per pack. This does not apply to illicit cigarettes, of course, as they avoid tax altogether.

We also assume that the tobacco industry increases the CIF or ex-works amount by 10 per cent and the margin by 10 per cent across all five market segments, and in each of the four scenarios. It is possible and even likely that the tobacco industry may adopt a different pricing strategy for the different market segments. Experience from Mauritius (Valdois, Van Walbeek, Ross, Soondram, Jugurnath, Sun and Mohee 2020) and Cabo Verde (van Walbeek, Filby and Darsamo, forthcoming) shows that the tobacco industry is more likely to overshift the excise tax on the more expensive products, and more likely to undershift the excise tax on the cheaper products. These changes can be made by the user; however, the impact of different pricing strategies by the tobacco industry is not analysed in this paper.

2 The economic consequences of increases in the excise tax

The decomposition of the price of a pack of cigarettes in the base period is presented in Table 1. The weighted average of the excise tax burden and total tax burden are calculated on the volume of legal cigarettes only. For the weighted averages of the other components, the numbers include the illicit market.

[1] The buyer's cost of transportation, delivery and distribution of goods from the seller's factory.

Table 1 Per-pack decomposition of the retail price of cigarettes in the baseline scenario, by market segment

Per pack analysis (Naira per pack)	Domestic premium	Domestic mid-price	Domestic economy	Imported	Illicit	Weighted average
CIF/ex-works value	80.00	80.00	80.00	80.00	80.00	80.00
Import duty (including surcharge)	0.00	0.00	0.00	17.12	0.00	4.11
CISS value[2]	0.00	0.00	0.00	0.80	0.00	0.19
ETLS value[3]	0.00	0.00	0.00	0.40	0.00	0.10
Excise tax (ad valorem)	16.00	16.00	16.00	16.00	0.00	14.40
Excise tax (specific)	58.00	58.00	58.00	58.00	0.00	52.20
Margin	218.09	125.07	32.05	-4.88	70.00	103.26
VAT value	27.91	20.93	13.95	12.56	0.00	17.94
Retail price	400.00	300.00	200.00	180.00	150.00	272.20
Consumption (millions of sticks)	6,624	1,840	3,680	4,416	1,840	18,400
Excise tax burden	18.5%	24.7%	37.0%	41.1%	0.0%	29.3%
Total tax burden	25.5%	31.6%	44.0%	58.3%	0.0%	39.0%

This information is used to perform an aggregate analysis of both industry and government revenue in the baseline. To estimate the aggregate value of a particular value, the appropriate per-pack component of the price is multiplied by the quantity. The analysis is done separately for the five market segments.

The results for the economic impact of all four tax scenarios are summarised in Table 2. In each case the simulated value of the relevant variable is compared with the value in the baseline scenario. We show the five price segments, but emphasis is on the total cigarette market, shown in the last column. The impact of the tax increases (and the associated industry price responses) is shown for the following variables:

(1) Industry revenue (which is the sum of the CIF or ex-works value and the margin).
(2) Excise tax revenue (which is the sum of the specific and ad valorem excise taxes).
(3) Total tobacco tax revenue (which is the sum of the excise tax, the import duty, other import levies, and VAT).
(4) Cigarette consumption.
(5) Cigarette price (a weighted average of all price segments, including the illicit market).

[2] CISS – Comprehensive Import Supervision Scheme.

[3] ETLS – ECOWAS Trade Liberalisation Scheme.

Table 2 Percentage change in relevant variables for four different tax scenarios

	Domestic premium	Domestic mid-price	Domestic economy	Imported	Illicit	Total
Industry revenue						
Scenario 1	5.9%	2.1%	-6.5%	-4.2%	-0.3%	2.4%
Scenario 2	3.2%	-2.2%	-14.4%	-11.5%	-0.3%	-1.3%
Scenario 3	-0.2%	-7.5%	-23.2%	-19.5%	-0.3%	-5.7%
Scenario 4	-3.1%	-11.7%	-29.7%	-25.4%	-0.3%	-9.3%
Government revenue						
Excise revenue (ad val. and specific)						
Scenario 1	61.3%	55.5%	42.4%	45.9%		52.3%
Scenario 2	108.0%	97.0%	72.5%	78.3%		91.0%
Scenario 3	174.7%	154.6%	111.3%	121.4%		144.2%
Scenario 4	238.1%	208.0%	145.3%	160.2%		193.4%
All tobacco tax revenue						
Scenario 1	49.1%	46.8%	37.8%	33.8%		42.3%
Scenario 2	85.0%	81.0%	64.2%	56.6%		72.4%
Scenario 3	136.3%	128.4%	98.5%	87.4%		114.1%
Scenario 4	185.2%	172.4%	128.6%	115.4%		152.9%
Consumption						
Scenario 1	-3.8%	-7.2%	-15.0%	-12.9%	-9.4%	-9.1%
Scenario 2	-6.1%	-11.1%	-22.2%	-19.5%	-9.4%	-13.4%
Scenario 3	-9.3%	-15.9%	-30.2%	-26.9%	-9.4%	-18.3%
Scenario 4	-11.9%	-19.7%	-36.1%	-32.2%	-9.4%	-22.1%
Retail price						
Scenario 1	21.4%	25.3%	32.9%	35.4%	10.0%	25.1%
Scenario 2	32.2%	39.6%	54.4%	59.3%	10.0%	39.4%
Scenario 3	48.3%	61.1%	86.6%	95.2%	10.0%	60.7%
Scenario 4	64.4%	82.6%	118.9%	131.0%	10.0%	82.0%

In all four scenarios, an ad valorem tax of 50 per cent of the CIF or ex-works value is imposed. For scenario 1, the specific excise tax is levied at NGN80 per pack; for scenario 2, at NGN120 per pack, for scenario 3, at NGN180 per pack and for scenario 4, at NGN240 per pack.

Table 2 clearly illustrates that larger increases in the excise tax have better public health and fiscal effects than smaller increases. These results support the arguments of the international tobacco control literature that encourage governments to impose large excise tax increases in order to achieve correspondingly large public health and economic benefits (International Agency for Research on Cancer 2011). The effect of the tax increases is not the same for the different market segments, because, by assumption, some segments are more sensitive to price changes. The prices of some segments (i.e. the cheaper cigarettes) are disproportionately more affected by the imposition of substantially higher specific excise taxes.

3 The public health consequences of increases in the excise tax

The additional epidemiological module focuses on the number of premature deaths avoided because of the tax increase. As indicated earlier, two approaches have been followed. The first approach focuses on the decrease in smoking prevalence because of the tax increase. The decrease in smoking prevalence then translates to an estimate of how many people avoid premature death, because they have been able to quit smoking. The second approach uses the rule of thumb method developed by Jha and colleagues.

Table 3 presents the results of the epidemiological model using the first approach for the four different tax scenarios. Table 4 present the results of Jha's rule of thumb method. The World Bank development indicators (2020) show that the current life expectancy at birth of Nigerian men is about 61 years, while the median age of smokers is about 25 years. The difference between the life expectancy and the median age of smokers is 36 years. Against this backdrop, we assume that the epidemiological benefit of a current (but permanent) decrease in smoking lasts for an average of 30 years. Therefore, multiplying the annual number of premature deaths averted by 30 yields the numbers in the last row of Table 4 (expected number of premature deaths averted through intervention over 30 years).

Using the smoking prevalence approach (Table 3), the model demonstrates that the expected number of premature deaths averted through intervention increases from 57,000 smokers in the first scenario to 86,000 smokers in scenario 2, 121,000 smokers in scenario 3, and 149,000 smokers in scenario 4. Moreover, from the Jha's rule of thumb approach (Table 4), the model indicates that the expected number of premature deaths averted through intervention increases from 60,000 smokers in the first scenario to 89,000 smokers in scenario 2, going up to 147,000 smokers in scenario 4.

Should the government of Nigeria increase the excise tax to NGN240 per pack (together with an ad valorem tax of 50 per cent of the CIF/ex-works price), both approaches used in the model predict that nearly 150,000 premature deaths could be avoided. The fact that the number of deaths averted in both approaches is so similar increases the degree of confidence that one can have in them.

Table 3 Epidemiological module of the TETSiM model (smoking prevalence approach)

	Units	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Base scenario					
Aggregate cigarette consumption	Million sticks	18,400	18,400	18,400	18,400
Smoking prevalence	Percentage	5.60%	5.60%	5.60%	5.60%
Per capita cigarette consumption	Cigarettes per adult	172	172	172	172
Per-smoker cigarette consumption (annual)	Cigarettes per adult	3,071	3,071	3,071	3,071
Per-smoker cigarette consumption (daily)	Cigarettes per adult	8.4	8.4	8.4	8.4
Number of smokers	Million people	5.99	5.99	5.99	5.99
Expected number of future premature deaths among smokers	Million people	2.40	2.40	2.40	2.40
After the tax change					
Aggregate cigarette consumption	Million sticks	16,723	15,938	15,026	14,326
Smoking prevalence	Percentage	5.33%	5.20%	5.03%	4.90%
Per capita cigarette consumption	Cigarettes per adult	156	149	140	134
Per-smoker cigarette consumption (annual)	Cigarettes per adult	2,931	2,865	2,789	2,731
Per-smoker cigarette consumption (daily)	Cigarettes per adult	8.0	7.9	7.6	7.5
Number of smokers	Million people	5.71	5.56	5.39	5.25
Expected number of future premature deaths among smokers	Million people	2.28	2.22	2.15	2.10
Expected number of future premature deaths among quitters	Million people	0.06	0.09	0.12	0.15
Expected number of premature deaths averted through intervention	Million people	0.06	0.09	0.12	0.15
Expected number of premature deaths averted through intervention	Thousands of people	57	86	121	149

Table 4 Epidemiological module of the TETSiM model (based on Jha's rule of thumb)

Base scenario	Units	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Aggregate cigarette consumption	Million sticks	18,400	18,400	18,400	18,400
After the tax change					
Aggregate cigarette consumption	Million sticks	16,723	15,938	15,026	14,326
Expected number of premature deaths averted through intervention in current year	Thousands of people	2.01	2.95	4.05	4.89
Expected number of premature deaths averted through intervention over 30 years	Thousands of people	60	89	121	147

4 Recommendation

An increase in the excise tax is a win-win situation for the fiscus and for public health. We recommend that policy makers should apply the TETSiM model to simulate these effects of tobacco tax policy changes. An increase in the excise tax is expected to increase tobacco tax revenue and decrease cigarette consumption. A decrease in cigarette consumption decreases the number of tobacco-attributable deaths. The larger the increase in the excise tax, the greater will be its fiscal and public health impact.

References

Adeniran, A., Akanonu, P. C., Castradori, M., Onyekwena, C., Rodriguez Cairoli, F., Casarini, A., Pichón-Riviere, A., Palacios, A. and Bardach, A. (forthcoming, 2021) 'Estimating Direct Treatment Costs of Tobacco Disease Burden in Nigeria – Primary Data from Four Public Hospitals in Abuja, Ibadan, and Enugu', *Applied Health Economics and Health Policy*

Akanonu, P. C., Ishaku, J. and Onyekwena, C. (2019) *The Economics of Tobacco Control in Nigeria: Modelling the Fiscal and Health Effects of a Tobacco Excise Tax Change*, ICTD Working Paper 99, Brighton: IDS

Doll, R., Peto, R., Boreham, J., and Sutherland, I. (2004) 'Mortality in Relation to Smoking: 50 Years' Observations on Male British Doctors', *BMJ* 328.7455:1519

ECOWAS (2017) Directive CIDIR.1.12.17 on the Harmonization of Excise Duties on Tobacco Products in ECOWAS Member States, https://untobaccocontrol.org/impldb/wp-content/uploads/sierra_leone_2018_annex-5_ECOWAS_directive_tobacco_2017.pdf

Fagerström, K. (2002) 'The Epidemiology of Smoking: Health Consequences and Benefits of Cessation', Drugs 62 Suppl. 2:1–9

ICTD (2020) *Tobacco Taxation Fact Sheet: Nigeria*, https://www.ictd.ac/wp-content/uploads/2020/05/Nigeria_Tobacco_Tax_Factsheet.pdf

International Agency for Research on Cancer (IARC) (2011) *Effectiveness of Tax and Price Policies for Tobacco Control*, IARC Handbooks of Cancer Prevention, Volume 14, IARC

Jha, P. (2020) 'The Hazards of Smoking and the Benefits of Cessation: A Critical Summation of the Epidemiological Evidence in High-income Countries', *eLife* 9:e49979

Ocheneyi, F. (2018) 'Nigeria Harmonizes ECOWAS Excise Duty for Beer and Tobacco', *Nigeria Industrial Digest*, 13 March

Tesche, J. and Van Walbeek, C. (2020) 'Measuring the Effects of the New ECOWAS and WAEMU Tobacco Excise Tax Directives', *Tobacco Control* 2020-055843

Valdois, J. B., Van Walbeek, C., Ross, H., Soondram, H., Jugurnath, B., Sun, M. C. and Mohee, D. (2020) 'Tobacco Industry Tactics in Response to Cigarette Excise Tax Increases in Mauritius', *Tobacco Control* 29.e1: e115-e118

van Walbeek, C., Filby, S. and Darsamo, V. (forthcoming) *Tobacco Tax Modelling in Cabo Verde*

World Bank (2020) Development Indicators, https://databank.worldbank.org/source/world-development-indicators

World Health Organization (2019) *Report on the Global Tobacco Epidemic: Offer Help to Quit Tobacco Use*, Geneva: World Health Organization