Cigarette excise tax structure and cigarette prices in nine sub-Saharan African Countries: Evidence from the Global Adult Tobacco Survey

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Cigarette excise tax structure and cigarette prices in nine sub-Saharan African countries: evidence from the Global Adult Tobacco Survey

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ABSTRACT

Background Economic theory predicts that the excise tax structure influences the distribution of cigarette prices. Evidence shows that uniform specific excise tax structures exhibit the least price variability relative to other tax structures. The distribution of cigarette prices under different excise tax structures has never been examined for a group of African countries.

Objectives To examine the distribution of cigarette prices under different tax structures in nine African countries and to critically evaluate the effectiveness of African regional tax directives in promoting public health.

Methods Data from the Global Adult Tobacco Survey, conducted in eight African countries during 2012–2018, and data from the 2017 Gambia Tobacco Survey were used to construct survey-derived cigarette prices. The coefficients of variation and skewness of the price

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Most African countries levy purely ad valorem taxes, or mixed excise taxes with no minimum specific floor; many implement these systems under the guidance of regional tax directives.

⇒ A growing body of empirical literature shows that tax structures that deviate from a simple uniform specific structure are associated with a greater price gap between higher-priced and lower-priced products.

⇒ Absent from this growing body of evidence is any analysis of the distribution of cigarette prices under different excise tax structures in African countries.

WHAT THIS STUDY ADDS

Outline

❖ Background
❖ Objectives
❖ Methods
❖ Results
❖ Summary (with study limitations)
❖ Public Health Implication

Background

❖ Significant increases in excise taxes can help reduce cigarette smoking.[1]

❖ The impact of tax increase on cigarette smoking can be greatly reduced if those who smoke switch to cheaper brands.[2]

❖ While ad valorem excise taxes and tiered tobacco tax structures result in greater variability in prices, uniform specific excise taxes reduce price variability.[3]

1. National Cancer Institute, World Health Organization. The Economics of Tobacco and Tobacco Control. https://cancercontrol.cancer.gov/sites/default/files/2020-08/m21_complete.pdf.
2. Chaloupka FJ, Yurekli A, Fong GT. Tobacco taxes as a tobacco control strategy. Tobacco Control 2012;21(2):172-180.
3. Chaloupka FJ, Kostova D, Shang C. Cigarette Excise Tax Structure and Cigarette Prices: Evidence From the Global Adult Tobacco Survey and the U.S. National Adult Tobacco Survey. Nicotine & Tobacco Research 2014;16(Suppl_1):S3-S9.

Background (Cont'd)

❖ World Health Organization Framework Convention on Tobacco Control (FCTC) Article 6 recommends that countries adopt a uniform specific excise tax, or a mixed excise tax structure with a minimum specific floor.[4]

4. World Health Organization Conference of the Parties to the WHO FCTC. Guidelines for implementation of the Article 6 of the WHO FCTC. https://www.who.int/fctc/guidelines/adopted/Guidelines_article_6.pdf (accessed August 2021)

Objectives

❖To examine the distribution of cigarette prices under different tax structures for nine sub-Saharan African countries.

❖To provide support for evaluating the effectiveness of sub-Saharan African regional tax policy.

Methods

❖Data source

❖Measures and cigarette price calculation

❖Tax structures in year of survey

Methods

❖ **Data Source**

❑ Global Adult Tobacco Survey (GATS) conducted in eight sub-Saharan African countries: Botswana (2017), Cameroon (2013), Ethiopia (2016), Kenya (2014), Nigeria (2012), Senegal (2015), Tanzania (2018) and Uganda (2013).

GATS is a nationally representative, household survey of noninstitutionalized adults aged ≥15 years to monitor tobacco use and related indicators globally.

❑ Gambia Tobacco Survey conducted in the Gambia in 2017.

Gambia Tobacco Survey is a nationally representative survey of tobacco use among adults aged ≥18 years.

Methods (Cont'd)

❖ **Measures and cigarette price calculation**

❑ The unit of purchase (individual cigarettes, packs or cartons) and the number of cigarettes in each unit were calculated based on the following question:

"The last time you bought cigarettes for yourself, how many cigarettes did you buy?"

❑ The overall purchase amount in local currency was obtained from the following question:

"How much did you pay for this purchase?"

Methods (Cont'd)

❖ **Measures and cigarette price calculation (cont'd)**

❑ The price per stick was calculated by dividing the overall purchase cost by the number of cigarettes in the purchase. We then multiplied the single-stick price by 20 to estimate the price per 20 sticks.

❑ The prices in local currencies were converted into 2019 international dollars using the purchasing power parity (PPP) conversion factors and consumer price index of the country.

❑ Any observations greater than 30 international dollars were considered as outliers.

Table 1. Tax structures in year of survey

Country	Tax structure in year of survey	Tax rate levied
Botswana (2017)	Uniform mixed excise	11 Pula per pack of 20 cigarettes and 30% of the manufacturing cost (for domestic production) or 30% of the CIF value (for imported production)
Cameroon (2013)	Uniform *ad valorem* excise	25% of the sales value of cigarettes
Ethiopia (2016)	Uniform *ad valorem* excise	75% of the manufacturing cost (for domestic production) or 75% of the CIF value (for imported production)
The Gambia (2017)	Uniform specific	12 Dalasi per pack of 20 sticks
Kenya (2014)	Uniform *ad valorem* system with minimum specific floor	24 Shillings per pack of 20 cigarettes or 35% of the retail selling price, whichever is higher

Table 1. Tax structures in year of survey (Cont'd)

Country	Tax structure in year of survey	Tax rate levied
Nigeria (2012)	Uniform *ad valorem*	20% of the CIF value for imported products, or 20% of the ex-works price for domestically produced cigarettes [22]
Senegal (2015)	Uniform *ad valorem*	45% on the CIF value for imported products, or 45% of the ex-factory price for domestically produced cigarettes
Tanzania (2018)	Tiered specific excise	Filtered cigarettes: 588 shillings (Tsh) per 20 cigarettes; Unfiltered cigarettes: 249 Tsh per 20 cigarettes "Other" category: 1065 Tsh per 20 cigarettes
Uganda (2013)	Tiered Specific tax system	Soft cap 1 cigarettes: 640 shillings (Ush) per 20 cigarettes Soft cap 2: 700 Ush per 20 cigarettes Hinge-lids: 1380 Ush per 20 cigarettes

Methods (Cont'd)

❖ **Statistical analyses**

❑ The price variation of cigarettes was evaluated by comparing the coefficients of variation (CoV) across countries.

CoV is calculated by dividing the standard deviation (SD) of the prices by the mean price of the sample.

❑ T-test was used to determine whether differences in CoV by excise tax structure are statistically significant.

❑ The skewness coefficient of the reported prices was also analyzed.

Results

❖Boxplot of cigarette price distributions by country

❖Distribution of cigarette prices in 2019 international dollars by country

❖Descriptive statistics of cigarette prices in 2019 international dollars

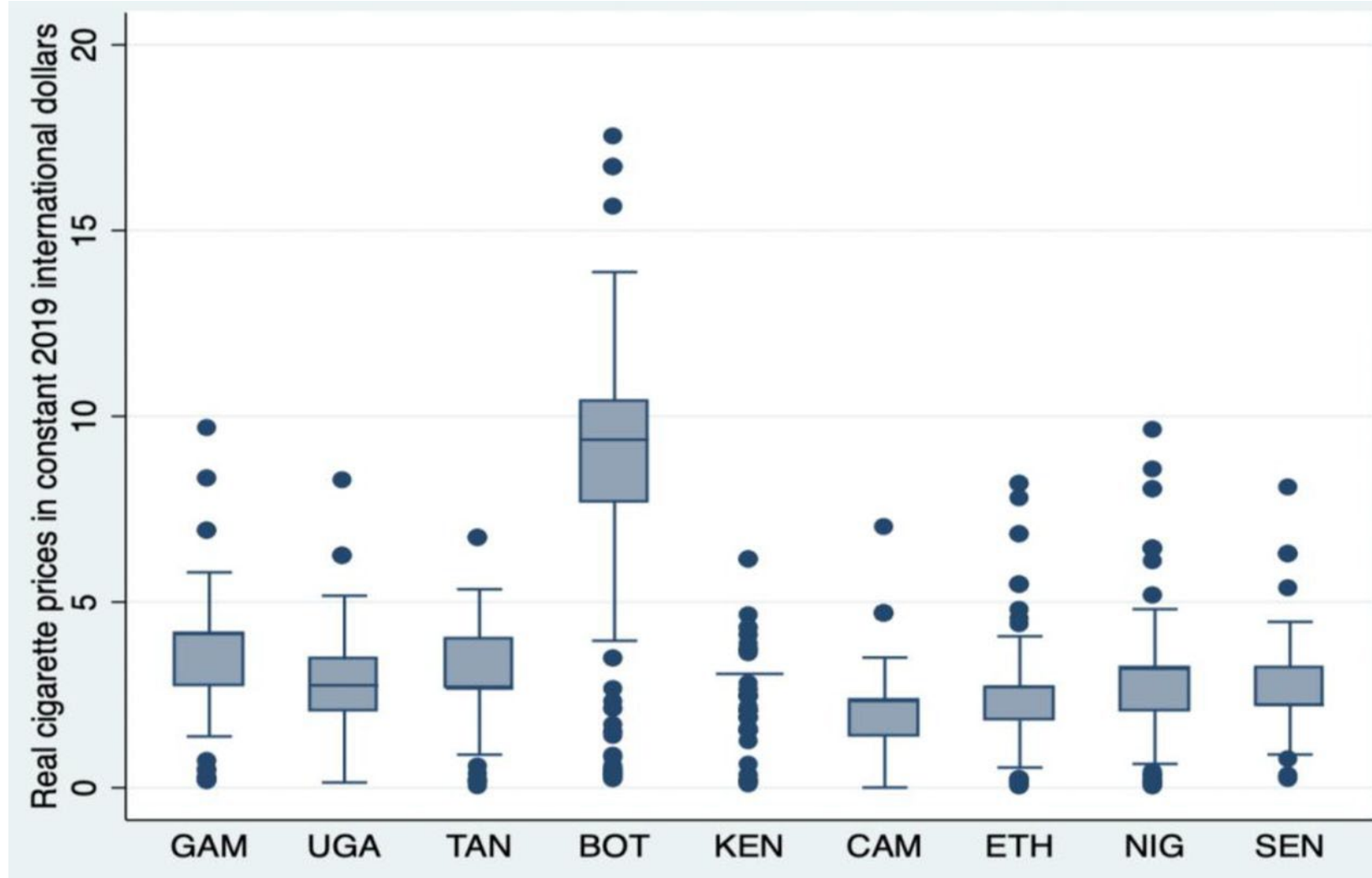# Figure 1. Boxplot of cigarette price distributions by country

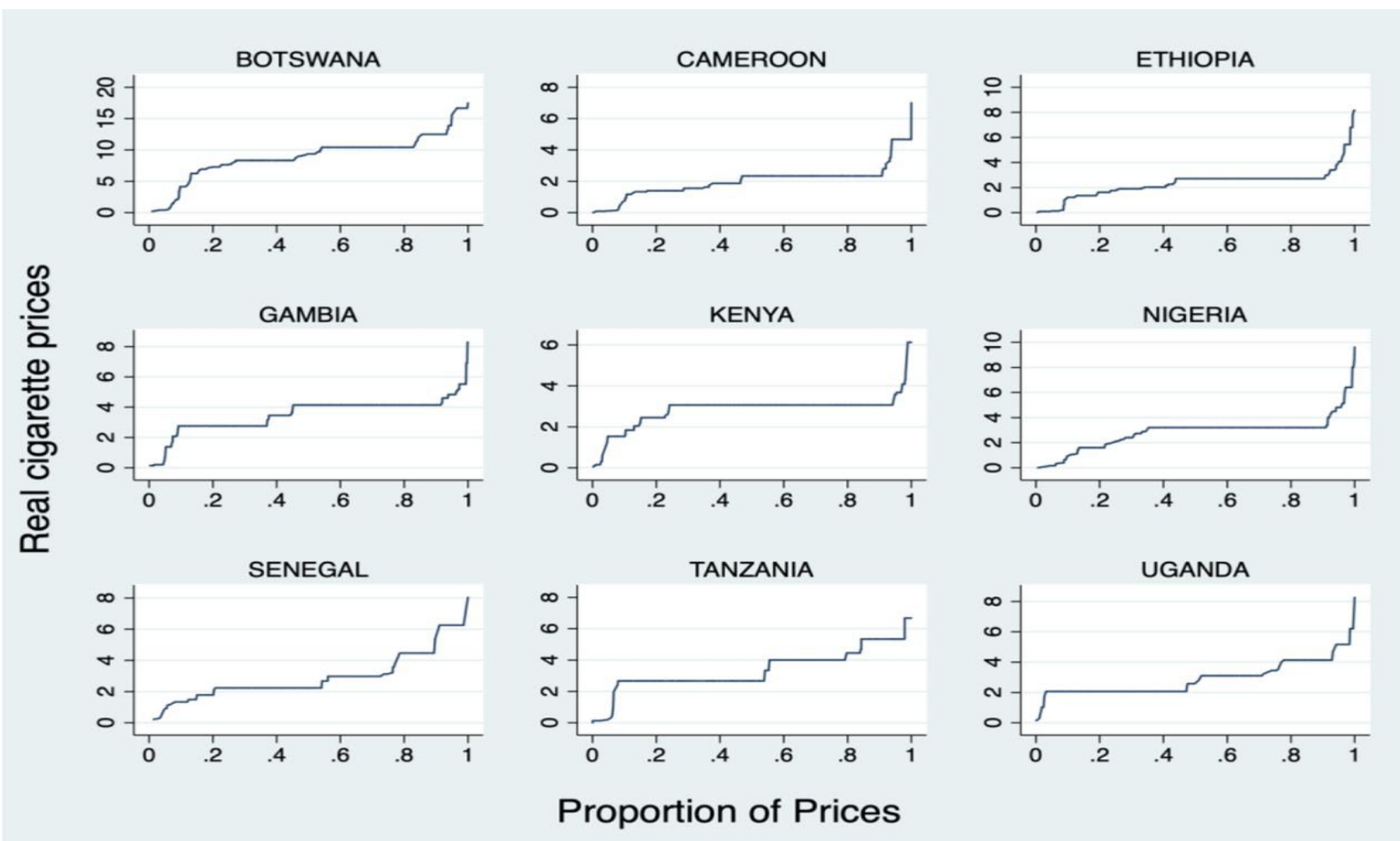# Figure 2. Distribution of cigarette prices in 2019 international dollars by country

Table 2. Cigarette prices in 2019 international dollars: descriptive statistics

Tax structure	Specific			Mixed		Ad valorem			
	Uniform	Tiered		Uniform		Uniform			
Country	The Gambia	Uganda	Tanzania	Botswana (specific plus ad valorem)	Kenya (minimum specific floor)	Cameroon	Ethiopia	Nigeria	Senegal
N	712	322	221	302	326	275	405	288	165
Mean	3.50	2.92	3.38	8.94	2.84	2.01	2.32	2.80	2.93
Median	4.14	2.76	2.67	9.37	3.06	2.34	2.72	3.21	2.23
SD	1.14	1.27	1.34	3.58	0.82	0.99	1.16	1.34	1.57
Coefficient of variation	0.32	0.39	0.40	0.40	0.29	0.49	0.49	0.48	0.53
Skewness	-0.84	1.05	-0.12	-0.54	-0.22	0.69	1.14	0.48	1.08

Summary
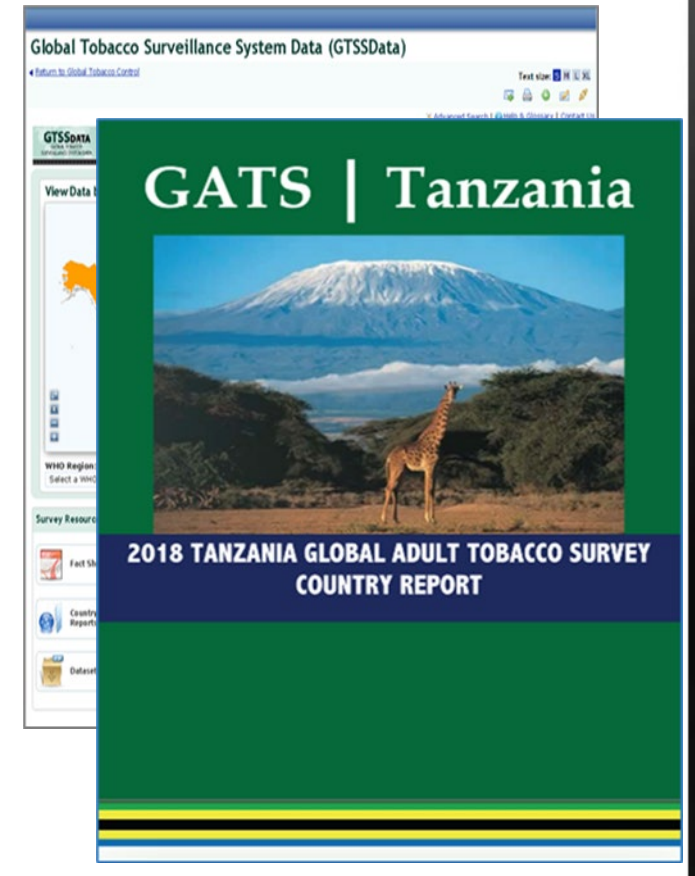
Summary

❖ Cigarette prices are positively skewed in countries with uniform ad valorem taxes, which means that prices tend to be clustered at lower levels.

❖ Cigarette prices are negatively skewed in countries that have a specific component in their excise tax structure, which means that, in these countries, cigarette prices are clustered at the higher levels.

Summary (Cont'd)

❖ The smallest price variability existed in countries with a uniform specific tax, or with a mixed system that works like a uniform specific tax.

❖ The largest price variability was observed in countries with an ad valorem tax structure.

Study Limitations

❖ The prices in the study reflect the prices of brands consumed by survey respondents who smoked and thus do not capture the full range of prices for all cigarettes available in each country.

❖ The study is subject to reporting biases.

❖ The causal relationship between tax structure and the distribution of cigarette prices can't be determined based on cross-sectional data.

❖ GATS did not take place in all countries in the same years.

❖ GATS covers those aged ≥ 15 years, but the Gambia Tobacco Survey is among adults aged ≥ 18 years.

Public Health Implication

Public Health Implication

❖ To reduce the variability of prices, countries with an existing ad valorem tax structure could add a minimum specific floor to their system, or convert to a uniform specific excise tax structure entirely.

❖ Cigarettes would be subject to less price variability if the ad valorem taxes were replaced with a uniform specific excise tax, or a uniform ad valorem tax with a sufficiently high minimum specific floor.

Public Health Implication (Cont'd)

❖ Tobacco tax directives that require the adoption of uniform specific excise taxes, or minimum specific floors, could be efficient to get multiple countries to adopt a FCTC-compliant excise tax structure.

❖ The evidence presented here can be used by tobacco-control professionals in the nine sub-Saharan African countries to incorporate FCTC recommendations in future tax directives.

Thank You

Let's Keep the Conversation Going

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The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.