



A Cross-Country Study of Cigarette Affordability and Single-Stick Purchases Using Survey Data From African Countries

AUTHOR: SAMANTHA FILBY

BACKGROUND

Tobacco tax increases that raise prices reduce tobacco consumption.^{1,2} However, income growth can offset these tax and price increases, thereby limiting their impact on tobacco use.³

The affordability of tobacco products, which is determined by the interplay of consumers' income and tobacco prices, has therefore attracted increasing attention at the policy level.⁴⁻⁶ As a matter of best practice, the Article 6 guidelines on implementation of the World Health Organization Framework Convention on Tobacco Control (WHO FCTC) encourage countries to consider income dynamics when adjusting their tobacco tax rates, to ensure that tobacco products become less affordable over time.⁷

Matching the emphasis placed on the concept of affordability at the policy level, several multi-country studies have examined the association between cigarette affordability and cigarette consumption by estimating the affordability elasticity of demand.^{3,8-11} In this literature, cigarette affordability is typically measured using the Relative Income Price (RIP) - the percentage of GDP per capita required to purchase 2000 cigarettes sticks.

A common limitation acknowledged in this literature is the use of the retail price of a 20-pack of a single cigarette brand, such as the most-sold brand or the cheapest brand sold domestically, to construct Relative Income Price (RIP) affordability indices.^{8,9,11} This average price measure has several shortcomings in terms of reflecting the true average price level in a given country, namely:

1. A single retail price cannot detect the variety of brands and prices that are available in each market.¹² This distorts the average in countries where a substantial number of smokers do not smoke the most-sold brand.
2. A single retail price cannot account for the purchase of cigarettes in quantities other than packs, yet not all smokers buy cigarettes in packs.¹² Purchases of single-stick cigarettes are especially common in LMICs.¹³⁻¹⁵
3. Single retail prices are often collected from one or two types of outlets and thus do not capture differences in prices paid between the multitude of outlets where individuals can purchase cigarettes.¹² Moreover, if the single retail price is taken from producer price lists, rather than collected through observations at retail outlets, the results also do not capture price promotions and coupons.¹⁶
4. These prices do not account for the fact that the average price level is affected by cigarette smoking intensity within a country.¹² By the law of demand, heavier smokers are expected to buy cheaper cigarettes than low-intensity smokers.¹²

Prices derived from surveys can address these shortcomings. Survey-derived data on cigarette prices from the Global Adult Tobacco Survey had not been previously used to estimate cigarette affordability in the African setting, or to study the link between cigarette affordability and smoking behaviour in the region.

STUDY OBJECTIVE

This study uses publicly available, individual-level data on smoking behaviour, environments, and attitudes from the Global Adult Tobacco Survey (GATS) to study the association between cigarette affordability, smoking participation, and smoking intensity in eight sub-Saharan African countries. The countries included in the analysis are Botswana, Cameroon, Ethiopia, Kenya, Nigeria, Senegal, the United Republic of Tanzania, and Uganda.

It also provides nationally representative estimates of the proportion of people who purchase cigarettes in the form of single sticks. Article 16 of the FCTC advises Parties to ban the sale of single cigarette sticks.¹⁷ Single-stick sales threaten the public health agenda because they are typically more accessible to youth and indigent individuals.¹⁸ They also limit individuals' exposure to health warnings that usually appear on cigarette packs.¹⁸

DATA

GATS is a nationally representative, standardized survey of adults aged 15 and older.¹⁹ The survey collects individual-level information on respondents' socio-demographic characteristics and exposure to a range of tobacco-control policies.¹⁹ Survey respondents, which include tobacco users and non-users, are randomly selected through multi-stage, geographically clustered sampling methods.¹⁹ Each country-level dataset provides sampling weights that can be used to provide nationally representative estimates for adults aged 15 and older.¹⁹

Amongst cigarette smokers, GATS collects information that can be used to derive the average price paid for cigarettes in each country in a manner that reflects brand variety, the types of packaging in which cigarettes are purchased, and the different venues where cigarettes are bought. Specifically, GATS asks cigarette smokers to report the cigarette packaging type (e.g., single sticks, packs, cartons), the number of individual cigarettes contained in each packaging type, and the number of each packaging type bought, during their most recent cigarette purchase.¹⁹ It also asks respondents to indicate the cost of this purchase.¹⁹

The variables used in the study are listed and defined in Table 1. The primary variable of interest is the RIP of cigarette affordability.

METHOD

The study employed a two-part model of cigarette demand. The first part of the model was used to gain insight into the factors that influence an individual's decision to smoke cigarettes (model of smoking prevalence). The second part of the model was used to gain insight into the factors that influence the number of cigarettes smoked (model of conditional cigarette demand).

The model of smoking prevalence includes both adults who smoked and did not smoke and controls for a range of demographic and socioeconomic factors, as well as factors that can be influenced by tobacco-control policies such as cigarette affordability, the rate of advertising exposure, the exposure rate to antitobacco messaging, and the percentage of the population that is misinformed about the harms of tobacco use. The model also controls for macroeconomic factors such as the proportion of the population living below the poverty line.

The model of conditional cigarette demand included only those adults who were currently smoking cigarettes. It controlled for the same factors as the model of smoking prevalence.

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Table 1. Definition of Analysis Variables cont.

Dependent variables		
Category	Variable	Definition
Cigarette smoking outcomes	Smoking participation	1= respondent reported smoking cigarettes daily or less than daily, and 0= did not report smoking cigarettes at all.
	Conditional demand	The average number of cigarettes smoked per day by current smokers.
Independent variables		
Category	Variable	Definition
Tobacco control variables	Relative Income Price of cigarette affordability	A country-level measure of the ratio of the median price paid for 2000 cigarettes to per capita gross domestic product. The higher the RIP, the less affordable cigarettes are, and vice versa.
	Local prevalence of cigarette advertising exposure	Percentage of respondents, averaged at the primary sampling unit, who report having seen any advertisements or signs promoting cigarettes through any of the following channels in the last 30 days: television, radio, billboards, posters, newspapers, magazines, cinema, the internet, public transportation vehicles or stations, public walls. This measure is included to account for country-specific characteristics that may influence smoking such as the local non-price tobacco-control environment.
	Local prevalence of anti-tobacco media messages	Percentage of respondents, averaged at the primary sampling unit, who report having seen any information about the dangers of using cigarettes, or any information that encourages quitting in newspapers, magazines, television, radio, or billboards. This measure is included to account for country-specific characteristics that may influence smoking such as the local non-price tobacco-control environment.
	POWE composite score	A country-level score ranging between 1 and 25 which proxies for countries' implementation of non-price tobacco-control policies.
	Misinformed about the harms of tobacco smoking	1= respondent does not know or believe that tobacco causes serious illness, and 0= respondent does know or believe that tobacco causes serious illness.
Socio-demographic variables	Age	Respondent's age in years.
	Age-squared	Respondent's age in years, squared. Added to account for potential non-linearity between age and smoking outcomes.
	Gender	1= male, and 0 = female.
	Residence type	1 = urban, and 0 = rural.
	Highest level of educational attainment	1= No formal education, 2= Primary schooling completed, 3= Secondary schooling completed, and 4=Any form of tertiary education completed.
	Asset-based wealth quintile	1= Lowest quintile, 2=second-lowest quintile, 3= third-lowest quintile, 4= second-highest quintile, and 5= highest quintile.
	Employment	1= Employed, 2= Unemployed, and 3 =Not in the workforce.
	Marital status	1= Single/never married, 2=Married/cohabiting and 3= Divorced/Separated/Widowed.
	Proportion of the population living below the poverty line	Country-level variable measuring the percentage of the population living on less than \$1.90 a day (at 2011 international prices), taken from the World Bank Development Indicators. This poverty line is set by the World Bank to classify people living in extreme poverty.

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RESULTS

- Lower cigarette affordability (i.e., a higher RIP) is significantly associated with lower cigarette smoking prevalence and lower smoking intensity.
- The estimated affordability of smoking participation is -0.245 , indicating that a 10% increase in the RIP is associated with a 2.45% decrease in cigarette smoking prevalence.
- The estimated affordability of smoking intensity is -0.155 , indicating that a 10% increase in the RIP is associated with a 1.55% decrease in cigarette smoking intensity.
- Across all countries, the majority of smokers purchase cigarettes in the form of single sticks. The proportion of smokers who purchased cigarettes in the form of single sticks is lowest in Ethiopia (60.7%) and exceeds 90% in Kenya, Tanzania and Uganda.
- All countries included in this analysis had ratified the FCTC at the time their GATS surveys were conducted, yet only Ethiopia, Kenya and Nigeria had implemented legislation banning the sale of single cigarette sticks at this time.²⁰ However, even in these three countries, more than half of cigarette smokers reported buying cigarettes in the form of single sticks. This suggests weak ban enforcement in these three countries.

POLICY IMPLICATIONS

- Findings provide local evidence for the countries sampled on the importance of implementing excise tax increases that reduce cigarette affordability over time.
- Findings on the prevalence of single stick cigarette sales, even amongst countries that have banned their sale, point to the need for governments to enact, and enforce, legislation that prohibits the sale of single cigarettes, in order to reduce the supply of cigarettes.
- Taken together, the findings of this study highlight that it will require a comprehensive tobacco-control strategy, one that includes measures to reduce both the demand and supply of cigarettes, to tackle their use in the region effectively.

[The full paper:](#)



Acknowledgments:

Gratitude is extended to Carrie Whitney, Liping Pan and Corné van Walbeek for their comments on the research manuscript and to Elizabeth Baldwin for editing support.



Funding: Funding provided by the *Bloomberg Initiative to Reduce Tobacco Use* through the CDC Foundation with a grant from Bloomberg Philanthropies.

Disclaimer: The findings and conclusions in this report are those of the author and do not necessarily represent the official position of the CDC Foundation.



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