Cigarette prices and smoking among adults in eight sub-Saharan African countries: Evidence from the Global Adult Tobacco Survey

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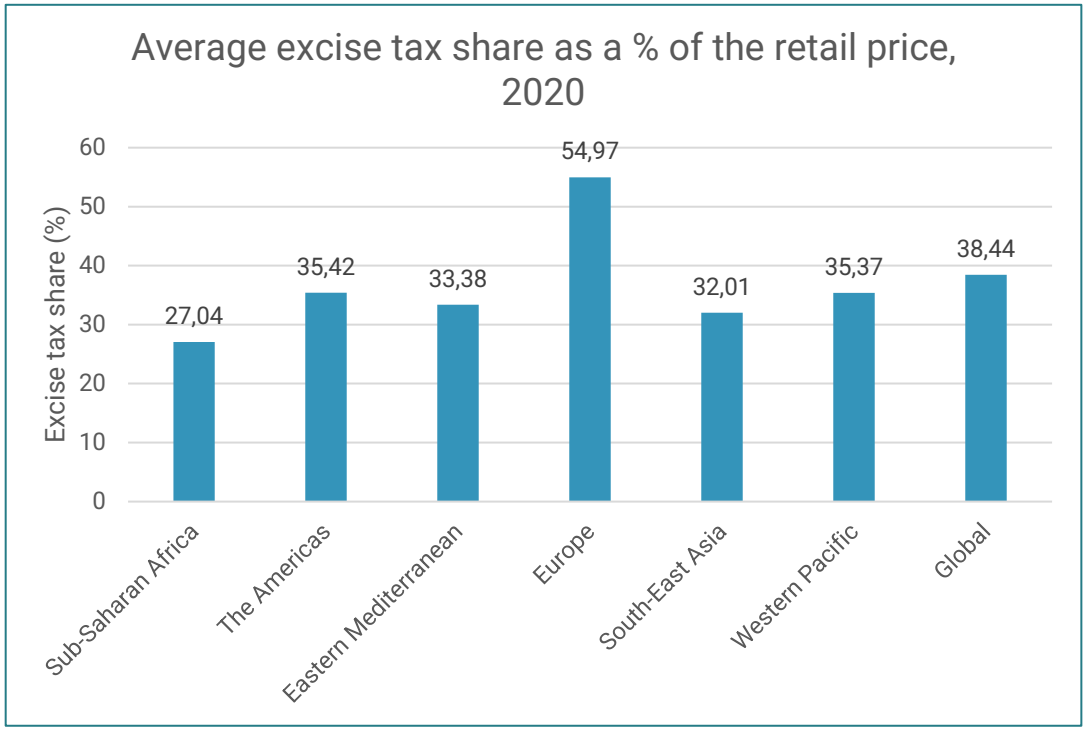
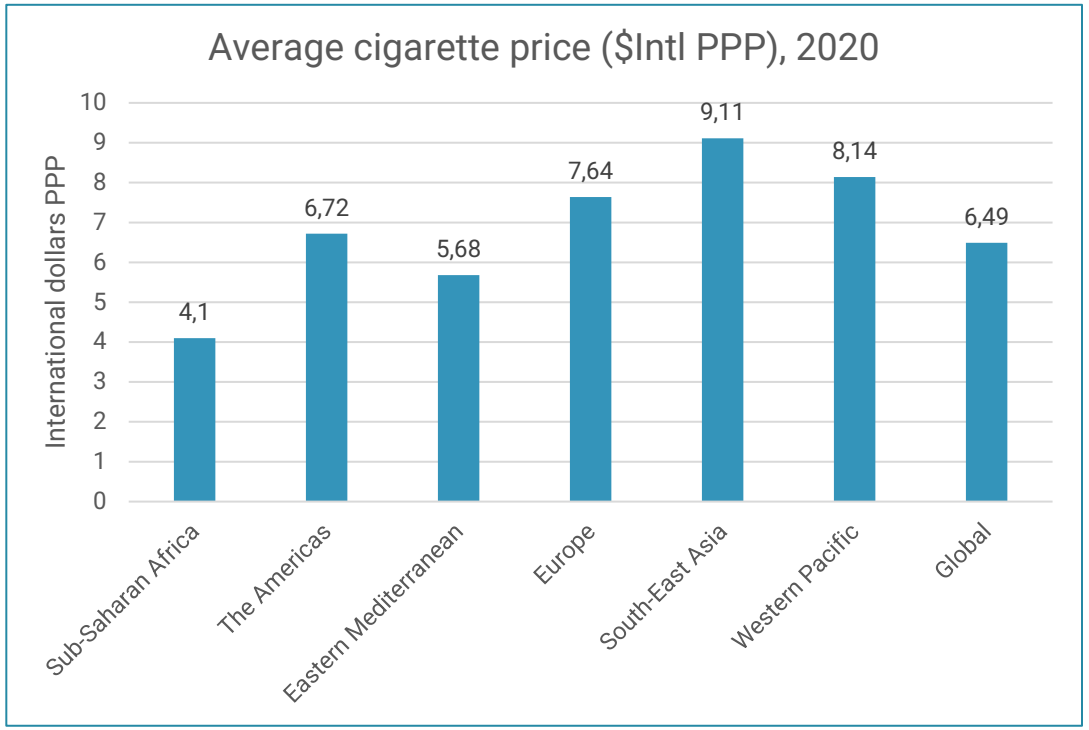
Background

- Increasing the excise tax on tobacco products is an effective policy for reducing tobacco demand.
- The Article 6 Guidelines of the World Health Organization Framework Convention on Tobacco Control encourage Parties to consistently raise taxes on tobacco products to render them less affordable over time.
- Due to the fast economic and population growth, coupled with intensive marketing efforts by the tobacco industry, the number of smokers in Africa is projected to increase dramatically.

Background

Despite growing concern over tobacco use in sub-Saharan Africa, countries on the continent have the lowest tobacco tax rates in the world.





Source: Tobacconomics, 2022

Background

- Although a wealth of international evidence shows the effectiveness of cigarette price increases in reducing tobacco use, policymakers demand local evidence before implementing tax increases.

- The literature that examines the association between cigarette prices and adult smoking behaviour in SSA has three main limitations:

    1. It is dominated by evidence from South Africa.

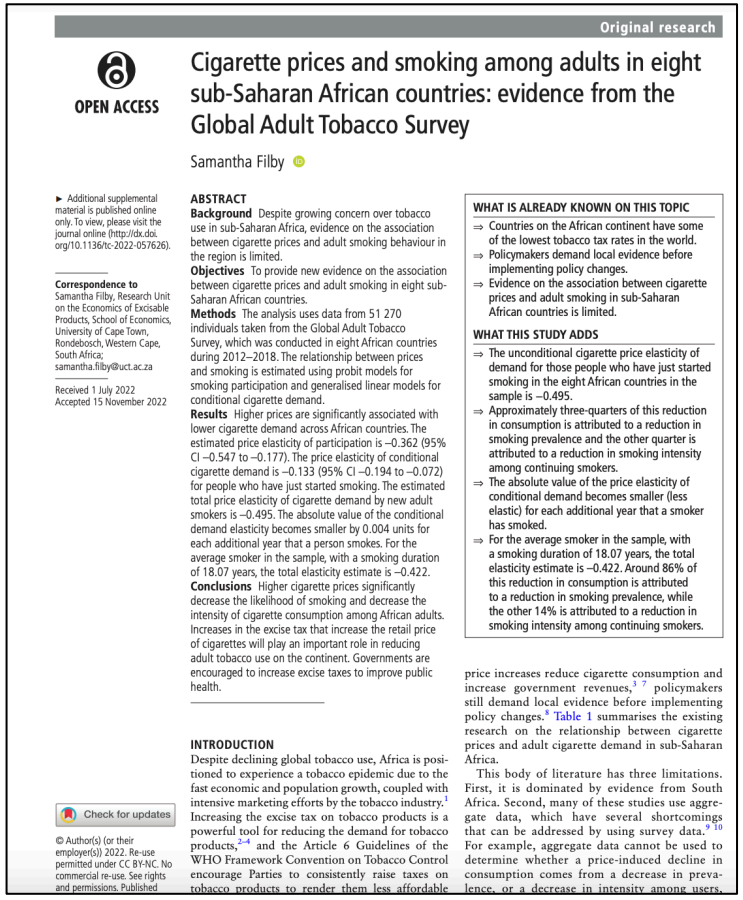
    2. Dominated by studies that use aggregate as opposed to survey data. Aggregate data:

        - cannot be used to determine whether a price-induced decline in cigarette use comes from a decrease in prevalence, or a decrease in smoking intensity, and

        - typically, only considers price and income as determinants of cigarette demand, ignoring individual-level determinants.

    3. The bulk of studies that do use survey data rely on data collected in, or before 2010 → outdated.

Research objective



Original research

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ABSTRACT

Background Despite growing concern over tobacco use in sub-Saharan Africa, evidence on the association between cigarette prices and adult smoking behaviour in the region is limited.

Objectives To provide new evidence on the association between cigarette prices and adult smoking in eight sub-Saharan African countries.

Methods The analysis uses data from 51 270 individuals taken from the Global Adult Tobacco Survey, which was conducted in eight African countries during 2012–2018. The relationship between prices and smoking is estimated using probit models for smoking participation and generalised linear models for conditional cigarette demand.

Results Higher prices are significantly associated with lower cigarette demand across African countries. The estimated price elasticity of participation is −0.362 (95% CI −0.547 to −0.177). The price elasticity of conditional cigarette demand is −0.133 (95% CI −0.194 to −0.072) for people who have just started smoking. The estimated total price elasticity of cigarette demand by new adult smokers is −0.495. The absolute value of the conditional demand elasticity becomes smaller by 0.004 units for each additional year that a person smokes. For the average smoker in the sample, with a smoking duration of 18.07 years, the total elasticity estimate is −0.422.

Conclusions Higher cigarette prices significantly decrease the likelihood of smoking and decrease the intensity of cigarette consumption among African adults. Increases in the excise tax that increase the retail price of cigarettes will play an important role in reducing adult tobacco use on the continent. Governments are encouraged to increase excise taxes to improve public health.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Countries on the African continent have some of the lowest tobacco tax rates in the world.
⇒ Policymakers demand local evidence before implementing policy changes.
⇒ Evidence on the association between cigarette prices and adult smoking in sub-Saharan African countries is limited.

WHAT THIS STUDY ADDS

⇒ The unconditional cigarette price elasticity of demand for those people who have just started smoking in the eight African countries in the sample is −0.495.
⇒ Approximately three-quarters of this reduction in consumption is attributed to a reduction in smoking prevalence and the other quarter is attributed to a reduction in smoking intensity among continuing smokers.
⇒ The absolute value of the price elasticity of conditional demand becomes smaller (less elastic) for each additional year that a smoker has smoked.
⇒ For the average smoker in the sample, with a smoking duration of 18.07 years, the total elasticity estimate is −0.422. Around 86% of this reduction in consumption is attributed to a reduction in smoking prevalence, while the other 14% is attributed to a reduction in smoking intensity among continuing smokers.

INTRODUCTION

Despite declining global tobacco use, Africa is positioned to experience a tobacco epidemic due to the fast economic and population growth, coupled with intensive marketing efforts by the tobacco industry.[1] Increasing the excise tax on tobacco products is a powerful tool for reducing the demand for tobacco products,[2–4] and the Article 6 Guidelines of the WHO Framework Convention on Tobacco Control encourage Parties to consistently raise taxes on tobacco products to render them less affordable

price increases reduce cigarette consumption and increase government revenues,[3 7] policymakers still demand local evidence before implementing policy changes.[8] Table 1 summarises the existing research on the relationship between cigarette prices and adult cigarette demand in sub-Saharan Africa.

This body of literature has three limitations. First, it is dominated by evidence from South Africa. Second, many of these studies use aggregate data, which have several shortcomings that can be addressed by using survey data.[9 10] For example, aggregate data cannot be used to determine whether a price-induced decline in consumption comes from a decrease in prevalence, or a decrease in intensity among users,

Check for updates

To provide new evidence on the association between cigarette prices and cigarette demand among adults in sub-Saharan African countries.

The price elasticity of cigarette demand

- The price elasticity of cigarette demand indicates by how much cigarette use declines when cigarette prices increase. It comprises two components: the price elasticity of smoking participation and the price elasticity of smoking intensity.

Price elasticity of demand
=
Price elasticity of smoking participation (aka smoking prevalence)
+
Price elasticity of smoking intensity

When the price of cigarettes increases, the consumption of cigarettes is expected to decrease for two reasons:

1. The number of smokers decreases (decrease in smoking prevalence).
2. The number of cigarettes smoked by remaining smokers decreases (decrease in smoking intensity).

Main data source

- The Global Adult Tobacco Survey (GATS): a nationally representative, standardized household survey of noninstitutionalized adults aged 15 and older that uses a standardized protocol to monitor tobacco use and related tobacco control indicators globally.
- It collects individual-level information on topics such as respondents':
  - background characteristics,
  - tobacco use and cessation,
  - exposure to second-hand smoke,
  - expenditure on cigarettes and quantities purchased, and
  - attitudes towards and perceptions about tobacco use.
- To date, GATS has been implemented in nine SSA countries: Botswana, Cameroon, Ethiopia, Kenya, Nigeria, Senegal, South Africa, the United Republic of Tanzania, and Uganda.
- Data from South Africa are not yet publicly available.

GATS is one of four data sets collected under the Global Tobacco Surveillance System. The system is compiled by CDC and WHO. All data collected under this project are publicly available.

GATS in SSA

Country	Survey Year	GATS sample (n)	Population aged 15 and older in millions (N)
Botswana	2017	4,643	1.45
Cameroon	2013	5,271	12.48
Ethiopia	2016	10,150	60.38
Kenya	2014	4,408	27.12
Nigeria	2012	9,765	93.33
Senegal	2015	4,347	8.24
Tanzania	2018	4,797	31.48
Uganda	2013	8,508	18.38

Method

- To estimate the price elasticity of cigarette demand, two models were run: a model of smoking participation and a model of smoking intensity.
- The model of smoking participation includes the entire sample (smokers and non-smokers).
- The model of smoking intensity includes only cigarette smokers.
- In addition to cigarette prices, both models controlled for respondents' gender, residence-type, education, wealth, employment and marital status, and included proxies for non-price tobacco-control policies and country-level poverty (the percentage of people living below the poverty line in each country).
- The model of smoking intensity also includes the number of years that the person had been a smoker as an additional control.

Tobacco-control variables		Ln(Cigarette price)	**-0.014*** (0.004)**
		Price elasticity: smoking participation	**-0.362*** **
		Local rate of exposure to cigarette advertising	0.013 (0.015)
		Local rate of exposure to antismoking messages	0.009 (0.017)
		Misinformed about the harms of tobacco smoking	**0.027*** (0.009)**
Individual-level variables		Age	0.007*** (0.001)
		Age squared	-0.00007*** (0.000)
		Male	0.127*** (0.012)
		Urban	0.001 (0.008)
	Education (Base = no formal education)	Primary schooling completed	0.007 (0.004)
		Secondary schooling completed	0.002 (0.006)
		Any form of tertiary education	-0.012** (0.005)
	Wealth (Base= lowest wealth quintile)	Low	-0.006 (0.004)
		Mid	-0.011 (0.008)
		High	-0.020 (0.013)
		Highest	-0.025* (0.014)
	Employment (Base = unemployed)	Unemployed	0.008 (0.006)
		Not in the workforce	-0.026*** (0.0058)
	Marital status (Base = never married)	Married/cohabiting	-0.022*** (0.007)
		Divorced/Separated/Widowed	0.016*** (0.005)
Country-level variables		% of the population living below the PPP$ 1.90 poverty line	-0.001*** (0.000)

Model Results: Smoking participation (N= 51,122)

Key findings

<u>In terms of factors that can be influenced by tobacco-control policy:</u>

- Higher cigarette prices are significantly associated with lower smoking prevalence: a 10% increase in cigarette price is associated with a 3.6% decrease in cigarette smoking prevalence.
- Those who do not know/believe that smoking tobacco causes serious illness are significantly more likely to smoke than those who believe/know that it does.

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		Price elasticity: smoking participation	-0.362***
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Country-level variables		% of the population living below the PPP$ 1.90 poverty line	**-0.001*** (0.000)**

Model Results: Smoking participation (N= 51,122)

Key findings

In terms of individual-level characteristics:

- Being male is associated with a substantially higher probability of smoking.
- People with any form of tertiary education smoke less than people with no formal education.
- People in the highest wealth quintile smoke less than people in the lowest wealth quintile.
- Relative to singletons, those who are married/cohabitating are less likely to smoke while divorced/separated/widowed are more likely to smoke.

Tobacco-control variables		**Ln(Cigarette price) = price elasticity**	**-0.133*** (0.031)**
		Smoking duration	0.003 (0.002)
		Ln(Cigarette price) x Smoking duration	**0.004** (0.001)**
		Local rate of exposure to cigarette advertising	0.028 (0.067)
		Local rate of exposure to antismoking messages	-0.166 (0.120)
		Misinformed about the harms of tobacco smoking	0.023 (0.0706)
Individual-level variables		Age	0.007 (0.005)
		Age squared	-0.0002** (0.000)
		Male	**0.149*** (0.041)**
		Urban	0.035 (0.035)
	Education (Base = no formal education)	Primary schooling completed	0.016 (0.030)
		Secondary schooling completed	0.022 (0.040)
		Any form of tertiary education	0.036 (0.047)
	Wealth (Base= lowest wealth quintile)	Low	**0.116* (0.061)**
		Mid	**0.158** (0.078)**
		High	**0.162** (0.080)**
		Highest	**0.134* (0.071)**
	Employment (Base = unemployed)	Unemployed	**0.084* (0.045)**
		Not in the workforce	-0.020 (0.039)
	Marital status (Base = single/never married)	Married/cohabiting	0.033 (0.033)
		Divorced/Separated/Widowed	0.000 (0.043)
Country-level variables		% of the population living below the PPP$ 1.90 poverty line	**-0.004** (0.002)**

Model Results: Smoking intensity (N=2,284)

Key findings

- <u>In terms of factors that can be influenced by tobacco-control policy:</u>
  - Higher cigarette prices are significantly associated with lower cigarette consumption among smokers.
  - However, the impact of cigarette prices on reducing the number of cigarettes smoked among smokers diminishes as the number of years that someone has been a smoker increases.

Tobacco-control variables		**Ln(Cigarette price) = price elasticity**	**-0.133*** (0.031)**
		Smoking duration	0.003 (0.002)
		Ln(Cigarette price) x Smoking duration	**0.004** (0.001)**
		Local rate of exposure to cigarette advertising	0.028 (0.067)
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	Marital status (Base = single/never married)	Married/cohabiting	0.033 (0.033)
		Divorced/Separated/Widowed	0.000 (0.043)
Country-level variables		% of the population living below the PPP$ 1.90 poverty line	**-0.004** (0.002)**

Model Results: Smoking intensity (N=2,284)

Key findings

- In terms of individual-level characteristics:
  - Among smokers, the number of cigarettes smoked increases as age increases, though at a decreasing rate.
  - Being male and wealthier is associated with a higher smoking intensity.
- At the country-level:
  - A lower proportion of people living below the poverty line is associated with heavier smoking.

Results: Summary

- Several factors, both demographic and policy-related, influence adult smoking prevalence and intensity in the eight sampled SSA countries.
- In terms of factors that can be influenced by tobacco-control policy, higher cigarette prices are associated with lower cigarette smoking prevalence and intensity.
- The total price elasticity of demand for the average smoker in the sample, with a smoking duration of around 18 years, is –0.422. This means that a 10% increase in cigarette prices reduces cigarette consumption by 4.22%.
- Since the price elasticity of smoking participation is -0.362, this means that most of the reduction in cigarette consumption following a price increase comes from a reduction in smoking prevalence, not smoking intensity.
- This is good news for public health!

Policy Implications

- The epidemiologic literature clearly indicates that a smoker will realise much greater health benefits if they quit smoking, rather than simply reducing the number of cigarettes that they smoke.
- The research from SSA shows that the bulk of the reduction in cigarette consumption following a price increase comes from a reduction in smoking prevalence.
- This means that excise tax increases could be a potent tool to improve public health in the countries sampled.
- Governments of the sampled African countries would do well to make more use of this powerful tool to reduce the demand for cigarettes.

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Thank you!

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Let’s
discuss!