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Cigarette Price and Other Factors Associated with Brand Choice and Brand Loyalty in Zambia: Findings from the ITC Zambia Survey

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Abstract

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Objectives—Little is known about cigarette pricing and brand loyalty in sub-Saharan Africa. This study examines these issues in Zambia, analyzing data from the International Tobacco Control (ITC) Zambia Survey.

Methods—Data from Wave 1 of the ITC Zambia Survey (2012) were analyzed for current smokers of factory-made (FM) cigarettes compared to those who smoked both FM and roll-your-own (RYO) cigarettes, using multivariate logistic regression models to identify the predictors of brand loyalty and reasons for brand choice.

Results—75% of FM-only smokers and 64% of FM+RYO smokers reported having a regular brand. Compared with FM-only smokers, FM+RYO smokers were, on average, older (28% vs. 20% ≥ 40 years), low income (64% vs. 43%), and had lower education (76% vs. 44% < secondary). Mean price across FM brands was ZMW0.50 (USD0.08) per stick. Smokers were significantly less likely to be brand-loyal (>1 year) if they were aged 15-17 years (vs. 40-54 years) and if they had moderate (vs. low) income. Brand choice was predicted mostly by friends, taste, and brand popularity. Price was more likely to be a reason for brand loyalty among FM+RYO smokers, among ≥55 year old smokers, and among those who reported being more addicted to cigarettes.

Conclusions—These results in Zambia document the high levels of brand loyalty in a market where price variation is fairly small across cigarette brands. Future research is needed on longitudinal trends to evaluate the effect of tobacco control policies in Zambia.

Keywords

Zambia; brand loyalty; price; factory-made cigarettes; roll-your-own cigarettes

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Tobacco use – particularly smoking – is the most important preventable cause of premature death and disease, being projected to be responsible for a billion deaths in the 21st Century[1]. While the tobacco epidemic is leveling off or declining in many high-income countries, tobacco use is on the rise in many low- and middle-income countries[2]. Africa is a critically important region where the tobacco epidemic could exert an extraordinary toll. Although Sub-Saharan Africa is currently at low levels of tobacco use, projections are that smoking prevalence will increase by almost 39% by 2030[3-5]. Zambia, a lower-middle-income country, is considered to have relatively moderate cigarette smoking rates, with male prevalence rate estimated at 15.6% and female prevalence at 0.5%[5]. Zambia ratified the World Health Organization (WHO) Framework Convention on Tobacco Control (FCTC) on August 21, 2008.

Prior to ratifying the FCTC, Zambia had already enacted tobacco control legislation through the National Public Health Act of 1992. This law required text warning labels on tobacco packaging, banned smoking in a number of public places, and banned selling of tobacco products to minors (under 16 years old)[6]. However, these regulations were not well enforced[7]. In 2008, the smoking ban was extended to all public places, defined as “any building, premises, conveyance or other place to which the public has access.” In 2009, the Ministry of Health took further steps to enhance enforcement of the law by creating punishments ranging from fines of 400 Zambian Kwacha (ZMW) – approximately

USD67.00 – or higher to two years of imprisonment for smoking in public places. Zambia currently does not ban direct tobacco advertising, promotion, and sponsorship.

Research on the prevalence and patterns of tobacco use behavior in Zambia has been sparse. The Global Youth Tobacco Survey (GYTS) reported that 10.5% of Zambian students between the ages of 13 and 15 years were current smokers in 2007 (9.3% among males and 12.1% among females)[6]. Cigarette consumption in Zambia has been found to be higher among males, urban residents, and low educated groups[8]. Preliminary evidence using established methods to calculate cigarette affordability[9, 10] found that cigarettes in Zambia have become more affordable over the past decade[11]. However, to our knowledge, no prior published studies have reported on price distribution or brand loyalty in the Africa.

The vast majority of studies on brand choice comes from the US market, where it has been shown that peer influence and exposure to brand advertising are important factors in brand choice[12, 13]. Smokers with higher income have demonstrated more brand loyalty, and older adults have been more brand-loyal than smokers under the age of 25 years[14]. Understanding the factors influencing brand loyalty and the patterns of price distribution are important as countries develop their tobacco control strategies. For instance, taxation may be more effective among younger smokers and those in lower income segments who may be less brand loyal. Also, finding that large price gaps exist between brands may be a direct result of *ad valorem* taxes, which are not considered to be best practice in tobacco control[15].

The International Tobacco Control Policy Evaluation Project (ITC Project) is a multi-country prospective cohort study designed to measure the impact of key policies of the FCTC[16, 17]. The ITC Zambia Survey is the first-ever national study of tobacco use and tobacco control policies in Zambia. Using data from the ITC Zambia Survey, this paper describes cigarette price distribution and purchase patterns, reasons for brand choice, and other indicators of brand loyalty among Zambian smokers. We also explore the differences in use and brand loyalty between smokers of only factory-made (FM) cigarettes and concurrent smokers of FM and hand-rolled or roll-your-own (RYO) cigarettes. We examine whether brand choice and loyalty are associated with price and smoker characteristics in order to inform policymakers of potential tools that can be used to curb the growth of tobacco consumption and prevalence in Zambia.

METHODS

Sample

This paper uses cross-sectional data from the ITC Zambia Wave 1 Survey, which provides nationally representative, multi-dimensional estimates of patterns of tobacco use among the Zambian smoking population. Data on tobacco users and non-users of tobacco were collected using face-to-face interviews, with participants providing their informed consent before commencing an interview. Research ethics approval was obtained from the University of Waterloo Human Research Ethics Committee, and from the University of Zambia Biomedical Research Ethics Committee. Data collection was completed through a multistage clustered sampling design between September and December 2012. The ITC survey took an average of about 60 minutes for tobacco users to complete; and about 45

minutes for non-users of tobacco to complete. The survey team contacted smokers from 2,378 households of a total of 3,473 attempted (household contact rate = 68.5%). A total of 2,273 households responded to the survey (household response rate = 65.4%). In any enumerated household all tobacco users up to a maximum of 4 (randomly selected if necessary) were to be interviewed. Of these, a total of 1,588 tobacco users were identified and 1,483 tobacco users completed the interview (tobacco user individual response rate = 93.4%).

In this paper, only the sample of cigarette smokers is examined (users of smokeless tobacco who did not smoke cigarettes were excluded; *N*=275). A total of 1,219 smokers completed the survey. Smokers were defined as those respondents who had smoked at least 100 cigarettes in their lifetime and smoked at least once a week at the time of the survey. Smokers were asked whether they smoke FM cigarettes, RYO cigarettes, or both FM and RYO cigarettes. Because our main focus is on brand loyalty, we excluded smokers of RYO cigarettes who did not also smoke FM cigarettes (*N*=367) and those who did not specify cigarette type (*N*=6), leaving us with a sample of 846 smokers.

Brand loyalty measures

All smokers were asked the following questions: “Do you have a brand of cigarettes that you usually smoke?” (Coded as “Yes” vs. “No”) and “What is the name of your usual cigarette brand?” The following question was then used to determine whether smokers had had a usual brand for at least a year: “How long have you been smoking your usual brand of cigarettes?” Responses were coded as either <1 year or ≥ 1 year (where we combined two response options: 1-5 years or ≥ 5 years).

Reasons for brand choice measures

Smokers were asked the following question: “In choosing this brand of cigarettes, was part of your decision based on any of the following?” and were given the following response options to choose from: “the price”, “high quality”, “the taste”, “this brand is less harmful to my health”, “it is a popular brand”, “my friends smoke this brand”, and “the design of the pack.”

Cigarette price and single cigarette purchases

Respondents were asked to declare the price they paid the last time they purchased cigarettes for themselves. They were asked to report their most recent purchase of cigarettes using any applicable unit of measure (i.e., number of loose or single cigarettes; number of cigarette packs and number of cigarettes per pack; and number of cigarette cartons and number of packs/cigarettes per carton) for FM cigarettes. Reported FM cigarette prices were then standardized to a price per cigarette stick. We did not analyze reported RYO cigarette prices due to the lack of standard unit prices.

Other measures

Socio-demographic measures included in the analysis were sex (male, female), age category (15-17, 18-24, 25-39, 40-54, and 55 years and older); World-Bank-defined income category (from monthly household income: low, less than ZMW165 [USD28]; moderate,

ZMW165-265 [USD28-44]; high, more than ZMW265 [USD44]); education level (illiterate or less than primary school, some or completed primary school, and secondary school or higher). Level of tobacco dependence was assessed using the Heaviness of Smoking Index (HSI), which was based on the sum of two categorical variables, namely self-reported time to the first cigarette of the day and the number of cigarettes smoked per day (HSI; 7 levels, 0=least dependent to 6=most dependent)[18].

Analysis

We used chi-square tests to compare simple bivariate relationships between users of FM cigarettes only and users of FM+RYO cigarettes. The multivariate association between smoker characteristics and type of purchase was examined using logistic regression models. Logistic regressions were also used to test the relationship between smoker characteristics and brand loyalty measures, and the predictors for brand choice. All analyses were weighted to take into account the clustered sampling design. All analyses were conducted using Stata 13 (StataCorp, College Station, TX).

RESULTS

Smoker characteristics

Of the 846 smokers included in the study, 560 smoked FM-only cigarettes, and 286 smoked both FM and RYO cigarettes (Table 1). Reported regular brand use was 74.9% among FM smokers and 64.1% among smokers of both FM and RYO cigarettes. The overwhelming majority of smokers were male (91.6% for FM vs. 95.7% for FM+RYO). Compared with FM cigarette smokers, smokers of both FM and RYO cigarettes were, on average, older (28.4% vs. 19.8% were 40 years and older), low income (63.5% vs. 43.2%), and had lower educational attainment (76.1% vs. 43.8% <secondary). Smokers of FM-only cigarettes were less addicted than smokers of both FM and RYO cigarettes (54.3% vs. 70.4%; HSI>0). More than half of smokers and mixed users stated that their last purchase of cigarettes was a single cigarette.

Brand distribution and single cigarette purchases

According to smokers who reported smoking a regular brand of FM cigarettes, the Zambian cigarette market is dominated by three brands (Figure 1). The most reported regular brand was Pall Mall (39.2%), followed by Peter Stuyvesant (31.4%), and Sweet Menthol (12.8%). Among these smokers, 82.2% reported buying single cigarettes (vs. packs). The prevalence of single cigarette purchases within each of the top three brands was 84.5% for Pall Mall, 89.7% for Peter Stuyvesant, and 93.2% for Sweet Menthol. The associations between smoker characteristics and purchase type (i.e., single cigarette vs. pack) are shown in Table 2. Among FM cigarette only smokers, females and smokers aged ≥ 55 years were less likely to purchase single cigarettes (Odds Ratio [OR]=0.36, and 0.17, respectively). Also those with at least some primary education were significantly less likely to purchase single cigarettes compared to those with less than primary education (OR=0.10). Finally, smokers with a higher than zero HSI were less likely to choose single cigarettes compared with those with an HSI=0 (OR=0.43).

Price distribution

Figure 2A shows the reported median price per cigarette by brand of FM cigarettes. For the two most popular FM brands (i.e., Pall Mall and Peter Stuyvesant), the median price per cigarette was ZMW0.50 / USD0.08. The mean prices for both brands coincided with the median: Pall Mall, ZMW0.49 (0.01) mean (standard deviation) and Peter Stuyvesant, ZMW0.50 (0.01). The reported price per cigarette for Sweet Menthol, the third most popular brand, was approximately half of the price of the top two brands. The median price per cigarette for Sweet Menthol was ZMW0.30, with a mean of ZMW0.36 (0.02). Finally, the reported median price per cigarette for all other brands combined was also ZMW0.50, with a mean of ZMW0.40 (0.03). The median price per cigarette for singles is slightly higher than that for pack purchases (ZMW0.48 vs. 0.44) (Figure 2B).

Smoker characteristics and brand loyalty

The associations between smoker characteristics and brand loyalty are shown in Table 3. Among smokers who did not use RYO cigarettes, those with moderate income compared to those with low income (OR=0.51) and those who paid ZMW0.50 per cigarette compared with those who paid less (OR=0.29) were significantly less likely to be loyal to any brand for more than one year.

Reasons for brand choice

Factors predicting the proportion of smokers that nominated reasons for brand choice are shown in Table 4. We did not find differences by sex. Smokers between the ages of 15 to 17 years were significantly less likely to choose a brand because of taste compared to older smokers (OR=0.07). Smokers over the age of 54 years were more likely to choose a brand because of price (OR=8.99) and popularity (OR=3.53) compared to those between the ages of 40 and 54 years. Smokers in the high-income group were less likely to choose a brand because of price (OR=0.46), but more likely to choose their brand because of taste (OR=2.99), perceived relative harm (OR=2.83), popularity (OR=3.08), and friends' advice (OR=3.05). Compared to the smokers who smoked FM cigarettes exclusively, smokers of both FM and RYO cigarettes were more likely to choose their brand because of price (OR=4.59) and less likely to choose their brand because of perceived quality (OR=0.36) and taste (OR=0.39). Smokers with a nonzero HSI were more likely to choose a brand because of perceived relative harm (OR=2.07) and popularity (OR=1.88) relative to smokers with HSI=0. Finally, choosing a brand because of pack design was not significantly associated with any smoker characteristics.

DISCUSSION

Almost half of smokers surveyed in the ITC Zambia Wave 1 Survey used FM-only cigarettes, with the rest using either RYO cigarettes, or a combination of the two (i.e., FM and RYO). Among FM cigarette smokers, over 90% stated that the last purchase of cigarettes was a single cigarette. According to the survey, smokers purchasing single cigarettes seem to be paying a similar price per-stick as smokers who purchase an entire pack. The wide prevalence of single cigarette purchases in Zambia could represent a significant barrier to tobacco control, particularly given that there were no significant

differences found in per cigarette prices when sold as singles compared to packs. The Zambian government has not forbidden the sale of loose cigarettes in *Ntembas* (kiosks); this should be a main focus for tobacco regulation.

Although the reported cigarette price varied, smokers in Zambia paid on average ZMW0.50 (USD0.08) per stick of FM cigarettes. We also found that smokers who paid less than ZMW0.50 per cigarette were more likely to be brand loyal. Given the reported cigarette prices in this survey and prior findings on the affordability of cigarettes in Zambia[11], cigarette prices may be too low to motivate smokers to quit. According to the WHO, increasing tobacco taxes is the single most cost-effective strategy to reduce the prevalence of tobacco use, especially among youth[19]. The finding that there is a significant price differential between Peter Stuyvesant and Pall Mall on the one hand and Sweet Menthol is largely explained by the fact that Zambia levies the excise tax on tobacco products as an *ad valorem* tax[11]. This is consistent with prior evidence of greater price variation in countries with ad valorem taxes[20], where low price products are made more attractive by increasing the difference between low and high priced brands[15]. The WHO recommends specific tobacco excise taxes since these reduce the gap between premium and low-priced alternatives and limit opportunities for smokers to switch to cheaper alternatives in response to tax increases.

As expected, we found that smokers under the age of 18 were less likely to be brand-loyal. Smokers in this age group were also less likely to report choosing a cigarette brand based on taste. It turns out that young smokers are under-represented in this study. Insufficient analytic power among this sub-group may have suppressed significant associations with respect to price and brand choice. In Zambia as in other countries, the youngest age group is the most vulnerable demographic group to marketing efforts by the tobacco companies. It is likely that the increased focus of the tobacco industry on building their market in Africa will lead to higher smoking prevalence in upcoming years. For this reason, it is critical for governments in Zambia and throughout the African Region to protect the youth by increasing the price and taxation of tobacco products and banning the sale of single cigarettes[21].

Low-income smokers reported that they were more price-sensitive, whereas smokers with higher income reported other reasons for their brand choice, such as perceived quality and taste. Evidence from other low- and middle-income countries[21] shows that taxation is an effective tobacco control tool among low-income smokers. In other countries, RYO cigarette use has been shown to be consistently and significantly associated with low income[22-24]. Although it cannot be confirmed with cross-sectional analyses, the concurrent use of RYO cigarettes suggests that low-income smokers in Zambia may be substituting them for FM cigarettes and this serves as a reminder that future policies should not be limited to only FM cigarettes.

In the absence of restrictions on misleading descriptors such as “light”, “mild”, or “low tar” on cigarette packages, some Zambian smokers are misled to choose a particular brand on the basis that they are less harmful than others. For example, we found perceived harm to be associated with brand choice among high-income smokers. To date, Zambia has not banned

the use of false, misleading, or deceptive packaging labels, and therefore these findings are not surprising. The FCTC recommends that governments prohibit the display of quantitative or qualitative statements about tobacco constituents and emissions, suggesting that one brand is less harmful than another[19]. The finding that pack design was not significantly associated with brand choice likely stems from the high proportion of smokers who buy singles rather than packs; the importance of pack design may well increase in the future if restrictions are implemented on the sale of singles.

With respect to limitations of this study, the sample size was relatively small, and thus the statistical power for some of the tests was low, especially among sub-groups. Furthermore, our results are cross-sectional and cannot be used to assess tobacco control policy impact. It should be noted, however, that the ITC Zambia Project is a longitudinal cohort study, and longitudinal analyses from Zambia will be forthcoming.

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What this paper adds

- This paper reports findings from the first-ever national study of tobacco use in Zambia and its focus on price, brand choice, and brand loyalty add to the still-sparse literature on the economics of tobacco use in the African Region.
- Levels of brand loyalty are high in Zambia, despite low income. These findings will help inform public health practitioners on how to tailor their tobacco control interventions to appeal to different demographic groups.
- The findings on price distribution from this study demonstrate that very low prices, coupled with the very high prevalence (over 80%) of single cigarette purchases, pose a challenge for tobacco control efforts in the country and provides the foundation for initiatives to increase taxes on tobacco products.

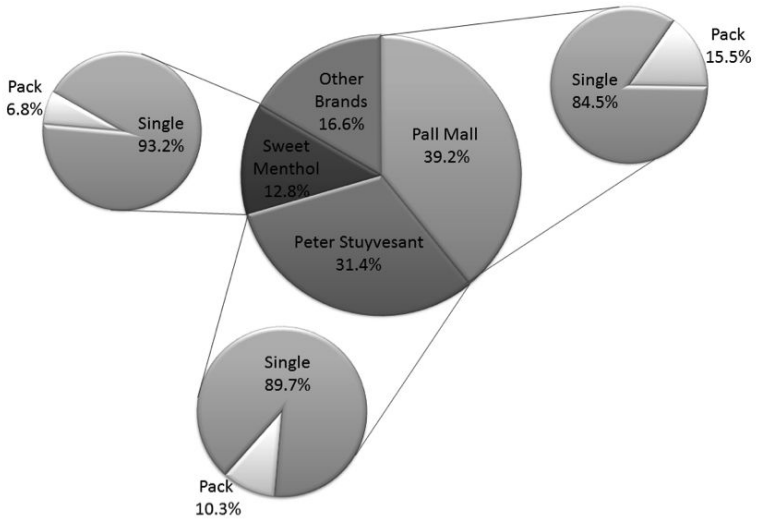
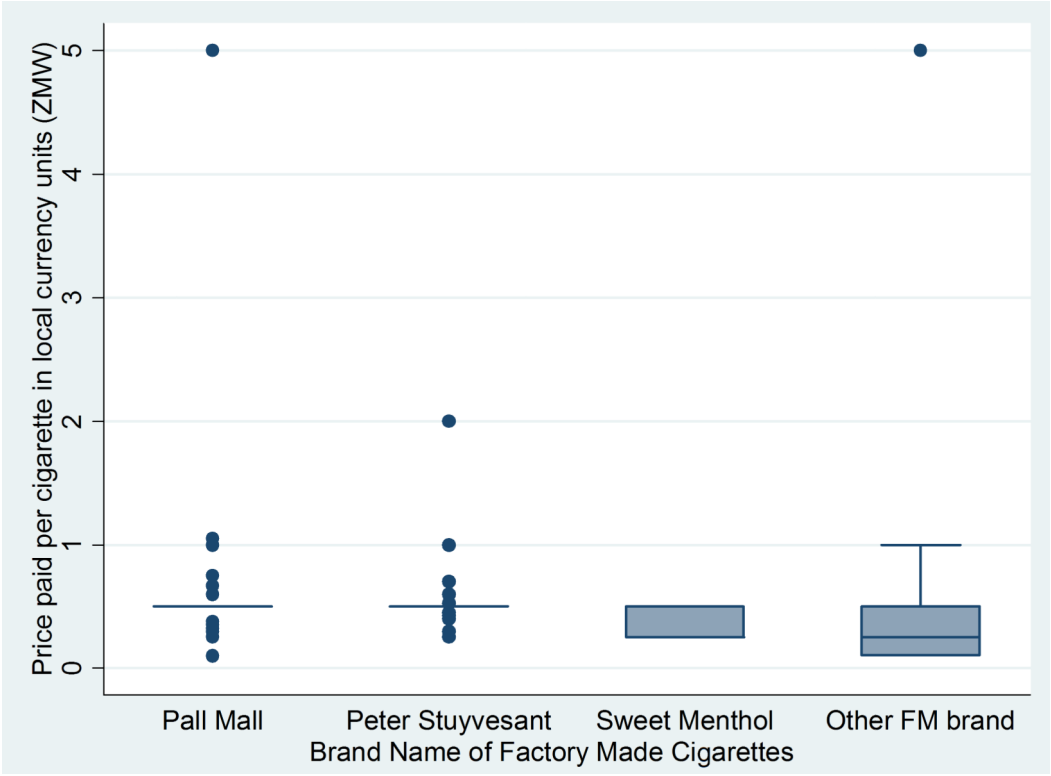
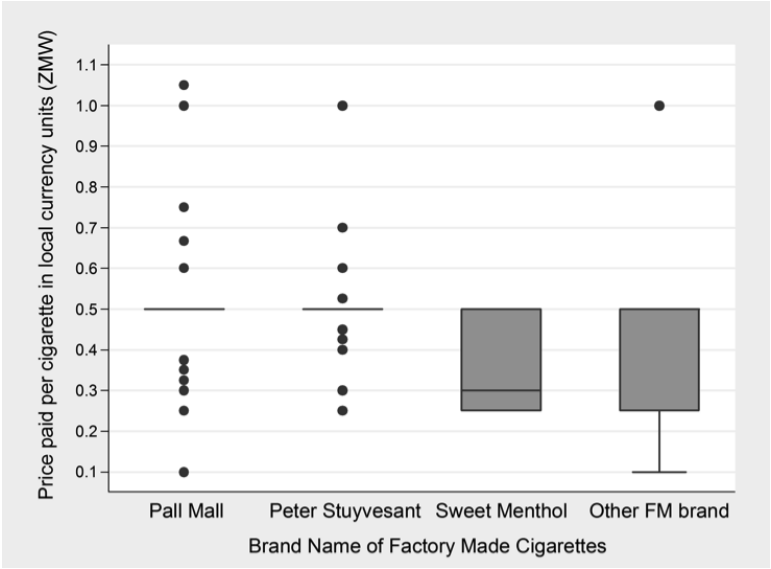


Figure 1.

ITC Zambia Survey Wave 1 (2012): Reported last purchase – regular cigarette brand for factory-made (FM) cigarettes and single cigarette vs. pack purchases





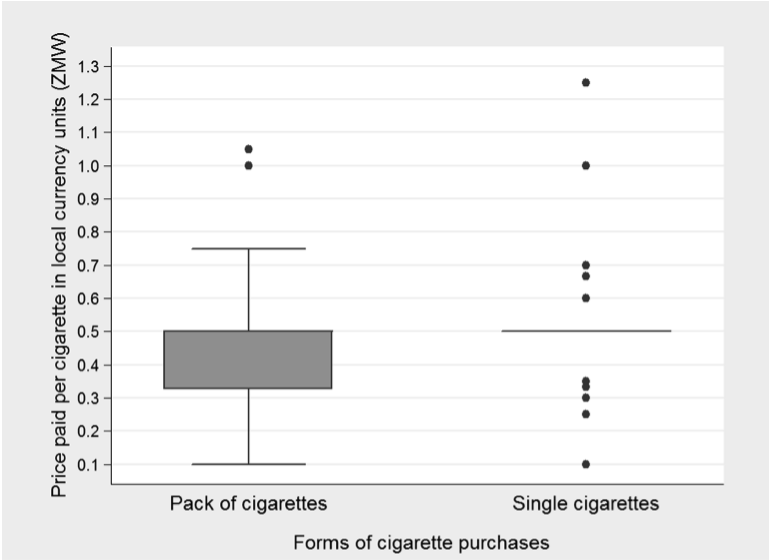


Figure 2.

Price per cigarette (in Zambian Kwacha [ZMW]) for factory made cigarettes among popular brand varieties (A), and by single cigarette vs. pack purchases (B), ITC Zambia Survey Wave 1 (2012)

Table 1

Percentage of factory-made (FM) cigarette smokers reporting same brand (smokers of FM cigarettes only vs. FM and roll-your-own)

Total number of smokers (*N*=846)	**FM only (*N*=560)**	**FM+RYO (*N*=286)**
Total % with same brand, unadjusted	74.9	64.1
X^2		11.7
p value		0.2
Gender		
Male	91.6	95.7
X^2		5.7
p value		0.4
Age		
15-17 years	3.7	2.1
18-24 years	38.0	22.8
25-39 years	38.5	46.7
40-54 years	12.4	18.3
≥55 years	7.4	10.1
X^2		129.2
p value		<0.001
Income		
Low	43.2	63.5
Moderate	19.1	17.2
High	37.7	19.3
X^2		88.0
p value		<0.001
Education		
Illiterate or < primary	2.3	8.4
Some or completed primary	41.5	67.7
Secondary or higher	56.2	23.9
X^2		269.4
p value		<0.001
Heaviness of smoking index (HSI)		
0	45.7	29.6
1	8.6	23.7
2	19.7	21.3
3	17.3	19.7
4	7.6	3.9
5	1.2	1.4
6	0.0	0.3

Total number of smokers (*N*=846)	**FM only (*N*=560)**	**FM+RYO (*N*=286)**
X^2		98.6
p value		<0.001
Purchase type		
Single	84.8	77.3
Pack	15.2	22.7
X^2		1.3
p value		0.626

FM: factory-made; RYO: roll-your-own

Table 2

Association between individual smoker characteristics and purchase type (single vs. pack): Odds Ratio (95% CI)

		Single Cigarette (vs. Pack)	
		FM Only (*N* = 419)	**FM+RYO (*N* = 523)**
Sex			
	Male (ref)	-	
	Female	0.36 (0.13-0.98)*	0.41 (0.16-1.04)
Age			
	15-17 years	13.46 (0.99-182.19)	18.51 (1.37-250.15)*
	18-24 years	1.75 (0.63-4.84)	3.11 (1.21-8.03)*
	25-39 years	1.18 (0.46-3.00)	1.24 (0.57-2.67)
	40-54 years (ref)	-	-
	≥55 years	0.17 (0.21-0.89)*	0.45 (0.14-1.48)
Income			
	Low (ref)	-	-
	Moderate	0.88 (0.32-2.47)	1.69 (0.63-4.58)
	High	1.09 (0.43-2.80)	2.22 (0.91-5.44)
Education			
	Illiterate or < primary (ref)	-	
	Some/completed primary	0.10 (0.01-0.87)*	0.72 (0.19-2.70)
	Secondary or higher	0.07 (0.01-0.92)*	0.57 (0.16-2.06)
Heaviness of Smoking Index (HSI)			
	0 (ref)	-	-
	1-6	0.43 (0.21-0.89)*	0.48 (0.24-0.95)*

FM: factory-made; RYO: roll-your-own; ZMW: Zambia Kwacha

* $p<0.05$;

** $p<0.01$;

*** $p<0.001$

Table 3

Association between individual smoker characteristics and brand loyalty: Odds Ratio (95% CI)

		Same brand (any length)		Same brand (>1 year)	
		FM Only (*N* = 407)	**FM+RYO (*N* = 103)**	**FM Only (*N* = 406)**	**FM+RYO (*N* = 101)**
Sex	Male (ref)	-	-	-	
	Female	2.00 (0.48-8.34)	3.50 (0.17-72.70)	0.87 (0.31-2.49)	6.05 (0.18-207.88)
Age	15-17 years	0.83 (0.23-2.93)	-	0.32 (0.11-0.92)*	-
	18-24 years	1.23 (0.50-3.03)	5.70 (0.63-51.58)	0.85 (0.39-1.89)	2.09 (0.25-17.32)
	25-39 years	0.85 (0.39-1.86)	1.77 (0.46-6.92)	0.83 (0.41-1.70)	1.22 (0.30-5.03)
	40-54 years (ref)	-	-	-	-
	≥55 years	0.56 (0.16-1.93)	2.18 (0.15-32.00)	0.73 (0.22-2.44)	1.87 (0.17-20.31)
Income	Low (ref)	-	-	-	-
	Moderate	0.78 (0.38-1.61)	6.03 (0.89-40.93)	0.51 (0.22-0.68)**	4.90 (0.73-32.90)
	High	1.28 (0.67-2.43)	1.59(0.52-4.87)	0.62 (0.43-1.77)	1.65 (0.48-5.69)
Education	Illiterate or < primary (ref)	-	-	-	-
	Some/completed primary	0.91 (0.42-1.95)	0.44 (0.07-2.79)	0.43 (0.10-2.48)	0.33 (0.04-2.60)
	Secondary or higher	-	1.54 (0.25-9.42)	0.53 (0.12-3.07)	1.12 (0.12-10.16)
Heaviness of Smoking Index	0 (ref)	-	-	-	-
	1-6	0.81 (0.44-1.49)	0.12 (0.33-3.74)	1.55 (0.84-2.88)	2.71 (0.78-9.39)
Price	<0.50 ZMW (ref)	-	-	-	-
	=0.50 ZMW	0.22 (0.10-0.53)***	0.45 (0.10-2.14)	0.29 (0.11-0.74)**	0.45 (0.08-2.43)
	>0.50 ZMW	0.97 (0.08-11.02)	0.41 (0.05-3.47)	1.01 (0.08-13.22)	0.08 (0.00-1.15)

FM: factory-made; RYO: roll-your-own; ZMW: Zambia Kwacha

* $p<0.05$;

** $p<0.01$;

*** $p<0.001$

Table 4

Factors predicting proportion of smokers nominating reasons for brand choice: Odds Ratio (95% CI)

	Price (*N* = 448)	**Quality (*N* = 451)**	**Taste (*N* = 452)**	**Health (*N* = 423)**	**Popularity (*N* = 445)**	**Friends' Advice (*N* = 444)**	**Pack Design (*N* = 424)**
Sex							
Male (ref)	-	-	-	-	-	-	-
Female	1.88 (0.73-4.85)	1.59 (0.58-4.40)	1.92 (0.68-5.47)	0.34 (0.05-2.06)	1.64 (0.36-7.37)	0.84 (0.30-2.38)	2.98 (0.65-13.64)
Age							
15-17 years	0.98 (0.13-7.54)	0.36 (0.07-1.75)	0.07(0.01-0.57)*	-	1.08 (0.18-6.38)	1.66 (0.40-6.90)	-
18-24 years	1.19 (0.46-3.08)	1.91 (0.93-3.91)	0.91 (0.38-2.18)	0.74 (0.30-1.83)	1.65 (0.80-3.42)	1.89 (0.68-5.20)	0.77 (0.19-3.17)
25-39 years	0.99 (0.54-1.83)	1.10 (0.57-2.09)	0.81 (0.45-1.45)	0.85 (0.32-2.23)	1.49 (0.87-2.54)	1.60 (0.69-3.73)	1.84 (0.56-6.05)
40-54 years (ref)	-	-	-	-	-	-	-
≥55 years	8.99 (2.11-38.39)**	1.13 (0.33-3.85)	0.60 (0.22-1.66)	0.68 (0.20-2.32)	3.53 (1.41-8.82)**	0.46 (0.15-1.37)	0.07 (0.00-1.59)
Income							
Low (ref)	-	-	-	-	-	-	-
Moderate	1.65 (0.74-3.65)	0.63 (0.36-1.10)	0.78 (0.38-1.59)	1.80 (0.80-4.06)	1.63 (0.82-3.23)	2.91 (1.48-5.70)**	1.09 (0.26-4.58)
High	0.46 (0.21-0.99)*	1.41 (0.84-2.38)	2.99 (1.60-5.59)***	2.83 (1.24-6.45)*	3.08 (1.67-5.65)***	3.05 (1.65-5.64)***	1.33 (0.28-6.25)
Education							
Illiterate or < primary (ref)	-	-	-	-	-	-	-
Some/completed primary	0.61 (0.16-2.39)	0.86 (0.27-2.80)	1.05 (0.35-3.16)	0.86 (0.14-5.43)	0.53 (0.18-1.59)	0.72 (0.20-2.64)	2.04 (0.21-19.53)
Secondary or higher	0.46 (0.11-1.95)	1.06 (0.32-3.58)	1.66 (0.51-5.39)	0.36 (0.06-2.22)	0.40 (0.13-1.17)	0.38 (0.11-1.35)	4.32 (0.33-56.98)
Concurrent use of HR/RYO							
FM only (ref)	-	-	-	-	-	-	-
FM + RYO	4.59 (1.81-11.66)**	0.36 (0.18-0.72)**	0.39 (0.18-0.86)*	0.45 (0.19-1.03)	1.82 (0.93-3.56)	2.23 (0.96-5.19)	0.71 (0.23-2.14)
Heaviness of Smoking Index							
0 (ref)	-	-	-	-	-	-	-
1-6	1.76 (0.86-3.61)	1.39 (0.81-2.40)	0.89 (0.45-1.74)	2.07 (1.03-4.13)*	1.88 (1.09-3.25)*	1.18 (0.67-2.10)	1.84 (0.57-5.91)

FM: factory-made; RYO: roll-your-own

* $p<0.05$;

** $p<0.01$;

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***$p<0.001$