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Does Tobacco Make Consumers Happy? Evidence From Cameroon

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Abstract

The main objective of this paper is to study the effects of tobacco consumption and addiction on happiness in Cameroon. Data used come from the 2014 Multiple Indicator Cluster Survey (MICS) which provides a specific module on the Global Adult Tobacco Survey (GATS) on a sample of 14,712 respondents whose 9,861 are women. Tobacco consumption is assessed whether an individual actively smokes, while tobacco addiction considers the frequency and intensity of smoking. The happiness index is measured as a well-known measure of subjective well-being based on a Multiple Correspondence Analysis (MCA). Results show that tobacco consumption and addiction are associated with lower levels of happiness. This finding is robust while addressing endogeneity and conducting sensitivity analysis by sex and residential milieu. Specifically, comparing the Ordinary Least Squares (OLS) results with the two-stage least square (2SLS) results, we find that, the OLS results understate the effects of tobacco consumption and addiction on happiness. It appears that smoking has both physical costs and mental health consequences on tobacco consumers. For instance, female consumers are more hurt by tobacco. Hence, quit gender-sensitive strategies may benefit from including the mental health effect that tobacco generates on consumers.

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1. Introduction

In order to satisfy their happiness (or utility, in economic terms), people make purchases, taking into consideration price, income, and other variables. The majority of the time, consumption decisions are made independently of one another. But Chaloupka (1991) notes that alcohol, tobacco, and other items are highly addictive, suggesting that choices about whether to consume them at any given time depend on choices made in the past.

Economic theories explaining this behavior are divergent and can be divided into two broad categories. On one extreme lies the irrational theories of addiction (Pollak, 1969; Schelling, 1978) which ignore addiction and claim that they are not subject to the fundamental economic laws. Thus, considering that the tobacco consumer is time-inconsistent, irrational, and not forward-looking, will always regret his/her past choices and will be unhappy. While on the other extreme is the theories of rational addictive behaviors that consider tobacco consumers to be time consistent, forward-looking, rational, and happily addicted (Becker & Murphy, 1988).

Tobacco consumption and happiness remains a crucial issue for policymakers who have worked on enacting taxes, bans, and other measures to reduce addictive substance consumption, as the causality between tobacco consumption and health has been studied in depth and negative externalities have been highlighted (Chaloupka IV & Wechsler, 1995; Goel, 2007; Trofor et al., 2018). Despite Gruber and Mullainathan's potential application of perceived well-being (subjective well-being) data in the addiction literature, econometric research in this area remains limited. Brodeur (2012) investigated the economic influence of smoking prohibitions in the United States and found evidence that supports Gruber and Mullainathan's findings (2006). He brings out that the impact of smoking prohibition on life satisfaction, which is another proxy measure of one's perceived utility, among likely smokers in the United States remains positive and statistically significant.

Moreover, some works have been done to analyze the gender and residential milieu of tobacco-addicted consumers and have shown high disparities among cultures (Higgins et al., 2015; Kim et al., 2005; Morrow et al., 2002; Ng et al., 2007) and among countries (Warren et al., 2008). Rural areas have a higher tobacco consumption rate than urban areas, this is due to some factors such as lower income, educational levels, and unemployment (McCallister et al., 2013), and lack of social facilities (Matthews et al., 2017). However, results that exist in the literature do not provide evidence in developing context as Cameroon where tobacco consumption is increasing. Overall, 8.9% of Cameroonians (i.e. 1.1 million consumers) use tobacco and its by-products (smoking and smokeless tobacco) amongst which 13.9% are men and 4.3% women. Tobacco is currently smoked by 11.8% of men and 0.6% of women (0.7 million), with 2.2% of men and 3.8% of women using smokeless tobacco products. (NIS & ICF., 2020). A comprehensive analysis of tobacco use by residential areas shows that tobacco use is higher in rural areas (7.1%) than in urban areas (4.9%). The Ministry of Public Health for Cameroon reported in 2015 that, 10.12% of on school-going adolescents aged 13-15 had smoked a cigarette, of which

13.8% were boys and 5.7% were girls.

In light of the publicly known negative health effects, the question remains why do people consume tobacco? According to Moore (2009), one possible explanation is that tobacco consumption might positively influence happiness. In this context, our study attempts to investigate the causality between tobacco consumption and addiction and happiness in Cameroon. Considering this era of globalization, our work contributes to the literature by improving on past studies in three ways.

First, this paper uses data from the Multiple Indicator Cluster Survey (MICS-2014) that provides a specific module on the Global Adult Tobacco Survey (GATS) for a sample of 14,712 respondents whose 9,861 are women. This unique data permits us to construct an index of happiness which is a multidimensional concept and by methodically addressing problems of endogeneity, we can gain a new understanding of the effects of tobacco consumption and addiction on subjective well-being. This work prolongs that of Churchill and Farrell (2017) by using a broader array of measures of smoking behaviors and a multidimensional measure of happiness.

Furthermore, our research adds to previous work by investigating the effect of tobacco addiction on happiness. Even though our data does not permit us to clinically measure addiction, this study employs two measures as proxies for addiction levels: consumption frequency and intensity. There are several instruments available for measuring tobacco addiction, including the Fagerstrom Nicotine Dependence Test (Heatherton et al., 1991). A number of tobacco consumption measures are examined in our analysis as proxies for tobacco addiction, including regularity/frequency and quantity/intensity of consumption.

Finally, to the preeminent of our awareness, the present study examines the effect of tobacco addiction on subjective well-being using all forms of tobacco (smoking and smokeless tobacco) and is the first of its kind. Drawing on the measure of the index of subjective wellbeing, the results of our research suggest that tobacco consumption and addiction negatively affect subjective happiness (perceived wellbeing).

The remainder of this paper is organized in the following manner: Section 2 describes the data and variables, as well as the empirical strategy for the analysis. Section 3 presents the result of the findings while section 4 presents the discussion, and Section 5 concludes the work.

2. Method

2.1. Data

The data for this study come from the most recent Multiple Indicator Cluster Survey (MICS) in Cameroon, which was conducted in 2014 by the National Institute of Statistics (NIS) in collaboration with the Ministry of Public Health and UNICEF. MICS is an international household survey developed by UNICEF in the 1990s that provides comparable information about men, women, and children, and measures key indicators that track progress toward achieving the Millennium Development Goals. Initially, 5,345 men and 10,447 women were eligible for the sampling and at the end

4,851 men and 9,861 women really responded making a total of 14,712 respondents. Since the technique of data collection here is by stratification, the next stratum is made up of tobacco consumers and it is known as the Global Adult Tobacco Survey (GATS) for individuals aged 15 years in Cameroon.

2.2. Construction of Variables

2.2.1. *Dependent variable (Happiness index)*

Happiness: Subjective wellbeing is usually related to the positive difference between feeling good and feeling bad, while happiness is just feeling good (Diener & Chan, 2011). Nevertheless, both forms are concerned about wellbeing and share complex relationship with each other (Subjective well-being (SWB) is the scientific term for happiness and life satisfaction).

Respondents answered 13-item questions clustered into five dimensions that assessed their perception of wellbeing: overall wellbeing (04 items), occupational wellbeing (01 item), Economic wellbeing (01 item), Physical wellbeing (02 items), community wellbeing (02 items), and interpersonal wellbeing (03 items). The internal reliability measured using Cronbach's alpha of the items-questions of each dimension was satisfactory. Given the items' categorical structure, The Multiple Correspondence Analysis (MCA) technique is used to calculate the Multidimensional Happiness Index. (HI):

$$HI_i = \frac{\sum_{k=1}^{K} \sum_{J_k=1}^{J_k} w_{jk} \cdot I_{i,J_k}}{K}$$

Where HI_i is the MCA score obtained of individual ., Krepresents the number of categorical items, J_k is the total number of categories for indicators k , I_{i,J_k} stands for the binary indicator taking 1 if the individual has the category j_k , and w_{jk} represents the normalized first axis score of the categoryj_k . This statistical approach was preferred to averaging the item variables because it efficiently reduces the multiple indicators and avoids a skewed distribution of the variable. MCA was carried with respect to two criteria: firstly, appreciate the discriminatory power of each item-variable over the first axis, and secondly check the compliance with the First Axis Ordering Consistency (FAOC) property. Therefore, percentage of total inertia which describes the explanatory power of the first axis is 82.7%. The results of MCA are given in appendix B. However, in order to further refine the normality of the distribution of scores, but also to ensure that the HI variable takes only positive values, the logarithmic transformation [(–)+1] is applied to the estimated scores, where *min* is the minimum score. High HI values reflect an increasing positive perception of their happiness.

2.2.2. *Control variables*

Three indicators are used to track tobacco consumption and addictive behavior. The first measure is based on respondents' tobacco consumption status and is thus a dummy variable that equals 1 if the respondents consume tobacco and 0 if they do not. The following two measurements are loosely defined as addictive behaviors which represents those who are dependent on tobacco or addicted to it.

The second measure is addiction proxy 1 (frequency of tobacco consumption), a measure of the frequency with which tobacco is consumed. The MICS asks, "What is your frequency of tobacco consumption (smoke and smokeless)?" On a three-point scale, we code 3 if the respondent consumes tobacco every day, 2 if the respondent consumes tobacco less than once per day, and 1 if the respondent does not consume tobacco every day. According to the literature, this measure correlates with nicotine levels in the body and can be used as a proxy for behaviors such as heavy, continuous, and automatic smoking (Baker et al., 2007; Toll et al., 2007).

The third Addiction proxy 2 (intensity of tobacco consumption), a measure of the intensity of tobacco consumption. It is constructed on the basis of the number of cigarettes and smokeless tobacco consumed per day or the frequency of tobacco consumption to consider addiction as a continuum rather than as a discrete threshold, which is the approach used by clinical scales. As a result of using this measure, tobacco consumers will be able to answer accurately, and health promotion literature uses it to help smokers determine whether or not their tobacco consumption impacts their health. (Rantis et al., 2022).

The most common proxies for measuring tobacco dependence are measures (Addiction proxy 1 and Addiction proxy 2), but it is unclear whether they are appropriate for population-based samples because they are designed for clinical diagnosis. Because the prevalence of clinical addiction is typically low in a population sample, this discrimination can be problematic. A high degree of variability is evident across the population-based sample for these addiction proxy variables, which can be used to measure the impact of addicted behaviors on happiness.

2.2.3. *Other control variables*

In accordance with the literature on subjective wellbeing, we also control for the following factors that may affect respondents' reported happiness: gender, age, educational status, marital status, employment status, income, religion, quartile of economic wellbeing, residential area, type of occupation, respondent owns a house, respondent has a child. (Churchill & Mishra, 2017; Diener & Oishi, 2000; Helliwell et al., 2016; Tay et al., 2014). As pointed out by Geiger and MacKerron (2016), we also include dummy variables to capture alcohol consumption, which is complementary to tobacco and tends to make consumers happy for a short period of time.

2.1. Methodology

2.1.1. *Econometric specification*

In order to estimate the effect of tobacco consumption status and behaviors on subjective wellbeing, we use an econometric specification that was developed by Churchill and Mishra (2017); Diener and Oishi (2000); Helliwell et al. (2016) and Tay et al. (2014).

$$HI_i = \alpha + \gamma_m T_{m,i} + \beta_n X_{n,i} + \epsilon_i$$

Where HI is the dependent variable corresponding to the Happiness Index of individual i. $T_{m,i}$ is a set of variables of

interest including tobacco consumption status and tobacco addiction (frequency and consumption intensity). $X_{n,i}$ represents a set of control variables such as socioeconomic and demographic characteristics. Finally,ϵ_i is an error term that measures all of the other factors that can influence the happiness index but are not mentioned in the preceding model.

2.3.2. *Estimation technique*

In line with previous studies, we will use as baseline an ordinary least squares (OLS) estimation technique to regress equation (A2) above because Happiness index is a continuous dependent variable. However, tobacco consumption and addiction behaviors are mainly endogenous and may bias the estimation results. Therefore, we apply a two-stage least squares (2SLS) estimation technique, as proposed by Lewbel (2012).

IV approach is employed, similar to the conventional two-stage least squares (2SLS) method since external instruments are either unavailable or weak in this case, internal instruments are used. In Lewbel's approach, the residual of the auxiliary equations is multiplied by the exogenous variable (X_i) containing the mean center form ($\bar{X}$) to construct an internal instrument (Baum et al., 1970; Lewbel, 2012).

3. Results and Discussion

3.1. Descriptive statistics

The descriptive statistics contained in Appendix B illustrate a strong variation of some explanatory variables Here, it is clear that on average, the mean of happiness index is 1.916. Among the same sample, on average 16.5% reported using tobacco. Nonetheless, 2.645 of these tobacco consumers frequently (i.e. every day) consume tobacco products. Among these tobacco consumers, on average 32.4% consume more than a unit per day. The mean age of respondent is 29 years old showing that the sample is mainly made up of youths.

Also, more than half the sample on average is employed (54.1%) while only averagely 36.3% of them own a house. This can be probably because their income does not allow them to save and invest but only permit them to run the day-to-day activities of the household. 53.8% of the sample is married on average, while 9.8% are divorce. However, 30.7% of respondents have at least attended primary school, 47.3% a secondary school level and only 7.6% have attended university.

Finally, 72.9% of the respondents on average are Christians while only 20.6% are Muslims. Among the surveyed population, 63.8% reported drinking alcohol, 17.4% reported to be poor, 20.6% to neither be poor nor rich, 24.5% reported to be rich and 25.4% to be highly rich. 57.3% of the average sample live in urban areas and 32.9% of the sample are male.

After studying the characteristics of variables, it is now important to establish the relationship that exits between variables.

This is done by comparing happiness index between tobacco consumers and non-consumers in overall, but also according to sex and residential status as seen in Table 1.

Table 1. The mean comparison test of tobacco consumers

Sample group	Tobacco Non Consumer (1)		Tobacco Consumer (2)		Difference in mean (1) - (2)	t-statistic
	Obs	Mean	Obs	Mean		
Overall	12,284	1.909612	2,428	1.94974	- 0.0401279	- 10.6484***
Men	3,128	1.9113	1,723	1.9568	- 0.0454	- 9.1865***
Women	9,156	1.9090	705	1.9322	- 0.0232	- 3.1319***
Urban	6,891	1.9089	1,543	1.9420	- 0.03301	- 6.6359***
Rural	5,393	1.9104	885	1.9632	- 0.0528	- 9.4491***

*Source: Author using MICS (2014) dataset,*** p<0.01, ** p<0.05, * p<0.1

The t-statistics are negative and significant at 1% for the overall sample. Therefore, the null hypothesis is rejected and we conclude that consumers of tobacco are statistically and significantly happier than non-consumers. The main explanation for this result is that tobacco help to relief from stress as explained by Slopen et al. (2012). The results remain consistent in the subsamples of men, women, urban and rural areas.

3.2. Effects of tobacco consumption and addiction on happiness

The results for the association between tobacco consumption and happiness are shown in Table 2. Columns 1–3 show the ordinary least squares (OLS) results, whereas columns 4–6 show the two stage least squares (2SLS) results for the effect of tobacco consumption on Happiness. Explicitly, the coefficient on the tobacco consumption binary is -0.0122 and -6.188 units in columns 1 and 4, respectively. In this study, a standard deviation increase in tobacco consumption is associated with a decrease in happiness of 0.0037 and 0.907 standard deviations before and after endogeneity correction, respectively. This result corroborates with that of Churchill and Farrell (2017) in the context of England.

Table 2. Happiness effects of tobacco addiction (OLS and Lewbel 2SLS regressions)

Variables	OLS			Lewbel 2SLS		
	(1)	(2)	(3)	(4)	(5)	(6)
Tobacco_binary	-0.0122***			-6.188***		
	(0.00373)			(0.907)		
Tobacco_frequency		-0.00305***			-2.233***	
		(0.00106)			(0.392)	
Tobacco_volume			4.82e-06			-1.540**
			(0.000522)			(0.631)

Age	0.0363***	0.0363***	0.0363***	0.0229*	-0.000481	-0.00255
	(0.000850)	(0.000851)	(0.000851)	(0.0118)	(0.0162)	(0.0261)
Age2	-0.000421***	-0.000420***	-0.000422***	7.87e-05	0.000722**	0.000632
	(1.21e-05)	(1.21e-05)	(1.21e-05)	(0.000181)	(0.000291)	(0.000522)
Employed	0.0250***	0.0242***	0.0241***	0.479***	0.0729	-0.0805
	(0.00307)	(0.00306)	(0.00306)	(0.0787)	(0.0539)	(0.0860)
House owner	-0.00391	-0.00394	-0.00354	-0.190*	-0.297**	-0.192
	(0.00711)	(0.00711)	(0.00711)	(0.101)	(0.134)	(0.190)
Has atleast a child	-0.0331***	-0.0332***	-0.0334***	0.126**	0.0821	0.256
	(0.00435)	(0.00435)	(0.00435)	(0.0639)	(0.0783)	(0.159)
Married	0.0249***	0.0249***	0.0249***	0.0186	0.0621	0.0169
	(0.00429)	(0.00429)	(0.00429)	(0.0588)	(0.0750)	(0.105)
Divorced	0.0161***	0.0157***	0.0154***	0.387***	0.272**	0.305*
	(0.00561)	(0.00561)	(0.00561)	(0.0942)	(0.107)	(0.181)
Primary	-0.00223	-0.00196	-0.00221	-0.00976	0.185**	0.213
	(0.00450)	(0.00450)	(0.00450)	(0.0616)	(0.0849)	(0.141)
Secondary	-0.00368	-0.00376	-0.00392	0.120*	0.116	0.0999
	(0.00494)	(0.00494)	(0.00494)	(0.0701)	(0.0886)	(0.128)
University	-0.0136*	-0.0139**	-0.0138**	0.0930	-0.0754	-0.188
	(0.00693)	(0.00693)	(0.00693)	(0.0963)	(0.121)	(0.183)
Christians	0.00393	0.00372	0.00379	0.0794	-0.0475	-0.147
	(0.00504)	(0.00504)	(0.00504)	(0.0699)	(0.0882)	(0.137)
Muslims	-0.00111	-0.00163	-0.00116	0.0253	-0.344***	-0.316
	(0.00604)	(0.00604)	(0.00604)	(0.0828)	(0.121)	(0.196)
Alcohol consump.	-0.0214***	-0.0215***	-0.0226***	0.591***	0.830***	0.246*
	(0.00329)	(0.00329)	(0.00327)	(0.101)	(0.160)	(0.136)
Poor	-0.0184***	-0.0186***	-0.0185***	0.0255	-0.0953	0.0509
	(0.00485)	(0.00485)	(0.00485)	(0.0668)	(0.0855)	(0.122)
Middle	-0.00713	-0.00777	-0.00707	-0.0331	-0.513***	-0.184
	(0.00503)	(0.00504)	(0.00503)	(0.0690)	(0.125)	(0.142)
Rich	-0.00426	-0.00533	-0.00428	0.00480	-0.774***	-0.242
	(0.00561)	(0.00563)	(0.00562)	(0.0769)	(0.167)	(0.168)
Highly rich	0.00640	0.00504	0.00602	0.200**	-0.707***	-0.325
	(0.00612)	(0.00613)	(0.00612)	(0.0885)	(0.164)	(0.201)
Sex	0.00832	0.00769	0.00506	1.656***	1.926***	1.532**
	(0.00741)	(0.00740)	(0.00736)	(0.262)	(0.360)	(0.651)
Rural area	-0.00145	-0.00180	-0.00170	0.124**	-0.0731	-0.0137
	(0.00365)	(0.00365)	(0.00365)	(0.0533)	(0.0647)	(0.0890)
Constant	1.272***	1.281***	1.274***	0.703***	6.462***	1.373***
	(0.0136)	(0.0138)	(0.0136)	(0.204)	(0.941)	(0.334)

Observations	14,712	14,712	14,712	14,712	14,712	14,712
R-squared	0.337	0.337	0.337	-	-	-
Ajusted R-squared	0.3363	0.3362	0.3358	-	-	-
F-test	373.76	373.58	372.95	4.31	2.85	0.93
Prob > F	0.000	0.000	0.000	0.000	0.000	0.5541
Akaike crit. (AIC)	-13939.49	-13937.09	-13928.75	63099.36	70148.15	80041.66
Bayasian Crit, (BIC)	-13779.96	-13777.57	-13769.23	63258.88	70307.67	80201.18

*Notes: standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1*

Source: Author using MICS (2014) dataset.

The findings also indicate that increased tobacco use (addiction proxy 1) is associated with lower levels of happiness. A standard deviation increase in tobacco consumption frequency is associated with a decrease in happiness of 0.392 and 0.00106 before and after endogeneity correction, respectively. Thus, the more tobacco an individual consumes on a daily basis, the lower the individual's level of happiness, which is the same result discovered in the context of England by Churchill and Farrell (2017).

Finally, we find out that the intensity of tobacco consumption (addiction proxy 2) is linked with lower levels of happiness. The findings suggest that the more tobacco respondents consume per day, the less happy and satisfied they are. According to the coefficients, a standard deviation increase in smoking intensity is associated with a 0.631 standard deviation decrease in happiness. These findings are consistent with those of Adan and Sánchez-Turet (2000), Dawkins et al. (2007), Shahab and West (2012) and Barros et al. (2015), who found that tobacco consumption reduces consumer happiness, but contradict those of Chang et al. (2016), who discovered that tobacco consumption improves consumer happiness.

Happiness has an inverted U-shape relationship with age, according to other control variables. This be perceived by the positive relationship in happiness regressions and a negative relationship in age squared regressions and this is in line with the existing works (see for example: Easterlin (2006). Employment makes people happy for the OLS result and after correction of endogeneity problem, only consumers but not addicted are happy. Having at least a child reduces the happiness level of individuals even though after resolving the problem of endogeneity, it is significant only for tobacco binary. Being married and divorced with respect to single individuals tend to show high levels of happiness. Alcohol consumption on its part makes consumer to be unhappy in the OLS results while for 2SLS, those who consume only, those who consume every day and those who consume intensively feel happy.

The findings reveal that individuals with the university level of education are less happy compared to their counterparts with no level of education for OLS results. Male sex compared to female are happier after correction of endogeneity problem. Minimum acceptable income levels are associated with higher levels of happiness. In the OLS results, poor people also have the tendency to have lower levels of happiness.

Overall, when we compare the OLS results to the 2SLS results, we find that the OLS results understate the effects of smoking status and addiction on happiness across all columns. The emerging conclusion of a negative effect of smoking behavior, however, remains valid. All the authors who worked on this topic did not take into consideration the sex and residential milieu of tobacco consumers.

3.3.3. Sensitivity analysis

Table 3 shows findings results for the relationship between tobacco consumption and happiness (results by sex). Columns 1 to 3 present the 2SLS for Males while columns 4 to 6 the 2SLS results for female. The results suggest that male tobacco consumers show statistically higher level of happiness while females show lower levels of happiness than do non consumers. In particular, the coefficient on the tobacco consumption binary is 0.296 units and -2.629, respectively, implying 0.296 higher and 2.629 lower happiness levels for males and females who consume tobacco. Here, an increase in standard deviation of tobacco consumption is associated with an increase of 0.0501 and a decrease of 0.303 standards deviation in happiness respectively for males and females. Generally, men tend to use tobacco products at higher rates than women (Higgins et al., 2015). Male individuals feel happy due to the fact that they are mostly stress up with family problems, work tensions etc. and consume tobacco to relief from stress.

Table 3. Effects of tobacco consumption on happiness (Estimation by Sex)

Variables	Males			Females		
	(1)	(2)	(3)	(4)	(5)	(6)
Tobacco_binary	0.296***			-2.629***		
	(0.0501)			(0.303)		
Tobacco_frequency		-0.0279**			-1.107***	
		(0.0121)			(0.211)	
Tobacco_volume			0.184***			-0.138***
			(0.0700)			(0.0353)
Age	0.0273***	0.0325***	0.0110	0.0420***	0.0408***	0.0433***
	(0.00194)	(0.00148)	(0.0105)	(0.00322)	(0.00820)	(0.00145)
Age2	-0.000325***	-0.000359***	-0.00019*	-0.000489***	-0.000363***	-0.000528***
	(2.41e-05)	(1.80e-05)	(0.000112)	(4.97e-05)	(0.000130)	(2.23e-05)
Employed	-0.00787	0.0238***	0.0772**	0.0264***	0.0377*	0.0236***
	(0.00970)	(0.00641)	(0.0391)	(0.00866)	(0.0222)	(0.00392)
House owner	-	-	-	-0.00885	0.00434	0.0117
				(0.0175)	(0.0444)	(0.00839)
Has at least a child	-0.0289**	-0.00764	-0.0840	-0.0591***	-0.0783**	-0.0424***
	(0.0116)	(0.00864)	(0.0518)	(0.0125)	(0.0323)	(0.00566)
Married	0.0433***	0.0157*	0.0818	0.0406***	0.0417	0.0143**
	(0.0119)	(0.00925)	(0.0499)	(0.0123)	(0.0312)	(0.00568)
Divorced	-0.00998	0.0384***	-0.0933	0.0318**	-0.0206	0.00721
	(0.0157)	(0.0122)	(0.0725)	(0.0160)	(0.0406)	(0.00711)

	(0.0137)	(0.0122)	(0.0723)	(0.0166)	(0.0406)	(0.00711)
Primary	-0.00833	0.0132	-0.0877	0.000667	0.0406	-0.0125**
	(0.0118)	(0.00887)	(0.0578)	(0.0128)	(0.0339)	(0.00590)
Secondary	-0.0106	0.00846	-0.0227	0.0195	0.0138	-0.0127*
	(0.0122)	(0.00904)	(0.0478)	(0.0149)	(0.0374)	(0.00659)
University	-0.00888	-0.00339	0.0686	0.0126	-0.0574	-0.0354***
	(0.0154)	(0.0117)	(0.0654)	(0.0218)	(0.0546)	(0.00987)
Christians	-0.00310	-0.00270	0.0560	0.0349**	0.0148	0.00967
	(0.0112)	(0.00847)	(0.0489)	(0.0153)	(0.0382)	(0.00679)
Muslims	-0.0165	-0.00963	0.0892	0.0252	-0.149***	0.00652
	(0.0139)	(0.0104)	(0.0656)	(0.0180)	(0.0539)	(0.00806)
Alcohol consump.	-0.112***	-0.000953	-0.141***	0.0174*	0.170***	-0.0161***
	(0.0162)	(0.0140)	(0.0537)	(0.0101)	(0.0431)	(0.00425)
Poor	-0.0456***	-0.0329***	-0.0509	-0.0170	-0.0163	-0.0131**
	(0.0115)	(0.00858)	(0.0444)	(0.0143)	(0.0364)	(0.00642)
Middle	-0.0246**	-0.0389***	0.0387	0.00998	-0.139***	0.00226
	(0.0113)	(0.0102)	(0.0505)	(0.0150)	(0.0468)	(0.00675)
Rich	-0.00622	-0.0416***	0.0732	-0.00120	-0.194***	0.00227
	(0.0126)	(0.0131)	(0.0602)	(0.0169)	(0.0572)	(0.00760)
Highly rich	0.00316	-0.0263*	0.140*	0.00145	-0.157***	0.0140*
	(0.0135)	(0.0135)	(0.0766)	(0.0185)	(0.0569)	(0.00832)
Rural area	-0.0187**	-0.00226	-0.00302	0.00238	-0.0671**	-0.000876
	(0.00844)	(0.00610)	(0.0315)	(0.0109)	(0.0304)	(0.00490)
Constant	1.457***	1.409***	1.603***	1.154***	3.777***	1.179***
	(0.0343)	(0.0302)	(0.150)	(0.0468)	(0.508)	(0.0210)
Observations	4,851	4,851	4,851	9,861	9,861	9,861
F-test	79.75	137.35	5.47	50.22	8.58	229.19
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000
Akaike (AIC)	-2135.582	-4881.551	11095.77	8139.755	26586.18	-7604.88
Bayasian (BIC)	-2012.33	-4758.299	11219.03	8283.682	26730.1	-7460.953

*Notes: Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1*

Source: Author using MICS (2014) dataset

Afterward, according to the findings, increased frequency of tobacco consumption (addiction proxy 1) is associated with lower levels of happiness. A standard deviation increase in tobacco consumption frequency is associated with a decrease in happiness of 0.0179 and 0.211 for males and females, respectively. Thus, if an individual (males and females) consumes tobacco every day, the lesser the individual's happiness level which contradict the work of Chang et al. (2016) and join that of Barros et al. (2015).

Results equally depicts that smoking intensity (Addiction proxy 2) is associated with higher levels of happiness in men and lower levels of happiness in women. The findings suggest that the more tobacco consumed per day, the happier and satisfied males are, while females are less happy. Relying on the coefficients, a standard deviation increase in smoking intensity is associated with a 0.0353 standard deviation decrease in happiness for females, while an increase in standard deviation of 0.0700 is observed for males. This is because male gender consumption increases with time through a process of accumulation of stock as stated in the theory of rational addiction developed by (Chaloupka, 1991). Other control variables reveal strong correlation with happiness as revealed by the theory.

Table 4. Effects of tobacco consumption on happiness (Estimation by residential milieu)

Variables	Rural Area			Urban Area		
	(1)	(2)	(3)	(4)	(5)	(6)
Tobacco_binary	-9.447***			-2.978***		
	(2.886)			(0.376)		
Tobacco_frequency		-2.530***			-0.793***	
		(0.825)			(0.0947)	
Tobacco_volume			-0.172***			-0.0252***
			(0.0297)			(0.00382)
Age	-0.00573	-0.0170	0.0347***	0.0327***	0.0234***	0.0346***
	(0.0273)	(0.0319)	(0.00378)	(0.00812)	(0.00695)	(0.00122)
Age2	0.000739	0.00102*	-0.000348***	-0.000259**	-2.02e-05	-0.000390***
	(0.000495)	(0.000606)	(5.54e-05)	(0.000117)	(0.000107)	(1.75e-05)
Employed	0.305**	0.134	-0.00294	0.333***	0.0270	0.0243***
	(0.125)	(0.106)	(0.0148)	(0.0481)	(0.0237)	(0.00423)
House owner	-0.534*	-0.449	-0.0188	-0.0415	-0.0947*	-0.0134
	(0.275)	(0.285)	(0.0347)	(0.0635)	(0.0540)	(0.00946)
Has at least a child	0.236	0.230	-0.0172	0.0441	0.00294	-0.0180***
	(0.159)	(0.173)	(0.0216)	(0.0399)	(0.0328)	(0.00588)
Married	0.137	0.307*	0.0667***	0.00507	-0.0162	0.0110*
	(0.138)	(0.172)	(0.0215)	(0.0379)	(0.0319)	(0.00566)
Divorced	0.807***	0.584**	0.108***	0.154***	0.0509	0.00683
	(0.294)	(0.263)	(0.0302)	(0.0534)	(0.0422)	(0.00747)
Primary	0.00559	0.143	0.00365	0.0166	0.0627	0.0116
	(0.107)	(0.128)	(0.0168)	(0.0546)	(0.0463)	(0.00823)
Secondary	0.149	0.0761	0.0164	0.0777	0.0383	0.00108
	(0.136)	(0.144)	(0.0203)	(0.0563)	(0.0467)	(0.00828)
University	-0.189	-0.317	-0.0344	0.0659	-0.0218	-0.0123
	(0.337)	(0.381)	(0.0525)	(0.0666)	(0.0552)	(0.00983)
Christians	0.159	-0.220	-0.0530**	0.0390	0.0474	0.0168**

	(0.144)	(0.164)	(0.0226)	(0.0509)	(0.0427)	(0.00759)
Muslims	0.0228	-0.872***	-0.0683**	0.0141	0.0165	0.00962
	(0.162)	(0.333)	(0.0272)	(0.0607)	(0.0508)	(0.00906)
Alcohol consump.	0.829***	0.925***	0.0295*	0.294***	0.275***	-0.0231***
	(0.276)	(0.326)	(0.0172)	(0.0505)	(0.0440)	(0.00456)
Poor	0.121	0.0302	-0.000756	0.00909	-0.434***	-0.0409**
	(0.109)	(0.112)	(0.0159)	(0.108)	(0.102)	(0.0161)
Middle	-0.0469	-0.573***	-0.0337*	0.106	-0.358***	-0.00144
	(0.112)	(0.221)	(0.0179)	(0.0935)	(0.0884)	(0.0138)
Rich	0.0158	-0.849***	-0.0395	0.103	-0.470***	-0.00573
	(0.153)	(0.323)	(0.0246)	(0.0917)	(0.0941)	(0.0135)
Highly rich	0.172	-0.452	-0.0187	0.197**	-0.444***	0.00362
	(0.307)	(0.368)	(0.0478)	(0.0945)	(0.0936)	(0.0136)
Sex	3.116***	2.630***	0.239***	0.681***	0.602***	0.0264***
	(0.979)	(0.894)	(0.0546)	(0.107)	(0.0896)	(0.0101)
Constant	0.673	7.163***	1.238***	0.899***	3.278***	1.274***
	(0.414)	(1.967)	(0.0584)	(0.165)	(0.274)	(0.0236)
Observations	6,278	6,278	6,278	8,434	8,434	8,434
F-test	1.06	0.90	21.91	7.67	9.92	198.62
Prob > F	0.3910	0.5861	0.000	0.000	0.000	0.000
Akaike (AIC)	31102.98	32352.22	7816.739	24860.44	21866.05	-7225.866
Bayasian (BIC)	31237.88	32487.12	7951.635	25001.24	22006.85	-7085.065

*Notes: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

Source: Author using MICS (2014) dataset

Table 4 shows the findings for the relationship between our measures of tobacco consumption and happiness in the home. Columns 1–3 and 4–6 show the effects of tobacco consumption on Happiness (as measured by the index of subjective wellbeing) in rural and urban areas, respectively. According to the findings, tobacco users in both rural and urban areas are statistically less happy than non-users. In particular, the coefficient on the tobacco consumption binary is -9.447 units in column 1 and -2.978 in column 4, implying 9.447 and 2.978 lower happiness levels for a tobacco consumer in rural and urban areas, respectively. A standard deviation increase in tobacco consumption is associated with a decrease in happiness of 2.886 and 0.376 standard deviations in rural and urban areas, respectively. This clearly shows that the unhappiness of tobacco users is more pronounced in cities than in rural areas. It could be because, as Mathiews et al. (2017) explain, tobacco consumers in rural areas are unaware.

The findings also indicate that increased tobacco consumption (addiction proxy 1) is associated with lower levels of happiness in both rural and urban areas. A standard deviation increase in tobacco consumption frequency is associated

with a decrease in happiness of 0.825 and 0.0947 for rural and urban areas, respectively. Thus, smoking every day reduces happiness in both rural and urban areas, with the reduction being greater in urban areas than in rural areas.

Finally, higher levels of tobacco consumption intensity (Addiction proxy 2) are linked to lower levels of happiness. According to the standard coefficients, a standard deviation increase in smoking intensity is associated with a decrease in happiness of 0.0297 and 0.00382 standard deviations in rural and urban areas, respectively. Tobacco users' dissatisfaction is more pronounced in cities. This could be because tobacco users in cities have access to all of the amenities that will help remind them of the harmful effects of tobacco. These findings are consistent with those of Shahab and West (2012) and Barros et al. (2015), but differ because these studies did not account for residential area disparities.

4. Conclusion

The primary goal of this paper was to investigate the effects of tobacco use and addiction on happiness in Cameroon. Our findings clearly show that tobacco consumption has a negative impact on consumer happiness. One possible explanation is that regular nicotine doses cause changes in the brain, which then cause nicotine withdrawal symptoms when the supply of nicotine decreases. An analysis of this relationship continues to be a substantial topic for governments and policymakers seeking to implement smoking bans, tobacco tariffs, and other barriers to reduce tobacco consumption. Tobacco consumption clearly has negative health and physical effects; however, aside from the struggle of quitting (due to addiction), the question of why people continue to consume despite the adverse health consequences remains. According to the literature, there is a possible link between tobacco consumption and happiness (Chang et al., 2016; Moore, 2009). That is, the mental health benefits may outweigh the physical health costs, causing people to rationally choose tobacco use. We investigated the effect of tobacco consumption and tobacco addiction (considering both the frequency and intensity of tobacco consumption) on subjective happiness using measures of subjective wellbeing (Happiness index). Tobacco use and addiction are linked to lower levels of happiness, according to our findings.

In a nutshell, the study's findings indicate that the relationship between tobacco consumption and subjective benefit is inversely related. This negative effect is amplified by gender and residential environment. This implies that smoking has both physical and mental consequences. As a result, including the mental health costs that tobacco causes to consumers may benefit quit strategies. Our findings are limited in that we did not consider the pathways from tobacco consumption to improved mental health. In this case, the data simply isn't robust enough to answer the question. Nonetheless, our findings provide statistical support for the negative relationship between tobacco addiction and subjective well-being in general.

Footnotes

[1] The COPA criterion checks whether the structure of a given item's coordinates on the first axis respects the order of its terms and conditions. Other second-order properties concern discrimination measures or even first-axis spreading. These criteria were satisfactory in the analyses, but for the sake of synthesis, they are not discussed here.

Appendix

Appendix A: Composite index of Subjective wellbeing

The vast majority of studies conducted in criminology, sociology and even a strong recent economic literature are interested in assessing the subjective wellbeing of consumers of addictive substances, and so several measurement approaches are considered as pointed out by Chmiel et al. (2012). Nevertheless, the consensus that emerges from this diversity of approaches is that subjective wellbeing is a multilevel and multidimensional concept based on the ecological and systemic (multilevel), hedonic (satisfaction of needs), eudemonic (life fulfilment) and wellness/Quality of Life perspective (health and functioning) (Arcidiacono & Di Martino, 2016). It is therefore essential to construct a composite index capable of synthesizing information. The construction of a Composite Index of Subjective Wellbeing (CISWB) uses factor analysis techniques. However, the choice of technique is based on the scale of measurement of the items or variables. Indeed, 13 items organized around 05 dimensions were selected to assess Subjective Wellbeing as developed in the work of Diener et al. (1985): overall wellbeing (04 items), occupational wellbeing (01 item), Economic Well-being (01 item), physical wellbeing (02 items), community wellbeing (02 items), Interpersonal Well-being (03 items). The selected items are described in table A.

Table A. Descriptive statistics, result of the MCA and verification of the COPA principle

Dimension of SWB/ modalities	**Observations**		**MCA**	
	N	**%**	**(A)**	**(B)**
A. **Overall wellbeing**				
General estimation of happiness				
1. highly unhappy	250	1.70	4.600	0.028
2. Neither happy nor unhappy	833	5.66	3.177	0.044
3. highly happy	13629	92.64	-0.279	0.006
Satisfaction with your life in general				
1. highly unsatisfied	369	2.22	4.532	0.040
2. Neither satisfied nor unsatisfied	788	5.36	3.266	0.044
3. highly satisfied	13555	92.14	-0.313	0.007
Comparison of the level of satisfaction with the standard of living compared to last year				
1. worsened	426	2.90	3.847	0.033
2. more or less the same	1789	12.16	2.071	0.040
3. improved				

3. improved	12497	84.94	-0.428	0.012
In 1year your level of satisfaction with the standard of living will be				
1. worsened	8964	60.93	-0.938	0.041
2. more or less the same	305	2.07	2.932	0.014
3. improved	5443	37.00	1.381	0.054
A. **Occupational Wellbeing**				
Level of satisfaction with job	174	1.18	4.959	0.022
1. highly unsatisfied	4357	29.62	1.570	0.056
2. Neither satisfied nor unsatisfied	10181	69.20	-0.757	0.030
3. highly satisfied				
A. **Economic Wellbeing**				
level of satisfaction with current income	408	2.77	3.664	0.029
1. highly unsatisfied	3599	24.46	1.641	0.051
2. Neither satisfied nor unsatisfied	10705	72.76	-0.691	0.027
3. highly satisfied				
A. **Physical Well-being**				
Level of satisfaction with health	425	2.89	3.675	0.030
1. highly unsatisfied	432	2.94	2.909	0.019
2. Neither satisfied nor unsatisfied	13855	94.17	-0.203	0.003
3. highly satisfied				
Level of satisfaction with Physical appearance	232	1.54	4.290	0.022
1. highly unsatisfied	337	2.29	3.239	0.018
2. Neither satisfied nor unsatisfied	14143	96.13	-0.148	0.002
3. highly satisfied				
A. **Community Wellbeing**				
Level of satisfaction with the area you live	652	4.43	3.733	0.048

1. highly unsatisfied	740	5.03	2.831	0.031
2. Neither satisfied nor unsatisfied				
3. highly satisfied	13320	90;54	-0.340	0.008
Level of satisfaction with school				
1. highly unsatisfied	487	3.31	3.939	0.040
2. Neither satisfied nor unsatisfied				
3. highly satisfied	870	5.91	2.739	0.034
	13355	90.78	-0.322	0.007
A. **Interpersonal Well-being**				
Level of satisfaction with family life				
1. highly unsatisfied	329	2.24	4.385	0.033
2. Neither satisfied nor unsatisfied	653	4.44	3.367	0.039
3. highly satisfied	13730	93.33	-0.265	0.005
Level of satisfaction with friends				
1. highly unsatisfied	514	4.49	3.355	0.030
2. Neither satisfied nor unsatisfied	814	5.53	2.508	0.027
3. highly satisfied	13384	90.97	-0.281	0.006
Level of satisfaction with the way people around treat you				
1. highly unsatisfied	339	2.30	2.685	0.013
2. Neither satisfied nor unsatisfied				
3. highly satisfied	322	2.19	2.168	0.008
	14051	95.51	-0.114	0.001

Source: Author using MICS (2014) dataset Notes: The modality « *No idea* » was recodified « *and remains unchanged* ». ***N***=Number; **%**=Percentage. Colomn **(A)** gives the coordinates of the first factorial axis. The contribution to the explanation of inertia is given in column **(B)**.

The discrete nature of the variables leads to the use of multiple correspondence analysis (MCA) as a factor analysis technique. The construction of the HI was carried out at the individual level. As a first step, a preliminary MCA is conducted to visualize the multidimensional aspects of subjective wellbeing. The graph projection of the modalities of the items in the first quadrant (A) of graph 1 puts in the importance of the first factorial axis is obvious. This axis alone explains more than half of the total inertia (82.7%). The contribution of the second axis is only 10.8%. In addition, the

distribution of item modalities on the X-axis (first factorial axis) order the individuals are satisfied with their happiness state (high values) to those who unsatisfied (low values).

In addition, it is important to analyze the contact information for the modalities of the items on the first factorial axis, as well as their contributions to the explanation of inertia. This information is indispensable for selecting the variables used to construct the CIH according to the criterion of Ordinal Consistency on the First Axis (COPA)[1] factorial. This property is a necessary condition to ensure that HI will effectively order all individuals in the sample based on their level of happiness.

At the end of the first MCA, the Happiness score is calculated for each individual using the average of the item values weighted by their factor contribution on the first axis. The mean score is 1.95e-09 and its values range from -5.893022 to 0.6103254. However, in order to further refine the normality of the score distribution, but also to ensure that the final Happiness Index takes only positive values, the logarithmic transformation [(-)+1] is applied to the estimated scores, where designates the minimum score. At the end, an average HI of 1.916 with values between 0 and 2.015 is obtained. High HI values reflect an increasing sense of security on the part of individuals.

Appendix B: An overview of statistics and a description

Variable	Detailed descriptions	The mean	S.D.
HI	Continuous variable constructed based on all components of subjective wellbeing (Evaluation, Experience and Eudemonic)	1.916	0.185
Tobacco binary	If respondent consumes tobacco, dummy variable equals 1	0.165	0.371
Tobacco frequency Addiction proxy 1	The question is represented by a three-point addiction scale; what is your frequency of tobacco consumption (smoke and smokeless)? 3 if respondent consume tobacco every day, 2 if respondent consume tobacco less than once a day and 1 if respondent does not consume every day, 0 if respondent does not consume	2.645	1.288
Tobacco volume Addiction proxy 2	Quantity of tobacco consumed per day (smoked and smokeless tobacco)	0.324	2.443
Age	The respondent's age	29.285	10.334
Age2	A square measure of age	964.375	678.469
Employed	Respondents who are employed have a dummy variable equal to 1	0.541	0.498
House owner	The dummy variable is equal to 1 if the respondent owns a home	0.363	0.481
Has at least a child	The dummy variable is equal to 1 if respondent has at least a child	0.667	0.471
Married	The dummy variable is equal to 1 if respondent is married	0.539	0.499
Divorced	The dummy variable is equal to 1 if respondent is single	0.098	0.297
Primary	The dummy variable is equal to 1 if respondent has a primary education level	0.307	0.461
Secondary	The dummy variable is equal to 1 if respondent has a secondary education level	0.473	0.499
University	The dummy variable is equal to 1 if respondent has a university education level	0.076	0.265
Christians	The dummy variable is equal to 1 if respondent is a Christian	0.729	0.444
Muslims	The dummy variable is equal to 1 if respondent is a Muslim	0.201	0.401
Alcohol consumption	The dummy variable is equal to 1 if respondent drinks alcohol	0.638	0.481
Poor	The dummy variable is equal to 1 if respondent is poor	0.174	0.379
Neither poor nor rich	The dummy variable is equal to 1 if respondent is neither poor nor rich	0.206	0.404
Rich	The dummy variable is equal to 1 if respondent is rich	0.245	0.430
Highly rich	The dummy variable is equal to 1 if respondent is highly rich	0.254	0.436
Male	The dummy variable is equal to 1 if respondent is male	0.330	0.470
Rural area	The dummy variable is equal to 1 if respondent is lives in rural areas	0.573	0.495

Source: Author using MICS (2014) dataset

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