Socio-Economic impact of 'non-economic' factors on smoking behaviour in urban areas

A study with special reference to Bengaluru urban district

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***Abstract*: The purpose of this study is to identify the factors other than prices (economic factor) which influence the decision of a current smoker to continue smoking. The government has launched several schemes in order to reduce smoking amongst the public for the very obvious reason that smoking is injurious to health and can cause serious respiratory disorders, including lung cancer. Increase in Prices of the cigarettes through increasing the excise duty on cigarettes is a very common tool to reduce smoking by making it economically inaccessible to the masses. This study is focussed on the urban areas and tries to determine if prices effect the decision to smoke. It further tries to identify the non-economic factors that influence the smoking behaviour of the people. Finally, through this study, the relationship between the effect of price and the non-economic factors are observed to determine if the effect of price is still relevant once the non-economic factors come into play. The analysis is based purely on primary data collected from the current smokers in urban areas in Bengaluru. Although smoking includes different types of tobacco products, this study focuses only on cigarette smoking. The data has been analyzed using MS Excel and SPSS using 'Dummy Variable Regression Models'. The results show that though the consumption is affected initially because of price, but when the non –economic factors are taken into consideration, the effect of price is not significant anymore.**

Index terms - cigarettes, price, consumption, smoking behaviour

I. INTRODUCTION

"*Smoking is injurious to health*" is something we are all very familiar with and the Government of any country tries its best to make that a general knowledge among the public. Tobacco is carcinogenic in nature and causes premature deaths. India alone accounts for one-sixth of the total tobacco-related deaths in the world. The pattern of tobacco consumption is also unique in India. Tobacco is consumed in different forms in India including cigarettes, bidis, cigars or pipes for smoking, paan, gutka etc for chewing and others. Consuming tobacco is spread through different age groups, regions and genders in India.

1.1. Theoretical Background

The law of demand states that a rise in the price of a product will automatically lead to a decrease in its consumption i.e. a rise in the price of a good leads to a loss a loss in its demand. While this is true in case of normal goods, there are a few exceptions. Giffen goods, luxury goods are commonly known to be an exception to the law. Cigarettes, bidis and other tobacco-containing products, do not fall under either of the categories i.e Giffen goods or luxury goods. On the other hand, they are not completely ruled out as a Normal good either. This is because they are responsive to price changes similar to a Normal good, but the proportion of change in demand as a result of a change in the price of the cigarettes is very low.

Cigarettes and other tobacco containing products are termed as habit goods/ addictive goods which mean that the general law of diminishing marginal utility does not apply in case of these products. On the contrary, the utility of such products increases with the consumption of an additional unit: both in the short-run as well as in the long run. In the long-run, people who smoke on a regular basis tend to get addicted to it and find it difficult to quit.

1.2. Smoking and Taxation

The efficiency of taxation on tobacco products as a tool to reduce smoking behavior has been studied across various countries over a few decades. The results so far remain conflicting in the existing literature. While some agree that the taxes are indeed proving to be the most significant instrument to reduce consumption of tobacco products, there are quite a few who disagree in this context. Others find that there is not enough evidence to prove either of the outcomes. This means that while it cannot be concluded weather tobacco taxes can be effectively used as a measure to control consumption of tobacco products, there is not enough evidence to conclude otherwise as well.

1.3. Research Gap

The literature deals with the relationship between tax rates and the cigarettes consumption but does not take say much how this relationship changes once the other factors come into play. Also, the literature is scarce in terms of examining the non-economic factors as causes of smoking behavior especially in the context of India. In this study, I intend to fill these gaps using primary data analysis and econometric tools.

II. REVIEW OF LITERATURE

The relationship between tobacco taxes and tobacco consumption does not exist in a vacuum and is strongly affected by other factors or subgroups. The existing literature takes these subgroups into consideration like age, gender, time period, etc.

2.1. Demographic Factors

The existing literature suggests that that there the policies intended towards curbing smoking are more effective in case of males than females (Borren & Sutton, 1992; Rice, Godfrey, & Slack, 2009). In a study conducted in India, it was found that the age-standardized prevalence of smoking in men aged 15-69 years reduced from 27% in 1998 to 24% in 2015, but increased for ages 15-29. The smoking prevalence amongst women has remained almost constant (Mishra et al., 2016). Marti, 2011b estimated that even though females take the issue of mortality seriously, they underestimate the addictive capacity of cigarettes. Chaloupka found that gender was insignificant in determining the effect of taxation on the current smokers. However, he did find that gender did have a moderating effect on the non-smokers. Age of the smoker is one of the major factors which greatly modify the strength of the relationship between the two factors, namely taxes and consumption. Most of the literature agrees to the fact that a change in tax rate on cigarettes affects the younger population more than the older adults (Chaloupka et al., 2012; Marti, 2011b).

2.2. Awareness and Education

Awareness about the ill effects of smoking on one's own health as well as on others' is found to have a strong impact on an individual's decision to start smoking as well as their decision to quit. Some researchers have found that education is an important determinant of smoking prevalence (Giskes et al.,; Huisman et al, 2005).Borren & Sutton, (1992) found that awareness programmes have been most effective in reducing smoking for the 'high social classes'. Marti, (2011), found that smokers who had noticed warning labels are more aware of the risks of smoking. On the other hand, Robinson et al. (1997) have found that warning labels do not necessarily decrease the possibility that young individuals will be less prone to start smoking as they hardly take any notice of them. In fact, the prevalence of smoking amongst the educated people is equally high. Advertising ban for tobacco containing products and smoking ban in public places have been used as cautionary measures to contain the consumption of these products. Hamilton (1992) concluded from his study that "the net effect of the advertising ban will be to increase the per capita consumption of cigarettes".

2.3. Income

Income of the consumer has a strong influence on the smoking behavior of the consumer. As the income of the consumer increases, his consumption of cigarettes is found to increase. This means that income elasticity of cigarettes in positive. Thus we can treat cigarettes as a normal good. On the other hand, Mushtaq.S, Mushtaq.N, & Beebe, 2011 in their study found income to have a negative influence on consumption. Some economists also found the income elasticity in their study to be insignificant which implies that income apparently has no impact on cigarette consumption (Baltagi, B., & Levin, 1986; Borren & Sutton, 1992; Bmj et al., 2017).

2.4. Market Failure

The market for cigarettes and other tobacco products is not perfect and market failure is a common occurrence. Joachim Marti classified the market failures of tobacco use into three main categories namely "external costs", "lack of information", and "limited rationality". Most of the costs of the negative externalities like environmental degradation, fires caused by smokers and other costs which include medical costs, losses due to sick leaves etc. are uncertain and can't be accurately estimated. But these costs are definitely high. However, the current tax rates are estimated to be more than the cost of these externalities (Viscusi, 1995).

III. RESEARCH OBJECTIVE

- To determine if the cigarette consumption of the consumers is affected by price.
- To determine the factors (non-economic) other than price which influence the smoking behavior of the consumers.
- To determine if the non-economic factors act as a moderator for price effect on the consumption of cigarettes

IV. RESEARCH METHODOLOGY

The analysis in based on Primary data collected from current smokers from the urban areas of Bengaluru. The sample size was 271 and consisted of 159 male respondents and 112 female respondents. The sample consisted of respondents between the age 13 to 60 or more. The method of sampling used was convenient sampling and snowball sampling. The data was collected using Questionnaire method. Principal Component analysis was conducted to determine the 'non-economic factors' for smoking using SPSS. OLS Regression was used to test the different hypothesis.

V. DATA ANALYSIS

The data analysis was carries out in three different parts as shown below. The first part shows the effect of Price, the second part is focussed on deriving the significant 'non-economic' factors, and the third part deals with determining the moderating effect of non-economic factors on the price effect.

5.1 Effect of Price on Consumption

Variables:

The total number of cigarette sticks smoked by a consumer per day was taken as the dependent variable. The 'Effect of Price' was taken as the independent variable to test the first objective and was dummy coded (Yes=1; No=0; Maybe=2) in Excel for regression analysis.

Hypothesis:

The following null hypothesis was designed for testing the objectives defined above.

Hypothesis $_{10}$: The effect of price on the number of cigarettes smoked by an individual per day is not significant.
Hypothesis $_{1A}$: The effect of price on the number of cigarettes smoked by an individual per day is significant.

Model:
Log-linear dummy regression model was used to test the hypothesis. The analysis was done using SPSS.

$$\ln Y=\beta_0+\beta_1 D+\mu_1 \dots (1)$$

Where Y = Number of cigarette sticks per day, β_0=Constant, D= Effect of Price, β_1 = Coefficient of Effect of Price, μ_0=Error term. The results obtained from the regression equation are shown in Table 5.11 below.

Table 5.11: Results from the regression equation 1

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	0.936	0.112		8.339	0.000
Effect of price	0.228	0.105	0.131	2.172	0.031
a. Dependent Variable: lg_sticks_per_day					

Interpretation:

It can be observed the effect of price is significant on the number of cigarette sticks smoked by the individual per day (p value= 0.031<0.05). We see that the coefficient "Effect of Price" is positive on the number of cigarette sticks smoked per day which means that the individuals are affected by the price of cigarettes. The coefficient of 'effect of price' being positive implies that individuals are affected by price as it increases or decreases. Thus the null hypothesis, in this case, is rejected.

5.2 Non – Economic Factors

The non-economic factors consist of psychological factors as well as demographic and socio-cultural factors which have been derived as follows.

5.21. Psychological Factors

The non-economic factors included psychological factors like 'Effect of Stress', 'Effect of Brand ', and 'Event of smoking'. Event of smoking consisted of four events when people prefer to smoke namely "While socializing", "With liquor", "Under peer pressure" and "and "Under stress". This was tested similarly to the previous model using linear log dummy regression model in SPSS to find the significance of each. The number of cigarettes smoked per day was used as a dependent variable in this case as well.

Hypothesis:

Hypothesis$_{20}$: The psychological factors do not affect the total number of cigarettes smoked by an individual per day significantly.
Hypothesis$_{2A}$: At least one of the psychological factors significantly affects the total number of cigarettes smoked by an individual.

Model:

A Log-linear dummy regression model was used to test the hypothesis. The analysis was done using SPSS.

$$\ln Y=\beta_0+\beta_1 D_1+ \beta_2 D_2+ \beta_3 D_3+\mu_0 \dots (2)$$

Where Y=Number of cigarette sticks per day, β_0=Constant, D_1=Effect of stress, β_1 = Coefficient of "Effect of stress", D_2=Effect of brand, β_2= Coefficient of "Effect of brand", D_3=Event of smoking, β_3 = Coefficient of "Event of Smoking", μ_0=Error term
The results obtained from the regression equation are shown in Table 5.21 below.

Table 5.21: Results from the regression equation 2

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.155	0.233		0.665	0.507
Effect of stress on no. of sticks	-0.139	0.118	-0.076	-1.183	0.238
Effect of brand on No. of sticks	0.113	0.123	0.054	0.918	0.360
Event of smoking	0.132	0.026	0.328	5.113	0.000
a. Dependent Variable: lg_sticks_per_day					

Interpretation:

Table 3.2 shows significance and coefficients of the dependent variables. We see that off the three dependent variables, "Event of smoking" is the only significant variable at 95% confidence interval (p value = 0.000<0.05). We see that event of smoking is positively affecting the number of sticks an individual smokes with a coefficient value of 0.132. For the purpose of simplification, only the significant factor, in this case, i.e. 'Event of smoking' was included in the non-economic factors for further analysis.

5.22. Non-Economic Factors Using Principal Component Analysis

Principle component analysis was conducted using 27 questions from the primary data which were not used for any analysis before. Five factors were generated which were tested for internal reliability using Cronbach's Alpha value in SPSS. Four out of the five factors were found reliable.

Table 5.22 shows the four factors namely "Professional Influence", "Household Influence", "Consumer characteristics", "Awareness". The table shows the items and the item loadings within each factor.

Table 5.22: Factors obtained from Principle Component Analysis

Name of the Factor	**Percentage of Variance Explained**	**Items**	**Loadings**
Professional Influence	25.051	Employment Status	.963
		Job Status	.944
		Work experience in yrs	.940
		Job Sector	.926
		Job Category	.875
		Annual Income in Rs	.805
		Mode of education	.690
		Currently a student	.679
Household Structure	15.259	Type of Family	.941
		Size of Family	.933
		Current Residence	.889
		Current living arrangement	.748
Consumer Characteristics	12.236	Age of starting smoking	.877
		Age Group	.853
		Marital Status	.617
		Having children of their own	.536
		Highest level of education	.877
Awareness	9.182	Do you know tax rates between cigarette and bidi differ?	.877
		Do you know tax rate affects price?	.853
		Awareness about impact on others health	.617
		Do you know the tax rates are different forcigarettes of different lengths?	.536

Hypothesis:

Hypothesis$_{30}$: "Profession", "Household", "Consumer Characteristics" and "Awareness" have no significant impact on the per day consumption of cigarettes by an individual per day.
Hypothesis$_{3A}$: At least one of the factors i.e. "Profession", "Household", "Consumer Characteristics" and "Awareness" have a significant impact on the per day consumption of cigarettes by an individual per day.
Model:

Again a log-linear regression model was used with the number of cigarettes smoked per day as the dependent variable and the factors obtained from principle component analysis as independent variables. The following model was constructed and tested using SPSS.

$$\ln Y=\beta_0+\beta_1X_1+\beta_2X_2+\beta_3X_3+\beta_4X_4+\mu_0 \ldots (3)$$

Where Y=Number of cigarette sticks per day, β_0=Constant, X_1=Professional influence, β_1 = Coefficient of Personal influence, X_2=Household Structure, β_2= Coefficient of Household Structure, X_3= Consumer Characteristics, β_3 = Coefficient of Consumer Characteristics, X_4= Awareness, B_4= Coefficient of Awareness, μ_0=Error term. The results obtained from the regression equation are shown in Table 5.23 below.

Table 5.23: Results from the regression equation 3

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-1.443	0.043		-33.391	0
Professional Influence	0.346	0.043	0.416	7.993	0
Consumer Characteristics	-0.231	0.043	-0.278	-5.343	0
Awareness	-0.131	0.043	-0.158	-3.036	0.003
Household Structure	-0.049	0.043	-0.059	-1.128	0.26
a. Dependent Variable: lg_sticks_per_day					

Interpretation:

It is clear from table 5.23 that all the factors i.e. "Professional Influence", "Consumer characteristics" and "Awareness" are significant with p values less than 0.05 in each case except "Household Influence" which was insignificant with p value =0.260 >0.05. Hence for the purpose of convenience, only the significant factors i.e. "Professional Influence", "Consumer characteristics" and "Awareness" were used in the final analysis. Hence the null hypothesis H_{30} is rejected since more than one non-economic factor affect the number of cigarettes an individual smokes per day.

Hence, finally four significant non-economic factors were derived stated as follows:

- Event of Smoking
- Professional Influence
- Consumer Characteristics
- Awareness

5.3 Moderating effect of non-economic factors on 'Effect of Price'

Variables:

The total number of cigarette sticks smoked by a consumer per day was taken as the dependent variable. The non economic factors obtained from part 5.2 were used as independent variables for the regression analysis.

Hypothesis:

The following null hypothesis was designed for testing the objectives defined above.

Hypothesis $_{40}$: The non –economic factors have no significant moderating effect on the effect of price which affects the number of cigarettes smoked per day by an individual.
Hypothesis $_{4A}$: The non –economic factors have a significant moderating effect on the effect of price which affects the number of cigarettes smoked per day by an individual.

Model:

Again a Log Linear Dummy Regression Model was used for testing the above hypothesis.

$$\ln Y=\beta_0+\beta_1 D_1+ \beta_2 D_2+ \beta_3 X_1+ \beta_4 X_2 + \beta_5 X_3 + \mu_0 \dots (4)$$

Where Y=Number of cigarette sticks per day, β_0=Constant, D_1=Effect of price β_1 = Coefficient of effect of price, D_2= Event of smoking, $B_{2=}$ Coefficient of Event of smoking, X_1=Professional Influence, B_3= Coefficient of Professional Influence, X_2= Consumer Characteristics, B_4 = Coefficient of Consumer Characteristics, X_3= Awareness, B_5= Coefficient of Awareness, μ_0=Error term. The results obtained from the regression equation are shown in Table 5.31 below.

Table 5.31: Results from the regression equation 4

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-0.936	0.127		-7.399	0.000
Professional Influence	0.292	0.044	0.352	6.667	0.000
Consumer Characteristics	-0.208	0.042	-0.25	-4.909	0.000
Awareness	-0.094	0.043	-0.113	-2.195	0.029
Event of Smoking	-0.065	0.015	-0.231	-4.302	0.000
Effect of Price	-0.038	0.057	-0.034	-0.668	0.505
a. Dependent Variable: lg_sticks_per_day					

Interpretation:

Table 5.31 shows the individual coefficients of each variable and their significance values at 95% confidence interval. It can be observed that all the other factors including the constant values remain significant as earlier but the "effect of price" becomes highly insignificant as a result of the other factors (p value =0.505>0.05). Thus the null hypothesis "The non –economic factors have no significant moderating effect on the effect of price which affects the number of cigarettes smoked per day by an individual" is rejected.

A stepwise regression analysis in which each factor was tested along with the "effect of price", revealed that all the variables i.e. "Professional Influence", "Consumer Characteristics", "Awareness" as well as "Professional Influence" individually rendered the "Effect of price" insignificant while themselves remaining significant. Since the "Effect of Price" is individually significant in isolation, therefore, it can be concluded that the 4 non economic factors act as **moderators** for the "Effect of Price" in the regression model.

5.32. The Goodness of Fit of the Model

Table 5.32 shows the 'Goodness of Fit' of the final regression model.

Table 5.32: Model fit of Regression equation 4

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.569[a]	0.324	0.311	0.69019	2.15
a. Predictors: (Constant), Effect of Price, Consumer Characteristics, Awareness, Professional Influence, Event of Smoking					
b. Dependent Variable: lg_sticks_per_day					

Interpretation:

The Adjusted R^2 from Table 5.32 is 0.311 which explains only 31.1% of the dependent variable. This implies there are other factors which also influence smoking behaviour that are not covered in this study.

VI. FINDINGS AND CONCLUSION

From this study, it can be concluded that that consumers of cigarettes are indeed affected by the price of the cigarettes. But this influence of price on quantity isn't very significantly large. On the other hand, the occasions under which a person smokes significantly affects the consumption of the smoker. Not only does this affect the consumption of the smoker, this effect is much larger than the effect of price. The descriptive suggest that the majority of the consumers prefer to smoke while socializing, followed by smoking with liquor and finally under stress and under peer pressure. Apart from the event and price of the cigarettes, the consumers are also driven by the workplace environment and financial condition. Income, work experience, the kind of job they are in all significant when combined together. These factors have a positive impact on the number of cigarettes smoked by the consumer per day. Awareness about the ill effects of smoking on one's health and those surrounding others as well as awareness about the taxes on cigarettes negatively influences the decision of the smoker. This means that the more the consumer is aware of these things, the less is he going to consume. Finally, the age, marital status and children and level of education also the number of cigarettes smoked by the consumer negatively. The most important conclusion derived from this study was that the effect of price diminishes when other non-economic factors come into play. This means that in an isolated environment where all the consumers are homogenous in terms of their characteristics, the consumer will be affected by the price of the cigarettes, but the effect of price will lose its significance in the decision making process.

VII Research Implications:

The tax rates on cigarettes could be increased significantly and only then the consumers its effect on consumers would be large enough. 'Event' of smoking was significant, under which most of the people said they smoked during socializing. Steps can be taken to control and limit smoking in social gatherings which would reduce consumption. Similarly, controlling smoking in public places like bars and pubs could also bring down smoking as the second major event under which people prefer to smoke along with alcohol. Awareness also influences smoking behavior and hence large scale awareness campaigns need to be carried out regarding the health campaigns. The short term health effects of smoking could be stressed upon in the campaigns along with the long term effects. The campaigns could be targeted towards the youth.

VII Limitations:

This study is a Qualitative study which is based on a small sample collected from the urban areas of Bangalore and hence the results cannot be generalized on a large scale especially to rural areas. Although the respondents were promised anonymity in their responses, yet the possibility remains that the consumers may not have revealed the absolute truth with regards to their consumption patterns since it deals with revealing sensitive information.

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