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Deluna, Roperto and maneja, Kimbely

University of Southeastern Philippines

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# THE EFFECT OF SIN TAX AND ANTI-SMOKING CAMPAIGN IN REGULATING CIGARETTE SMOKERS IN DAVAO CITY, PHILIPPINES

Kimberly C. Maneja and Roperto S. Deluna Jr  
University of Southeastern Philippines

## Abstract

This study identified the effectiveness of Sin Tax and Anti-smoking media campaign in regulating cigarette smokers in Davao City. Descriptive statistics were used to present the socio demographic, awareness of anti-smoking media campaign and perception and attitude of a smoker. Logit regression analysis was used to know the responsiveness of the smokers to Sin Tax.

Result revealed that current cigarette smokers are mostly male, age group of 10-24, employed, single, smaller family size, urban and smokers having 8 to 11 years in school. Based on perception of the respondents, anti-smoking media campaign did not affect the smoking behavior of the respondents. However highest fraction of cigarette smokers are aware and reduced their cigarette consumption because of anti-smoking ordinance.

The result from Logit Regression Analysis revealed that occupational status, location and number of years in schooling are significant and having positive effects on their cigarette consumption in response to Sin Tax. While gender, age, marital status, family size, change in income, price of cigarette and price of rice are insignificant variables.

**Keywords;** *Sin Tax, Smoking Ban , Logit*

## INTRODUCTION

### Background of the Study

Sin Tax is a tax levied on commodities such as tobacco and alcohol or activities and services which are seen as vices and considered harmful or immoral. In principle, the excise tax on sin products is imposed for the purpose of (1) raising revenues and (2) discouraging the consumption of the tobacco products and alcoholic beverages (Manasan, *et al.*, 2013). It is argued that higher excise taxes on tobacco will “induce some smokers to quit, reduce consumption of continuing smokers, and prevent others from starting” (Sunley, 2009).

The most common form of "Sin Tax" is tax on cigarettes. Cigarette tax is popular due to the large number of deaths caused by smoking cigarettes, as well as the high health care costs. This type of tax was imposed by government to discourage individuals from involvement in such activities and to gain revenue for healthcare. When a government run deficits, the Sin Tax is typically one of the first taxes recommended by lawmakers to help fill the budget gap as source of government revenue. Because the demand for cigarettes is relatively price inelastic, the expectation is higher taxes will yield higher revenues in the near term while deterring smoking in the long run.

In the Philippines, several tax reforms for sin products was enacted in lieu for both revenue and non-revenue goals. Table 1 shows historical tax rate reforms for Sin Products in the Philippines and the response of tobacco consumption. It shows that tax reforms failed to curb consumption of this commodity.

Table 1. Tax reforms timeline for Sin Products and effects to tobacco consumption, Philippines.

<b>Reform Period with Tax Rate Increase</b>	<b>Consumption (in PM)</b>	<b>Growth rate (%)</b>
R.A 6956	1990	15.94
	1991	16.07
R.A 6956	1992	16.16
	1993	16.12
R.A 8240	1996	16.89
	1997	17.13
R.A 8240	1999	17.59
	2000	17.90
R.A 9334	2004	19.16
	2005	19.13

Source: Philippine Statistical Yearbook (opt. cit. DOF, 2013)

In terms of prices of cigarette, among the ASEAN countries Singapore has the highest price of popular brand of cigarette with PhP365.2, followed by Malaysia (PhP146.08).

While Philippines has the lowest price of popular brand of cigarette by Php. 27.72 Figure 1.

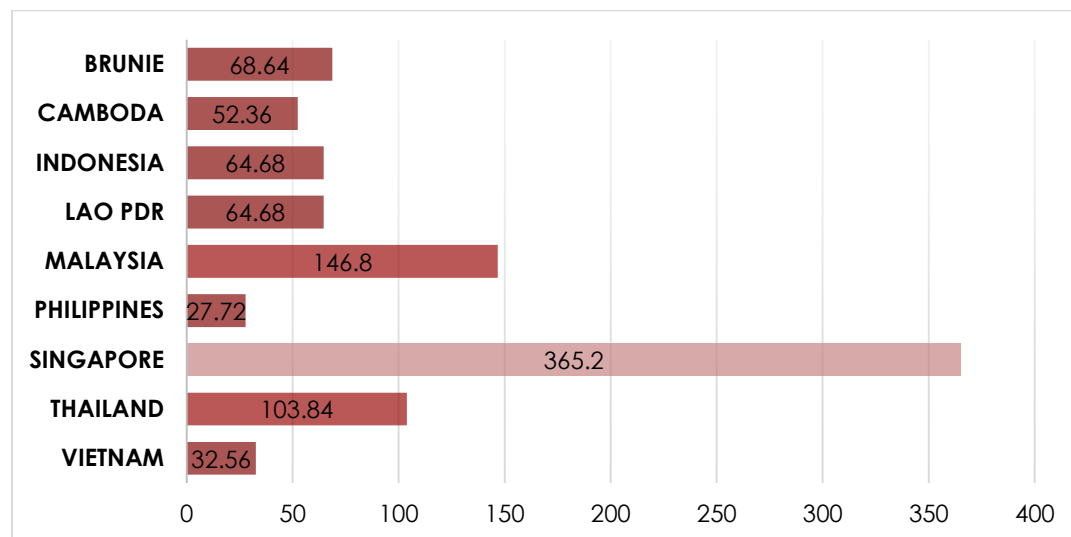


Figure 1. Prices of Popular Cigarette Brand, in Philippine Peso

Source: South Asia Tobacco Control Alliance, 2010

In the Aquino administration, the amendment of the Republic Act (R.A) 9334 was certified urgent (Macaraig, 2012). This led to the enactment of R.A 10351 “An Act Restructuring the Excise Tax on Alcohol and Tobacco products” which was implemented on the first day of January of 2013. Prior to R.A 10351 taxes on sin products follow a multi-tiered system. For instance, the excise tax schedule for cigarettes consists of four tiers referring to low-, medium-, high and premium-priced brands. The tax is based on the net retail price (exclusive of VAT and excise tax itself) of each brand, with cheaper brands being taxed less than the more expensive brands. The multi-tiered system of excise tax rate based on the net retail price was first introduced in 1996 with the enactment of R.A. 8240 and was later amended by R.A 9334 which took effect in 2005 (Manasan, *et al.*, 2013). The Department of Finance (DOF) outlined weaknesses and disadvantages of the multi-tiered system that requires reform. This includes the following weaknesses: (1) Classifying of new brands creates discretion for the taxing authority, (2) prone to downshifting/misreporting of consumption from high-priced and high-taxed brands to low-priced and low-taxed brands resulting in lower revenues, (3) eroded by inflation due to lack of automatic tax rate adjustment, (4) the effective tax burden relative to the retail price becomes less and less and the tax becomes more ineffective as a tool to curb consumption, these are among other weaknesses. Some disadvantages include (1) Difficulties to define tiers, (2) may result in switching to lower brands when taxes are increased (Tax increases to next higher specific rate when price increases. So, producers tend to set price near the top tier).

In lieu with the revenue goals and the need for reforms in the existing sin tax law (R.A 9334), R.A 10351 was enacted. R.A 10351 removes the price/brand classification freeze on the proper tax classification of alcohol and tobacco products

which will be determined every two (2) years. The new law shifted to unitary taxation to simplify the multi-tiered structure to prevent downshifting to lower price brands, to discourage consumption of sin products, and for easy tax administration. Annual indexation of excise tax rates was introduced to prevent (DOF, 2013).

The enactment of R.A 10351 is expected generate more revenues for the government. On the first year of implementation, the government is expected to raise additional revenues worth PhP 33.96 Billion, of which PhP 23.4 billion is from cigarettes, PhP 6.06 billion from distilled spirits and PhP 4.5 billion from fermented liquors. This incremental revenue will be allotted as follows: 15% will be allotted to fund the livelihood support of tobacco farmers, 68% will be allocated for the universal health care under the national health Insurance program, and the remaining 17% will be allocated nationwide for medical assistance and health facilities program (DOF, 2013). The reform envisions “a healthy Filipino society”, by making this reform effective in the reduction of tobacco and alcohol consumption.

Several cigarette smokers control strategies has also adopted in several parts of the Philippines. These include smoking ban in public places to protect non-smokers from the danger of second-hand smoke. Media tools was also employed to discourage smokers such media campaign through pictorial warnings, signage’s, billboard, posters, stickers, television advertisements and radios.

Among thousands of cities in the Philippines, Davao City is known to have the toughest implemented anti-smoking regulation. The city have received several commendations both locally and abroad for being one of the pioneering local government units to have successfully followed through with its anti-smoking campaign and smoking ordinance ([www.smokefree.doh.gov](http://www.smokefree.doh.gov)). The signage and posters can be seen in all public places in Davao City even in the public utility vehicles. The first smoking ban in Davao City through an anti-smoking ordinance was passed and implemented 13 years ago in 2002 ([www.businessmirror.com](http://www.businessmirror.com)).

The City expanded the anti-smoking ordinance into a Comprehensive Anti-smoking Ordinance No. 0367-12 in 2002. This aimed to reduce cases of smoking related diseases and earned revenues from violation fines. From July to December 2013, the City collected fines of PhP 955,000 from 1,911 violators and from January to June 2014 the city collected nearly PhP 2 million from 2,403 violators ([www.interaksyon.com](http://www.interaksyon.com)). The Task Force also reported that ailments attributed to smoking showed a decrease in the past years, citing that only 44 persons were afflicted with lung cancer, compared to 100 cases in 2012, deaths at 103, which were 10 cases less than in 2012 and chronic bronchitis afflicted 1,008 and heart diseases around 620.

## Rationale

Cigarette contains at least 43 carcinogenic substances causing cancer of the mouth, larynx, pharynx, esophagus, kidney, bladder, pancreas, and uterine cervix, not just cancer but also stroke, heart disease, tuberculosis and many more that will lead

to premature death. In fact, smoking decreases a person's life expectancy by 10 - 12 years. Smokers between the ages of 35 and 70 have death rates three times higher than those who have never smoked (World Health Organization 2011). Smoking is also health threatening to non-smokers through secondhand smoke. It also affects particularly the health of young children and babies causing asthma, bronchitis or sudden infant death syndrome (Environmental Protection Agency, 1992). Studies show that about 600 million people worldwide already live with chronic obstructive pulmonary disease (COPD), but its occurrence is predicted to rise to become the world's third leading cause of death by 2020. At present, COPD kills more than 2.75 millions of people every year, and is the fourth leading cause of death worldwide (World Health Organization 2011).

The Philippines has among the highest smoking prevalence rates in the world, ranking ninth (9<sup>th</sup>) for adult males (47.7%) and sixteenth (16<sup>th</sup>) for adult females (9%). According to the 2009 Global Adult Tobacco Survey (GATS) around 17.3 million Filipinos aged 15 years old and over are smokers, equivalent to an overall adult smoking prevalence of 28.3% (cited in Sta. Ana III, *et al.*, 2011) An economic cost of USD 2.86 billion to USD 6.05 billion or PhP 148.47 billion to 314.38 billion (USD 1=PhP53 in 2003) was estimated in 2003. This includes healthcare cost and productivity losses from death and disease related to four smoking-related diseases. The estimated cost is equivalent to seven to fifteen times the tobacco tax revenue for that same year. The same study also revealed that at least 10 Filipinos die every hour from tobacco-related diseases (WHO, 2003).

These facts, compelled policy makers to implement and enact regulations that will effectively curb consumption of tobacco products in the country. With the implementation of R.A 10351 in 2013, it is timely to assess the effectiveness of this reform along with other intervention aiming to stimulate smokers behavior on cigarette consumption.

It is important to study the effectiveness of government intervention in cigarette smoking particularly the Sin Tax of 2013 Republic Act. No. 10351 and Anti-smoking ordinance /campaign in order to understand the effect of these strategies on consumers' behavior. It is also important to understand the underlying factors that affects the responsiveness of individuals to smoking-control strategies. There are some related studies conducted in some part of the Philippines, but to the knowledge of the researchers, no study was conducted in Davao City.

## Objectives of the study

The general objectives of this study is to evaluate the effectiveness of the 2013 "Sin Tax" reform (R.A 10351) and smoking-control campaign in regulating cigarette smokers in Davao City. Specifically this study aims:

- To profile cigarette smokers in Davao City and ,

- to determine the effectiveness of R.A 10351 and Davao City's smoking-control strategies in regulating consumption behavior of smokers.

## Significance of the study

Analyzing the effectiveness of an intervention is a core importance in government decision making. Furthermore, understanding the factors that affects the responsiveness of individuals on policy reforms is very important in drafting and designing more effective policy in the future.

## Scope and Limitation

This study focused on the effectiveness of Sin Tax and Anti-smoking media campaign in regulating cigarette smokers in Davao City. The sin tax refer to R.A 10351 implemented on January 1, 2013. In terms of anti-smoking campaign, these include tarpaulins and other print material posted around the city. The study also include effectiveness of local anti-smoking ordinances. The study utilized primary information from conducted survey using a two stage random sampling design. Random interviews was conducted to individuals who smoke cigarette prior to January 1, 2013. All data/information used in the study are based on the recall and perception of the respondents.

Empirical analysis through Logit estimation was conducted on responsiveness of price effect of R.A 10351, while descriptive analysis was conducted for responsiveness to local ordinances and anti-smoking campaigns.

## REVIEW OF RELATED LITERATURE

This chapter present reviews of different literatures from which empirical evidences significant to this research are drawn. The reviews are presented to fully understand and strengthen the foundation and the result of this study.

Reinhardt and Giles (1999) studied the Canadian demand function for cigarettes to demonstrate the tax increase as an alternative policy to cigarette bans using Ordinary Least Squares. They used the data from the "CANSIM" database, Statistics Canada (1990, 1997, 1998a, 1998b, 1998c). Their result shows that 80% permanent increases in the price of cigarettes would only reduce the equilibrium level of cigarette consumption by a mere 18%. They concluded that the cigarette demand is extremely insensitive to price and income changes. This is evidence of the large consumer surplus smokers enjoy and the large revenue increasing potential of a cigarette tax increase policy, as opposed to cigarette bans.

Correspondingly the study conducted by Adda and Cornaglia (2006), examined the effect of excise taxes and smoking ban on smoking in public places on the exposure to tobacco smoke of non-smokers using Ordinary Least Square (OLS).

They used data from the National Health and Nutrition Examination Survey (NHANES III and NHANES 1999-2002). Their results shows that a one percent increase in taxes leads to 0.47% increase in the intensity of smoking. Excise taxes have a significant effect on passive smoking but smoking bans have contrasting effects on non-smokers. Bans in public transportation or in schools decrease the exposure of non-smokers, bans in recreational public places perversely increase their exposure by displacing smokers to private places where they contaminate non-smokers. Lastly, smoking bans increase the exposure of poorer individuals, while it decreases the exposure of richer individuals.

Murphy (2006) studied the effect of the large price increases on cigarette consumption using Ordinary Least Square (OLS) and instrumental variables (two-stage least squares). They used data from 50 states consumption plus the District of Columbia for the years 1990-2003. The result of his study indicates that over 15 years there is a decrease in consumption that has resulted from the sharp rise in price. This decreased in consumption could explain by other factors such as smoking ban, contributed a small amount of decreased in consumption. As the concluded the larger increase in prices experience larger reductions in consumption.

Manning et.al (1990), studied the excise taxes and regulations restricting smoking in public places affect cigarette consumption using Generalized Linear Model (GLM). They used data from National Health Interview Survey using the Generalized Linear Model. Their result shows that, adult cigarette demand suggests that the price elasticity of demand is low. Also study found that regulations restricting smoking in public places have a significant negative effect on cigarette demand. Additionally the teenage smoking results suggest that is not responsive to price changes as previous studies found.

Followed by Anger et.al, (2010) studied the short-term effects of public smoking bans on individual smoking behavior in Germany using Regression to estimate the result. They used data from German Socio-Economic Panel (SOEP). Their result shows that public smoking bans has a strong impact to the behavior of males and decline in demand for cigarette in individuals in urban areas. In the countryside, in contrast, smoking intensity showed no change. Among unmarried individuals, the propensity to be a regular smoker fell by around two percentage points and married individuals remained unaltered. Therefore, they concluded that smoking propensity and smoking intensity is reduced, in the short term, among various subgroups of the population by the introduction of the smoking ban and no significant effect on the large population in the short term. The result of heterogeneous effects may be explained by the greater exposure of these groups, in everyday life, to the constraints of public smoking bans.

The study of Tauras and Chaloupka (1999), investigate the impact of price, clean indoor air laws, and other socioeconomic factors have on smoking cessation by males and females separately using Semi-parametric Cox duration models to estimate the result. They used the data from 15,000 senior students at the University of Michigan. As their result shows the price is positively related to the probability of



smoking cessation for both young adult males and females. Their results clearly indicate that large increases in cigarette excise taxes would lead a significant number of young adults to quit smoking. Moreover, the estimates imply that stronger restrictions on smoking in private worksites will increase the probability of cessation among young adult females.

The study of Lee et.al (2011) examined the impact of the legislation on smoking prevalence, number of cigarettes smoked and location of smoking using Logit and Linear Regression model. They used data from cross sectional survey of nationally representative data from the Health Survey for England (HSE). As their result shows that the smoke-free legislation was not associated with a significant acceleration or deceleration in smoking daily consumption among continuing smokers during the 18 months after the implementation of the law. No evidence that anticipation of the legislation by smokers resulted in a reduction on smoking in the months prior to implementation. Along the existing trends there is widespread of compliance with the smoke free legislation which led to a large drops in indoor smoking in England. They concluded that the smoke-free legislation has no significant effect in a short term.

The study of Azagba and Sharaf (2011) focused on the impact of cigarette taxes on smoking participation using random effect Probit model. They used data from the Canadian National Population Health Survey and the recent tax variation across Canadian provinces. Their result shows that tax increases led to modest reduction in smoking participation, but this result is not generalized the outcome for all groups. As a result segregated from different groups, it shows that the participation tax elasticity is numerically larger and significant for males and middle age group. The low income group is more responsive to taxes unlike with the participation of high income group is not statistically significant. They concluded that different socio-demographic characteristics of smokers respond differently to tax increase designing appropriate measures will reduce smoking.

The study of Wilson et.al, (2012) examine the independent impact of tobacco control policies on smoking behavior, as measured by initiation, cessation, or prevalence and measured smoking behavior before and after policy implementation using the Time Series Analysis. Their result shows that increased in tax, low and middle income countries is more sensitive for having the estimated price elasticity of demand of -0.8, while high income countries for having -0.4 elasticity. The greater reductions of smoking found in smaller geographic areas with limited previous legislation, compared with studies conducted at the national level. They concluded the timing of a smoking ban relative to the underlying tobacco control environment may impudence its electiveness.

Punzalan et.al, (2013) determined the prevalence of smoking according to (i) gender, (ii) age, (iii) rural or urban residence, and (iv) educational attainment. Their study survey utilized stratified multi-stage sampling design to represent each of the 17 regions in the country. Their result shows that among were current smokers in the rural areas (33.1%) than urban areas (28.9%) and there were more current and

former smokers respondents where educational attainment was at the elementary any level (35.1% and 16.4%. respectively. While there were more never smokers whose educational attainment was at least the tertiary level (62.7%). Therefore they concluded that the Tobacco use in the Philippines is still prevalent at 31% and predominantly composed of male in the 20-29 age group. Current smoking is highest among rural dwellers and among individuals w/ elementary, while majority of Women College level respondents are never smokers.

Aguillon, J. and Romano, P (2012) aims to determine the effects of the extent of exposure to anti-smoking advertisements and the recall of National Capital Region (NCR) male high school students to their perceptions of and attitudes toward smoking. His survey was conducted randomly among 400 NCR male high school students. As his results found out that three in ten NCR male high school students had tried smoking at ages 12 to 14 years. There was a high general perceived susceptibility and severity of having smoking-related diseases among the NCR male high school students. As he concluded the general attitude of the students toward smoking was either positive or negative (neutral). His study also found out that there was a weak correlation between the NCR male high school students' exposure to and recall of anti-smoking advertisements and their perceptions of and attitudes towards smoking.

Lastly, the study of Peng and Ross (2009) examined the impact of cigarette taxes and advertising on the demand for cigarettes in Ukraine. They used data from monthly time-series data available from 1997 to 2006 in Ukraine using the generalized least square model. Their results demonstrated a strong positive association between cigarette sales and household income as well as a strong positive association between cigarette sales and tobacco advertising activity. Their results reveal that 50 percent increase in household income would result in 13 percent increase in cigarette sales, while 50 percent less outdoor tobacco advertising may reduce legal cigarette sales 16 percent. The results indicate that imposing further advertising restriction may help reduce smoking prevalence.

## METHODOLOGY

This chapter presents the theoretical framework, conceptual framework, economic, data and data sources, sampling design, statistical, empirical model and estimation procedure.

### Theoretical framework

#### Law of Demand and Supply

When the government has imposed tax incidence on a certain good, the price of good will be definitely increases. Tax incidence is an economic term for the division of a tax burden between buyers and sellers ([www.investopedia.com](http://www.investopedia.com)). According to

law of demand, the price and quantity demanded has the inverse relationship while other factors are remain unchanged. When the price of good increases, the quantity demanded will decrease. This is due to the willingness of consumer to purchase decreases and they are unable to afford it. This will lead to decrease in quantity demanded ([www.useconomy.com](http://www.useconomy.com)).

Consumer assumes that price is the most important influence on the amount of good purchase. But there are factors and do affect purchased, these factors called determinants of demand. One of the determinants of demand is the Tastes and Preferences change and are also affected by advertising, trends, health considerations etc. Another determinants is income, and people's income rises demand for goods and services rise too. Goods which obey this rule are called Normal Goods. However the exception to this is an inferior good. Demand for inferior goods will fall as income rises. The distribution of incomes will have an effect too. Expectations of future price changes people expected prices to rise in the near future they will try to beat the increase by buying early and vice versa. Population the size and make-up of the population affect demand. If there is a growing population more good is demanded. If the population is stable but is ageing things that old people need will increase in demand - i.e. health care. The last determinant of demand is the price of related goods. Complement goods as the price of complements rises, demand for the complement falls and so too will demand for the good. Substitute goods the higher the price of substitute goods, the higher the demand will be for this good (Paris, 2007).

However, imposed tax on a given good the supplier would be much happier to supply more goods in order to maximize profit. This has proven by law of supply as it shows the positive relationship between price and quantity supplied while other factors are remains unchanged. When the price of certain good increases, the quantity supplied will increase ([www.microeconomic.blogspot.com](http://www.microeconomic.blogspot.com)). There are other factors aside from price that affects the supply namely; resource prices, prices of related goods in production, technology, expectations and number of sellers (Paris, 2007).

The responsiveness or sensitivity of consumers/sellers with respect to change of price is measured by price elasticity of demand/supply. If the number is more than zero but less than one, the demand/supply is relatively inelastic. If the number is more than one, we say that demand/supply is relatively elastic. The more inelastic (elastic) is the demand/supply for the product, the steeper (flatter) is the demand/supply curve. Further if the number exactly equals one, the demand/supply is unit elastic, "Unit" means one. If the number exactly equals zero, the demand/supply is perfectly inelastic. Perfectly inelastic demand would be a violation of the law of demand. Finally, if the number is infinitely large, the demand/supply is perfectly elastic (Paris, 2007)

While the responsiveness or sensitivity of consumers/sellers with respect to the tax incidence is related to the price elasticity of supply and demand. When supply is more elastic than demand, the tax burden falls on the buyers. If demand is more elastic than supply, producers will bear the cost of the tax. If buyers have many alternatives to a good with a new tax, they will tend to respond to a rise in price by

buying other things and will, therefore, not accept a much higher price. If sellers easily can switch to producing other goods, or if they will respond to even a small reduction in payments by going out of business, then they will not accept a much lower price. The incidence of the tax will tend to fall on the side of the market that has the least attractive alternatives and, therefore, has a lower elasticity ([www.investopedia.com](http://www.investopedia.com)).

One of the example of tax incidence is the tax on the cigarette. Figure 3 shows that when the government has imposed tax on cigarettes, the price of cigarettes will be increase. However, in literature shows that demand for cigarette is inelastic to price changes. Cigarette is considered as inelastic demand because the price of cigarette increases gradually but people still continues purchasing cigarette. There are several reasons that lead to inelasticity of demand. Substitutability is one of it because if an item has fewer substitutes, it tends to have inelastic demand. The e-cigarette is not a good substitution for low income earner since e-cigarette is much more expensive than cigarette ([www.microeconomicblogspot.com](http://www.microeconomicblogspot.com)).

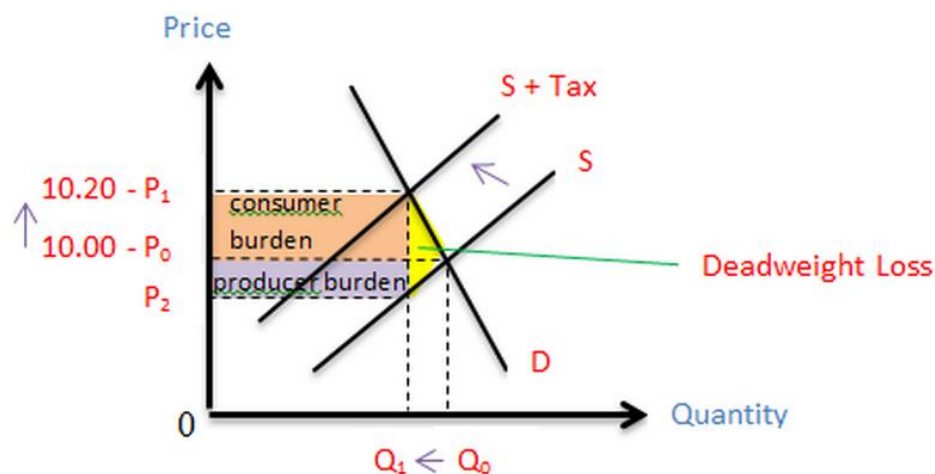


Figure 3. Tax incidence and inelastic demand curve.

Additionally making the inelastic demand curve of a cigarette is that smokers are hardly to quit since they have addicted to it. According to research smoker feels good and alert after inhaling cigarette, it takes just seconds for the nicotine to enter their blood and reach their brain. Once there, it stimulates the release of chemicals it give instant rush, making to feel good and more alert. Smoker's felt cigarette smoking will help them to feel calm and relax when they are stress. In reality, it is just relieving feelings of withdrawal symptoms that come on within hours or even minutes of your last cigarette. The smoker will undergo the physical withdrawal symptoms while quit smoking such as sniveling, coughing, headache, muscle cramp and etc. At the same time, they will get anxious, irritable and depress easily for no reason (quicksmokingsupport, 2013). Feeding their nicotine addiction reverses these effects and makes them feel calmer, and so because of this, they begin to associate smoking

with feeling relaxed (<http://www.bupa.co.uk/health-information/directory/w/why-smoking-addictive>).

### Rational Choice Theory

Becker and Murphy (1988) stated in their “Rational Choice Theory”, rational consumers maximize utility from stable preference as they try to expect the future consequences of their choices. The main feature of their models is that past consumption of harmfully addictive goods such as cigarette influences their current utility of current and future consumption. Their theory found out that a 10% permanent increase in the price of cigarette reduces current consumption by 4% in the short run and by 7.5% in the long run. The level of incomes, temporary stressful events that stimulates the demand for addictive goods and the level path of prices also affects the likelihood of becoming addicted. Permanent changes in prices of addictive goods may have modest short run effect on the consumption of addictive goods. This could be the source of general perception that the addicts do not respond much to change in price.

Another theory that will support the model of Becker and Murphy (1989) “An economic theory of cigarette addiction” by Suranovic et.al. (1998). According to their theory when prices increase or when a burst of new health information is disseminated, some of those who are about to start smoking, may not. Some of those who had recently begun to smoke may also quit. Those longtime smokers who were soon to quit, may quit a bit sooner. Their model also predicts some responsiveness of demand to changes in price and other exogenous shocks, even though for some individuals there would be no response at all. Also shows on how a smoker may experience a change of perspective as he grows older enough to encourage cold-turkey quitting. Their study shows that small price changes may have no effect upon a smoker’s consumption level and suggested that the higher consumption taxes could prevent more young smokers from starting and encourage current smokers to quit sooner.

Irvine and Nguyen (2009) stated in the “Toxic Choices: The Theory and Impact of Smoking Bans”. Their theory is about theoretical model of maximizing behavior on the part of smokers which serves as a vehicle to evaluate bans. Accordingly smoking bans come in different forms. The most common one, and which would be anticipated to have the greatest impact on behavior, is a ban on smoking in the workplace. Workplace bans effectively make smoking more difficult and costly for about one half of the effective day and therefore may be expected to have a substantial impact on behavior. As their theory stated of a utility maximizing agent, subject to a budget constraint, such bans are best predicted as increasing the cost of a cigarette smoked during these periods: if individuals choose to smoke a cigarette during their working day, it must be outside the cones of their office or workshop. This involves a time cost that changes radically the price of a cigarette. The prediction of their theoretical model is that the workplace bans have larger impacts on heavy smokers, by estimating a quartile regression which includes both workplace and home ban controls. As their additional predictions: (i) heavy smokers should be the ones most

heavily impacted by a workplace ban, (ii) higher income smokers experience a higher time cost when a workplace ban is imposed and (iii) smokers have an incentive to smoke their reduced number of cigarettes more intensively. Their empirical work indicates that the groups most affected by bans (in an absolute sense) are those at the top of the smoker distribution and at the top of the income distribution, the former because substitution becomes more challenging, and the latter on account of their elevated time costs. Their conclusion is that the effectiveness of workplace bans depends heavily upon whether there exist complementary restrictions on smoking in environments to which individuals may wish to switch their smoking following a workplace ban.

## Conceptual Framework

Figure 2 presents the conceptual framework of the study. This examines the effect of sin tax and smoking-control strategies in regulating cigarette smokers. The figure below shows that when there are changes in price of cigarette it may affect the cigarette consumption of cigarette smokers. It also shows that when there is smoking-control strategies introduced it may affect the perception of cigarette smokers.

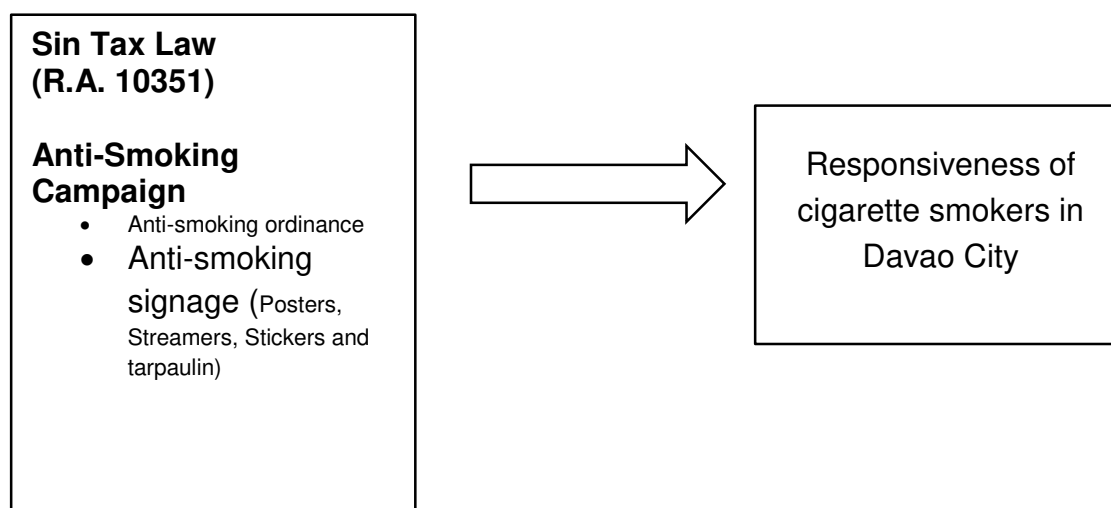


Figure 2. The conceptual framework of the study.

## Variables used

The study generated cross-section database from the completed survey questionnaires. To empirically analyze the responsiveness of cigarette smokers to R.A 10351, the following variables are used:

- 1) **Change in cigarette daily consumption ( $\Delta DC$ )**- This is measured in terms of number of sticks, the change is computed by getting the difference between the daily consumption during the survey and consumption prior to January 1, 2013.

- 2) **Change in the price of cigarettes ( $\Delta P$ )**- this is measured in terms of price of cigarette per stick, in pesos. The change is the difference in price during the survey and prior to January 1, 2013.
- 3) **Change in Income ( $\Delta Y$ )**-this is measured in pesos increments in individuals income prior to RA 10351 and during the period of the survey.
- 4) **Education (Edu)**- is the number in years of formal schooling of the respondent.
- 5) **Age**- is the age in years, based on last birthday of the respondent during the survey.
- 6) **Household size (HS)**- is the number of family members living on the same roof.
- 7) **Change in the price of rice ( $\Delta PR$ )**- measured as the pesos difference in the price of rice during the survey and prior to January 1, 2013.

The study also utilized several dummy variables for:

- 8) **Marital Status (DMS)**- 1 if the respondent is married and 0, otherwise.
- 9) **Sex (DS)**- 1 if the respondent is male and 0, otherwise.
- 10) **Location (DLoc)**- 1 if the respondent reside in urban barangay and 0, otherwise.
- 11) **Occupational Status (DOS)**- 1 if the respondent works in the public sector and 0, otherwise.

## Data Sources

The study utilized primary data gathered through random sampling survey conducted on the month of December in 2014.

## Sampling Design

The two stage random sampling design procedure was used in this study. First the researcher listed all districts in Davao City. In the first stage the study used the simple random sampling to select the two sub districts per district at random. The second stage also used the simple random sampling but this time, the sub political districts were consider as the primary sampling unit and the barangay is the secondary sampling unit. In the first political stage, three political districts (District 1, 2 and 3) were chosen to get the desired cluster. In each cluster two sub-districts are selected at random as a survey area of the study. In District 1, Talomo and Poblacion Districts were chosen. In District 2, Agdao and Buhangin Districts were picked, while in District 3, the selected districts were Toril and Tugbok.

In the second stage, six sub-districts were chosen that considered as a cluster to get the sample barangay. From the barangays, a sample of individuals was obtained on the following formula (Torremocha 2009).

$$n_i = n \left( \frac{N_i}{N} \right) \quad (1)$$

where:

$n$  = desired sample size for the sub-district

$N$  = sum of the population in every selected barangay in each sub district.

$N_i$  = individual population of barangay  $i$

$n_i$  = number of individuals used as sample from barangay  $i$

The overall number of sample is 1,000 for the whole city. Table 1 presents the distribution of samples per barangay.

Table 1 Sample for each Barangay

District	Sub-district	Barangay	No. of sample	Total percentage
1	Poblacion	27-C	29	2.91
		34-D	15	1.51
	Talomo	Dumoy	259	25.89
		Matina Pangi	188	18.76
2	Agdao	Kapt. Thomas	80	8.0
		San Antonio	168	16.82
	Bunawan	San Isidro	59	5.87
		Mahayag	68	6.77
3	Toril	Bayabas	36	3.59
		Baracatan	35	3.53
	Tugbok	New Valencia	20	2.09
		Tacunan	43	4.26
			<b>1,000</b>	<b>100</b>

## Statistical Model

The statistical procedure was divided into two parts. The first part is descriptive analysis by showing the socio-demographic profile of smokers, perception and attitude, awareness of anti-smoking media campaign and its effectiveness. The second part provided the empirical procedure in examining the responsiveness in terms of consumption before and during the implementation of Sin Tax law.

### Profiling of the respondents

Descriptive statistics was used to describe the socio-demographic profile of cigarette smokers, awareness of anti-smoking media campaign and its effectiveness. This will be presented in frequency and percentage.



### Determinants of responsiveness of Cigarette Smokers to “Sin Tax” law.

To empirically examine the responsiveness and determinants underlying the responsiveness of smokers to price increased brought about by the implementation of the new “Sin Tax” law, logit model was used. To estimate the parameters of the logit model, the functional model used is:

$$P_i = \frac{1}{1+e^{-[\alpha+\beta X_1]}} \quad (2)$$

Use logit models whenever your dependent variable is binary (also called dummy) which takes values 0 or 1. Logit regression is a nonlinear regression model that forces the output (predicted values) to be either 0 or 1. Logit models estimate the probability of dependent variable to be 1 ( $Y=1$ ). This is the probability that some event happens. Logit is far widely used discrete choice model. It is derived under assumption  $\epsilon_{nj}$  is the extreme value for all  $i$  the critical part of the assumption is that unobserved factors are uncorrelated over alternatives, as well as having the same variance for all alternatives. This assumption, while restrictive, provides a very convenient from the choice probability.

The popularity of logit model is due to its convenience. However the assumption of independence can be inappropriate in some situations. Unobserved factors related to one alternative might be similar to those related another alternatives. The assumption of independence also enters when a logit model is applied to sequence over time. The logit models assumption that each choice is independent to others. In many cases, one would expect that unobserved factors that affect the choice in one period would persist, at least somewhat, into the next period, inducing dependence among the choice over time. The maximization of the function starts with the logarithm of  $Y$ , expressed as;

$$\text{Log}(Y_t) = \ln \left[ \frac{P_t}{1-P_t} \right] = \alpha + \beta X_1 + \epsilon_1 \quad (3)$$

where:

$$\begin{aligned} P_t &= \text{the probability that the event } Y \text{ occurs, } (Y=1) \\ \frac{P_t}{1-P_t} &= \text{is the “odds ratio”} \\ \ln \frac{P}{1-P_t} &= \text{is the log ratio, or “logit”} \end{aligned}$$

The  $\beta$  is the slope coefficient and the effect of the independent variables on the “odd ratio”. A positive indicates an increase in the probability that  $Y=1$ ; a negative estimate indicates a decrease.

### Empirical Model

Applying Logit Regression the empirical formula was derived:

$$\Delta DC = \beta_0 + \beta_1 \Delta P + \beta_2 \Delta Y + \beta_3 Edu + \beta_4 Age + \beta_5 HS + \beta_6 PR + \beta_7 DMS + \beta_8 DS + \beta_9 DLoc + \beta_{10} DOS + \beta_{11} DAW + \varepsilon_t \quad (4)$$

Where:

**$\Delta DC$**  = is the difference of cigarette consumption before and after Jan 2013.

$$\begin{cases} 1 & \text{for decrease in cigarette consumption} \\ 0, & \text{otherwise} \end{cases}$$

**$\Delta P$**  = change in price of cigarette consumption before and after Jan. 2013.

**$\Delta Y$**  = change in income of the smoker before and after Jan. 2013.

**Edu** = is the educational attainment of the respondent

**Age** = is the age of the respondent

**HS** = is the household size

**$\Delta PR$**  = is the change in price of rice before and after Jan. 2013. The price of rice before minus price of rice in the present equals change in price of rice. This study choose rice to find out if the change in price of rice will affects the cigarette consumption of a smoker.

**DLoc** = is a dummy variable for location.

$$\begin{cases} 1 & \text{if the respondent lives in the urban areas} \\ 0, & \text{otherwise} \end{cases}$$

**DOS** = is the dummy variable for occupational status of respondent.

$$\begin{cases} 1 & \text{if the respondent is employed} \\ 0, & \text{otherwise} \end{cases}$$

**DS** = is the dummy variable for sex of the respondent

$$\begin{cases} 1 & \text{if the respondent is female} \\ 0, & \text{otherwise} \end{cases}$$

$\varepsilon$  = is for the error term

## Estimation Procedure

SHAZAM version 11.0 was used to test the significance and the estimations of the parameters. SHAZAM is a command-driven computer program for econometric and statistical computing. It was an integrated designed for comprehensive and complete econometric and statistical analysis that can execute complex and simple estimation.

## RESULTS AND DISCUSSION

Presented in this chapter are the results and interpretations of the data gathered in the study. The results are presented in tabular form with textual analysis and interpretation.

### Profile of the respondents

Table 2 shows the profile of cigarette smokers in Davao City. It revealed that almost half (48%) of smokers were belong to age group between 10 to 24 years old. This is followed by the age group of 25 to 44 with 32.2%, age group of 45 to 65 with 18.4% and age group of 65 and above with 1.4%. Based on the survey, the youngest smoker aged 10 while the oldest is 92 years old. In terms of sex, males are predominantly smokers (87%) than females (13%). In terms of marital status, revealed that 57% of cigarette smokers are single individuals which is higher compared to married individuals with 43.4%. According to Philippine Global Adult Tobacco Survey (GATS, 2009) there are more male cigarette smokers in the Philippines about 14.6 million male and female is about 2.8 million.

Smokers are found out to be educated. It revealed that 54% of smokers belongs to 7-10 years of schooling, followed by 11 and above. People who live in urban areas are mostly cigarette smokers (62.2%), compared to people living in the rural areas (37.8%). Urban people have more lazy time and lack of employment are the suggested reasons for them to be more smokers (Aguillon and Romano, 2012). Smoking in rural areas are attributed to lack of knowledge regarding the possible effects of cigarette on health (Source?). Lastly, it shows that 40% of smokers belong to family with household size below five (5) members. It decreases as household size gets larger.

Table 2. The Socio-demographic Characteristics of a Cigarette Smokers

Variable		Frequency	Percentage
Age	Below 15	15	1.5
	15-25	499	49.9
	26-35	310	31.0
	35-45	104	10.4
	56-65	57	5.7
	Above 65	15	1.5
Total		1,000	100
Sex	Male	866	86.6
	Female	134	13.4
	Total	1,000	100
Marital Status	Married	434	43.4
	Single	566	56.6
	Total	1,000	100
No of Years in	0-6	187	18.7
	7-10	541	54.1

School	11-above	460	46.0
	16 above	13	1.3
Total		1,000	100
Occupational Status	Employed	641	64.1
	Unemployed	359	35.9
Total		1,000	100
Location/Address	Rural	378	37.8
	Urban	622	62.2
Total		1,000	100
No. of Household Member	0-4	406	40.6
	5-8	320	32.0
	9-12	260	26.0
	13 above	14	1.4
Total		1,000	100

Table 3 summarizes the reasons why people smoke. There are 10 major reasons why “Davaeños” smoke. First, smokers said that cigarette smoking is a medicine for unpleasant taste after meal (22%). Second, smokers said that cigarette smoking is their past time, and for fun by 18%. Third reason, cigarette smoking is their vice/habit (15%). Fourth reason is influenced by their friends (12%). Fifth, cigarette smoking is a stress reliever (9%). Sixth, smokers said that every time they smoke they feel relax (4%). Seventh, reason cigarette smoking is delicious. Eight reason cigarette smoking can make them to look good and it gives additional “*pogi* points” (3%). Ninth reason, cigarette smoking can make their body energize (2%). Tenth reason, due to curiosity (1%). Other reasons (11%) include the following: cigarette smoking will help the body to remain warm, it can solve problem, it will help to avoid mosquito and etc.

Table 3. Reasons for Cigarette Smoking

Reasons	Frequency	Total Percentage
Medicine for unpleasant taste after meal	222	22.2%
Past time/Just for Fun	179	17.9%
Vice/Habit	145	14.5%
Influenced by Friends	121	12.1%
Stress Reliever	86	8.6%
To Feel Relax	36	3.6%
Delicious	35	3.5%
To look good/Additional “Pogi” points	29	2.9%
To Feel Energetic	22	2.2%
Curiosity	11	1.1%
Other Reasons	114	11.4%
TOTAL	1,000	100%

Table 4 presents the smoker's awareness about anti-smoking campaign. Smokers who are aware about anti-smoking campaign through visual materials in rural areas are 64.02% (242) out of 378 respondents and only 61 of them reduced their cigarette consumption. While in urban areas smokers who are aware in anti-smoking campaign through visual materials are 55.63% (346) out of 622 respondents. This 346 aware cigarette smokers only 164 reduced their cigarette consumption.

Table 4. Visual warnings and Awareness of Anti-Smoking Campaign

Question	Location		Frequency	Percentage
Are you aware of anti-smoking campaign through television, radio, billboards, posters newspapers, magazines and stickers?	Rural	Yes	242	64.02
		No	136	35.98
		Respondents	378	100
	Urban	Yes	346	55.63
		No	276	44.37
		Respondents	622	100
	Overall	Yes	588	58.8
		No	412	41.2
		Total Respondents	1,000	100
	Did the visual anti-smoking campaign reduced your cigarette consumption? (for those who said they are aware)	Rural	Yes	61
No			181	74.79
Aware Respondents			242	100
Urban		Yes	103	29.77
		No	243	70.23
		Aware Respondents	346	100
Overall		Yes	164	27.89
		No	424	72.11
		Total Awareness	588	100
Do you see Anti-Smoking messages in the public places such		Rural	Yes	285
	No		93	24.60

as in the restaurants, malls, terminals, markets, public utility vehicles and etc.?	Urban	Respondents	378	100
		Yes	495	79.58
		No	127	20.42
	Overall	Respondents	622	100
		Yes	780	78.0
		No	220	22.0
		Total Respondents	1,000	100
Did the Anti-Smoking messages reduced your cigarette consumption? (for those who said yes)	Rural	YES	220	77.19
		NO	65	22.81
		Aware respondents	285	100
	Urban	YES	366	73.94
		No	129	26.06
			495	100
Overall	Yes	586	75.13	
	No	194	24.87	
Total		Total Aware Respondents	780	100
Are you aware of anti- smoking ordinance of Davao city?	Rural	YES	279	73.81
		NO	99	26.19
		Respondents	378	100
	Urban	YES	528	84.89
		NO	94	15.11
		Respondents	622	100
Overall	Yes	807	80.7	
	No	193	19.3	
		Total Respondents	1000	100
	Rural	YES	200	71.68

		NO	79	28.32
		Aware Respondents	279	100
	Urban	Yes	425	80.49
		No	103	19.51
		Aware Respondents	528	100
Did the ordinance reduced your cigarette consumption? (for those who said yes)	Overall	Yes	625	77.45
		No	182	22.55
		Total Aware Respondents	807	100
Are you agree that banning cigarette display and advertisement would make easier to quit from smoking?		YES	414	41.4
		NO	516	51.6
Total			1,000	100

Cigarette smokers who are aware about smoking ban and anti-smoking messages in public places such as terminal, jeepney, hospital, restaurant and school in rural areas are 75.40% (285) out of 378 respondents and 220 of them are reduced their cigarette consumption. While cigarette smokers living in the urban areas are much aware about smoking ban and anti-smoking messages in public places by 79.58% (495) out of 622 respondents and 366 of them reduced their cigarette consumption.

Among the mitigating measures the anti-smoking ordinance is most effective to mitigate cigarette smokers. Cigarette smokers who are aware in rural areas are 73.81% (279) out of 378 respondents and 200 of them reduces their cigarette consumption. While in urban areas 84.89% (528) are aware and 425 of them reduced their cigarette consumption. Additionally cigarette smokers who agree in the statement of “about banning cigarette advertisement that would make them easy to quit from smoking” is 41.4% and smokers who disagree is 51.6%. According to Philippines Global Adult Tobacco Survey (GATS 2009) “hard hitting anti-tobacco advertisement and warnings especially those that include pictures reduce the number of children who will begin to smoke and smokers who quit”.

Table 5 presents the attitude and perception of smokers. Results revealed 66% of respondents discuss the harmful effect of cigarette among members of the

household. Majority (72%) believe that smoking ban and sin tax can improve health condition and can improve productivity and working performance (69%). However, smokers shows irresponsive behavior (69%) to future price increase and banning of cigarette smoking. This is a manifestation that even with the presence of information against cigarette smoking, smokers find it hard to quit smoking. The tendency is to adjust their consumption to cater additional cost of smoking.

Table 5. Perception and Attitude

Questions		Frequency	Percentage
Do you discuss about harmful effect of cigarette in your family?	YES	662	66.2
	NO	338	33.8
Total		1,000	100
Will you be smoker next year even if there is strong implementation of smoking ban and Sin Tax?	YES	692	69.2
	NO	308	30.8
Total		1,000	100
Do you believe that smoking ban and Sin Tax improve you're working performance?	YES	674	67.4
	NO	326	32.6
Total		1,000	100
Do you believe smoking ban and Sin Tax improve your health condition?	YES	718	71.8
	NO	282	28.2
Total		1,000	100

## Logit Regression Result

To empirically examine the factors affecting responsiveness of smokers to sin tax, logit regression was employed. Table 6 shows the result of the estimation. It revealed that location, occupational status and number of years of schooling significantly affects the responsiveness of smokers to price hikes due to sin tax. Other variables like age, marital status, gender, household size, change in price, change in price of rice and household income turned out insignificant.

Table 6 Results of Logit Regression

Variable Name	Estimated Coefficient	Standard Error	T-Ratio	Elasticity at Means	Weighted Aggregate Elasticity
Constant	-1.5571	0.3233	-4.8156	-0.9841	-0.9659*
Age	0.6565	0.5940	1.1053	0.1272	0.1262 <sup>ns</sup>



Marital Status	0.6433	0.1683	0.3812	0.1764	0.1776 <sup>ns</sup>
No. of Years in Schooling	0.4055	0.1848	2.194	0.2555	0.2533*
Occupational Status	0.2581	0.1531	1.6860	0.1042	0.1052*
Gender	0.1134	0.1969	0.5759	0.9602	0.9514 <sup>ns</sup>
Location/Address	0.2293	0.1400	1.6375	0.9014	0.9056*
No. of Household Member	0.8815	0.2642	0.3337	0.2959	0.2911 <sup>ns</sup>
The Change of Price in Cigarette	0.3164	0.5266	0.6008	0.2231	0.2255 <sup>ns</sup>
The Change of Price in Rice	-0.1276	0.5266	-0.1916	-0.1021	-0.2255 <sup>ns</sup>
Change in Income	-0.1713	0.1581	-1.0836	-0.3682	-0.3361 <sup>ns</sup>

Log-Likelihood Function = -651.21

Log-likelihood (0) = -658.96

With 10 D.F. P-value = 0.1154

Likelihood Ratio Test = 15.4849

Results revealed that an increase in years of education will increase the probability of decreasing cigarette consumption by 0.25%. Cigarette smokers having higher educational attainment discusses personal awareness and appreciation of the deadly effects of tobacco use (Punzalan, *et al.*, 2013).

Probabilities of binary case are presented in Table 7. It revealed that employed smokers have a higher probability of decreasing consumption by 40% compared to unemployed smokers with probability of 34%. Furthermore, smokers in the urban areas has higher probability by 5% of decreasing cigarette consumption compared to smokers in the rural areas.

Table 7 Probabilities of Binary Variables

----PROBABILIITIES OF TYPICAL CASE----					
Variable Name	Marginal Effect	Case Values	X=0	X=1	Marginal Effect
Age <sup>ns</sup>	0.1526	30.652			
Marital Status <sup>ns</sup>	0.1496	0.0000	0.4003	0.4159	0.0155
No. of Years in Schooling*	0.9432	0.9670			

Occupational Status*	0.6003	1.000	0.3403	0.4003	0.0601
Gender <sup>ns</sup>	0.2637	0.0000	0.4003	0.4278	0.0275
Location/Address*	0.5332	1.000	0.3468	0.4003	0.0536
No. of HH Member <sup>ns</sup>	0.2050	5.312			
Change in Price of Cigarette <sup>ns</sup>	0.7359	1.116			
Change in Price of Rice <sup>ns</sup>	-0.2967	12.659			
Change in Income <sup>ns</sup>	-0.3983	340.12			

## Summary and Recommendation

### Summary

This paper examines the effectiveness of Sin Tax and Anti-smoking media campaign in regulating cigarette smoker in Davao City using cross sectional data from cross sectional survey. This paper employed primary data from random sampling within Davao City. Cigarette smokers were the respondents of this study, smokers were interviewed and answered some questions about their socio demographic characteristics, awareness, perception and attitude. This paper employed Descriptive Statistics presented in tabular form and Logit Regression Analysis was used to show the empirical result of the study.

As the result of the study using Descriptive Statistic revealed that cigarette smokers are highest in prevalence of age group 10 to 24 and among male fraction. While single individual have the higher prevalence than married people. Individual attended to school for 8 to 11 years got the highest prevalence of smoking. Employed individual, living in urban areas and individual having less number of family members got highest prevalence to smoking. The occurrence of 41.1 % of smokers who don't know about anti-smoking media campaign and only 26.8% out of 41.1% reduced their cigarette consumption. Smokers who are aware to anti-smoking ordinance is 80.9% and 78.9% smokers reduced their cigarette consumption. About 78.2% are aware of anti-smoking messages and smoking ban in public places and 70.7% out of 78.2% reduced their cigarette consumption. The smokers who are disagree about banning cigarette advertisement will make them easy to quit from smoking is 51.6%.

Lastly the result from empirical procedure the Logit Regression Analysis verified that the smoker's number of years in schooling, occupational status and location are positively significant while the marital status, occupational status, gender, change in income, change in price of rice and cigarette is insignificant.

After analyzing the result, the study makes the following conclusion. The anti-smoking media campaign through visual material and signage are limited in the rural areas. Having a modest effect to those smokers may even prefer death than to live without cigarettes. Moreover the anti-smoking ordinance/smoking ban is an effective tool in regulating cigarette smokers in public places however it is only effective in urban areas especially in the city proper. This ordinance is beneficial to the city to make it cleaner, it also a prevention to air pollution and especially beneficial to the health condition of non-smokers.

As a conclusion for empirical results, the Sin Tax is positively significant in some variables in regulating cigarette smokers in Davao City. As the result revealed Sin Tax has a modest effect to the cigarette smoker's equivalent to modest increase in price of cigarette. Even if there is a price increase cigarette smokers still be smoking because cigarette is have an addictive substance and it will crave them to smoke.

## Recommendations

Base on the result of the study the following recommendations are made:

1. The researcher recommends to put more anti-smoking media campaign materials in urban and rural areas.
2. The researcher recommends to tighten or strict implementation of smoking ban and anti-smoking ordinance in public places not only in downtown area but also in sub-urban and rural areas.
3. Lastly the researcher recommends that the government should put higher additional tax in cigarette products.

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Appendix 1. Questionnaire used in the survey.

UNIVERSITY OF SOUTHEASTERN PHILIPPINES  
SCHOOL OF APPLIED ECONOMICS  
BO. OBRERO, DAVAO CITY

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**THE EFFECT OF SIN TAX AND ANTI-SMOKING CAMPAIGN  
IN REGULATING CIGARETTE SMOKERS IN  
DAVAO CITY**

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**Objectives:**

The general objectives of this study is to evaluate the effectiveness of sin tax and smoking ban in regulating cigarette smokers in Davao City specifically this study aims to;

1. To present the socio-demographic characteristic of smokers.
2. To estimate the responsiveness of cigarette smokers after implementing the Sin Tax Law (R.A 10531).
3. To determine the effectiveness of the smoking ban posters, anti-smoking ordinance and signage in all public places in regulating cigarette smokers.

**PART 1. Socio-demographic Status**

Name of Respondent:	
Age:	Gender:
No. of years in schooling:	Income per Month:
Occupational Status:	No. of household member:
Type of employment:	

**PART 2. Prevalence and Smoking History**

Why do you smoke?
How long have you been smoking?
What age are you when you start smoking cigarette?
How often do you smoke?

**PART 3. Consumption Pattern**

	BEFORE Jan.2013 (without in tax law)	AFTER (with sin tax law)
In a day how frequent do you smoke?		
In a day how many stick of cigarette did you smoked?		
How much did you spent on cigarette per day?		
How much is the price of cigarette per stick?		
If there is an increase in the price of the rice between Jan. 2013 and Dec. 2014 how much is the price increase? Is there an effect to your cigarette consumption? If yes how many stick of cigarette do you consume per day?		
If there is an increase/decrease of your income between Jan. 2013 and Dec. 2014? How much was the increase/ decrease of your income? Is there an effect to your cigarette consumption? If yes, how many stick per day do you consume?		

#### **PART 4 Pictorial Warnings and Awareness of Anti-smoking campaign**

	YES	NO
Are you aware of the anti- smoking campaign through television, radio, billboards, posters, newspapers, magazines and stickers?		
Did the Anti-smoking campaign affect your smoking behavior or consumption pattern? If yes, how many stick of cigarette/day? Why?		
Did you see Anti- Smoking messages in the public places such as in the restaurants, malls, terminals, markets, public utility vehicles and etc.?		
Did the anti-smoking messages affects your smoking behavior or consumption? If yes, by how many stick of cigarette/day? Why?		
Are you aware of anti-smoking ordinance of Davao city?		
Did the ordinance affect your cigarette consumption behavior? By how many stick of cigarette/day? And why?		
Banning cigarette displays in supermarkets, convenience store, sidewalk and etc. would make easier for smokers to quit smoking?		

Do you agree with this statement “cigarette displayed in the supermarkets, convenience stores, sidewalks and etc. make it more difficult for smokers to quit from smoking?”		
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### **PART 5. Perceptions and Attitudes**

	YES	NO
In your family do you discussed the harmful effect of smoking cigarettes?		
Do you think next year you will be still a cigarette smoker even if there is an implementation of Smoking ban and Sin tax in Our City?		
Do you think that smoking in the working places was strictly prohibited may improve the working performance of the employees?		
Do you think smoking ban and sin tax will improve the health condition of the secondhand smokers and cigarette smokers? (note: secondhand smokers are those people who inhale the smoke from cigarette smokers)		
When the smoking ban was introduced in Davao city I thought it was:		
When the Sin tax was introduced I thought it was:		
After few years of operation I think smoking ban and Sin tax is:		
I think the smoking ban has affected my:		
I think the Sin tax has affected my:		
I think the advantages of implementing the SMOKING BAN are:		
I think the advantages of implementing the Sin Tax are:		

### **Appendix 2. Detailed computation of sample size.**

The Two Stage Random Sampling



$$n_i = n \left( \frac{N_i}{N} \right)$$

Where:

$n$  = desired sample size for the sub-district

$N$  = sum of the population in every selected barangay in each sub district.

$N_i$  = individual population of barangay  $i$

$n_i$  = number of individuals used as sample from barangay  $i$ .

The overall number of sample is 1,000 for Davao City and the sample for each barangay

District	Sub-district	Barangay	2010 Total Population for each brgy.	$n \left( \frac{N_i}{N} \right)$	No. of sample = ( $n_i$ )	Total percentage
1	Poblacion	27-C	2,117	$1,000 \left( \frac{2,177}{71,813} \right)$	29	2.91
		34-D	1,093	$1,000 \left( \frac{1,093}{71,813} \right)$	15	1.51
	Talomo	Dumoy	18,804	$1,000 \left( \frac{18,804}{71,813} \right)$	259	25.89
		Matina Pangi	13,625	$1,000 \left( \frac{13,625}{71,813} \right)$	188	18.76
2	Agdao	Kapt. Thomas	5,013	$1,000 \left( \frac{5,013}{71,813} \right)$	80	8.0
		San Antonio	12,211	$1,000 \left( \frac{12,211}{71,813} \right)$	168	16.82
	Bunawan	San Isidro	4,260	$1,000 \left( \frac{4,260}{71,813} \right)$	59	5.87
		Mahayag	4,194	$1,000 \left( \frac{1,093}{71,813} \right)$	68	6.77
3	Toril	Bayabas	2,606	$1,000 \left( \frac{2,606}{71,813} \right)$	36	3.59
		Baracatan	2,561	$1,000 \left( \frac{2,561}{71,813} \right)$	35	3.53
	Tugbok	New Valencia	1,516	$1,000 \left( \frac{1,516}{71,813} \right)$	20	2.09
		Tacunan	3,093	$1,000 \left( \frac{3,093}{71,813} \right)$	43	4.26
					1,000	100
The sum of the population in every selected barangay			71,813			

### Appendix 3. Result of the estimation using Shazam Version 11

Welcome to SHAZAM (Double Precision) v11.0 - JUNE 201 Windows7 PAR=112400  
 ...NOTE..CURRENT WORKING DIRECTORY IS: C:\Users\saec\Documents\SHAZAM  
 |\_\*\*work of kim\*\*  
 |\_file 22 D:\kim.txt  
 ...NOTE..UNIT 22 IS NOW ASSIGNED TO: D:\kim.txt  
 |\_sample 1 1000  
 |\_read (22) consum age MS NOYS OS G A NHS cpc cpr ci/skiplines=1  
 ...NOTE.. 11 VARIABLES AND 1000 OBSERVATIONS STARTING AT OBS 1

|\_logit consum age MS NOYS OS G A NHS cpc cpr ci

REQUIRED MEMORY IS PAR= 183 CURRENT PAR= 112400  
 LOGIT ANALYSIS DEPENDENT VARIABLE =CONSUM CHOICES = 2  
 1000. TOTAL OBSERVATIONS  
 370. OBSERVATIONS AT ONE  
 630. OBSERVATIONS AT ZERO  
 25 MAXIMUM ITERATIONS  
 CONVERGENCE TOLERANCE =0.00100

LOG OF LIKELIHOOD WITH CONSTANT TERM ONLY = -658.96  
 BINOMIAL ESTIMATE = 0.3700  
 ITERATION 0 LOG OF LIKELIHOOD FUNCTION = -658.96

ITERATION 1 ESTIMATES  
 0.66091E-02 0.62389E-01 0.40297E-01 0.25209 0.11161 0.22432  
 0.88514E-02 0.25319E-01-0.12488E-02-0.16902E-04 -1.5328  
 ITERATION 1 LOG OF LIKELIHOOD FUNCTION = -651.23

ITERATION 2 ESTIMATES  
 0.65660E-02 0.64317E-01 0.40556E-01 0.25810 0.11335 0.22924  
 0.88129E-02 0.31277E-01-0.12743E-02-0.17128E-04 -1.5566  
 ITERATION 2 LOG OF LIKELIHOOD FUNCTION = -651.21

ITERATION 3 ESTIMATES  
 0.65652E-02 0.64334E-01 0.40553E-01 0.25810 0.11338 0.22929  
 0.88151E-02 0.31641E-01-0.12756E-02-0.17127E-04 -1.5571

VARIABLE NAME	ESTIMATED COEFFICIENT	ASYMPTOTIC STANDARD ERROR	WEIGHTED T-RATIO AT MEANS	ELASTICITY	AGGREGATE ELASTICITY
AGE	0.65652E-02	0.59396E-02	1.1053	0.12718	0.12617
MS	0.64334E-01	0.16833	0.38219	0.17646E-01	0.17762E-01
NOYS	0.40553E-01	0.18481E-01	2.1943	0.25545	0.25329
OS	0.25810	0.15309	1.6860	0.10423	0.10522
G	0.11338	0.19686	0.57593	0.96018E-02	0.95139E-02
A	0.22929	0.14003	1.6375	0.90135E-01	0.90562E-01
NHS	0.88151E-02	0.26418E-01	0.33368	0.29594E-01	0.29113E-01
CPC	0.31641E-01	0.52663E-01	0.60081	0.22313E-01	0.22546E-01
CPR	-0.12756E-02	0.66591E-02	-0.19155	-0.10205E-01	-0.10094E-01
CI	-0.17127E-04	0.15806E-04	-1.0836	-0.36815E-02	-0.33607E-02
CONSTANT	-1.5571	0.32334	-4.8156	-0.98406	-0.96586

SCALE FACTOR = 0.23258

VARIABLE NAME	MARGINAL EFFECT	----- PROBABILITIES FOR A TYPICAL CASE -----	X=0	X=1	MARGINAL EFFECT
AGE	0.15269E-02	30.652			
MS	0.14962E-01	0.00000E+00	0.40033	0.41587	0.15539E-01
NOYS	0.94316E-02	9.9670			
OS	0.60029E-01	1.0000	0.34025	0.40033	0.60083E-01
G	0.26369E-01	0.00000E+00	0.40033	0.42783	0.27500E-01
A	0.53327E-01	1.0000	0.34675	0.40033	0.53586E-01

NHS 0.20502E-02 5.3120  
 CPC 0.73589E-02 1.1158  
 CPR -0.29667E-03 12.659  
 CI -0.39833E-05 340.12

LOG-LIKELIHOOD FUNCTION = -651.21  
 LOG-LIKELIHOOD(0) = -658.96  
 LIKELIHOOD RATIO TEST = 15.4849 WITH 10 D.F. P-VALUE= 0.11536

ESTRELLA R-SQUARE 0.15456E-01  
 MADDALA R-SQUARE 0.15366E-01  
 CRAGG-UHLER R-SQUARE 0.20982E-01  
 MCFADDEN R-SQUARE 0.11750E-01  
 ADJUSTED FOR DEGREES OF FREEDOM 0.17571E-02  
 APPROXIMATELY F-DISTRIBUTED 0.13078E-01 WITH 10 AND 11 D.F.  
 CHOW R-SQUARE 0.15714E-01

PREDICTION SUCCESS TABLE

		ACTUAL	
		0	1
0	622.	361.	
PREDICTED 1	8.	9.	

NUMBER OF RIGHT PREDICTIONS = 631.  
 PERCENTAGE OF RIGHT PREDICTIONS = 0.63100  
 NAIVE MODEL PERCENTAGE OF RIGHT PREDICTIONS = 0.63000

EXPECTED OBSERVATIONS AT 0 = 630.0 OBSERVED = 630.0  
 EXPECTED OBSERVATIONS AT 1 = 370.0 OBSERVED = 370.0  
 SUM OF SQUARED "RESIDUALS" = 229.44  
 WEIGHTED SUM OF SQUARED "RESIDUALS" = 1000.7

HENSHER-JOHNSON PREDICTION SUCCESS TABLE

		OBSERVED		OBSERVED	
		PREDICTED CHOICE		COUNT	SHARE
ACTUAL	0	1			
0	400.524	229.476	630.000	0.630	
1	229.476	140.524	370.000	0.370	

PREDICTED COUNT 630.000 370.000 1000.000 1.000  
 PREDICTED SHARE 0.630 0.370 1.000  
 PROP. SUCCESSFUL 0.636 0.380 0.541  
 SUCCESS INDEX 0.006 0.010 0.007  
 PROPORTIONAL ERROR 0.000 0.000  
 NORMALIZED SUCCESS INDEX 0.016  
 |\_stop