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Does Excessive Alcohol Consumption Increase Economic Cost? An Investigation from Thailand

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ABSTRACT
Excessive consumption of alcohol is linked with the various adverse health consequences, including liver diseases, cancer, kidney failure, cardiac problems, and digestive problems. It also results impulsive death, increases the cost of health care, increases crime rates, lowers the productivity of individuals, decreases output, reduces the possibility of earning and increases unemployment rate Therefore, present study aims to investigate the impact of excessive alcohol consumption on the economic cost of the nation. The study uses three proxies of economic cost, including health care cost, productivity cost and the cost of crimes. The study collected the data from the national data bases of Thailand. The study applies ordinary least square regression for the empirical estimation of results. Results of the study show positive impact of excessive consumption of alcohol on economic cost; health care cost, productivity cost and the cost of crimes. The study concluded that the excessive consumption of alcohol adversely affects the economy of Thailand. Therefore, it is suggested that government should take strict action against the excessive use of alcohol consumption in order to control the economic cost.

Keywords: Excessive Alcohol Consumption, Economic Cost, Health Care Cost, Productivity Cost, Cost of Crimes.

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INTRODUCTION

Alcohol is extensively used as legal drug among individuals since ages. Excessive consumption of alcohol negatively affects the whole society. According to the report of *center for disease control and prevention,* every year, on average, 79,000 deaths in US are the reason of excessive consumption of alcohol. Moreover, extensive consumption of alcohol is linked with the various adverse health consequences, including liver diseases, cancer, kidney failure, cardiac problems, and digestive problems [12]. It also results impulsive death, increases the cost of health care, increases crime rates, lowers the productivity of individuals, decreases output, reduces the possibility of earning and increases unemployment rate [30]. Alcohol is considered as a gateway drug which is pungent liquid, volatile and colorless drug. It is produced through fermentation of barriers, grains or some other vegetables and fruits. The excessive consumption of alcohol causes progressive loss of dizziness, flushing and inhabitation, loss of impaired motor skills, coordination, slurred speech, blurred vision, memory impairment, irregular pulse, vomiting and sudden mood swings. Chronis heavy usage of alcohol leads to high B.P (blood pressure), severe liver deterioration (cirrhosis) and irregular heartbeats (arrhythmia). Therefore, present study aims to investigate the impact of excessive consumption of alcohol on the economic cost.

According to the NIAAA, a total of 538,026,000 gallons of bear was consumed in US in 2010 (ARDI, 2010) and the cost of per standard drink was almost $1.90. In 1998 the estimations of Harward revealed that economy faces the loss of $148 billion due to excessive consumption of alcohol. This figure was $184.6 billion in 2002 [26] which turns into $235 billion in 2010 [7]. These statistics shows that economy is adversely affected by the excessive consumption of alcohol and alcohol abuse continuously increasing the economic cost of the nation. Evidences show the increasing trend of alcoholic drinks in Thailand for thousands of years. After 1782, early of Ratanakosin period, the people of Thailand start excessive consumption of alcohol in the form of wine and bear. In 1978, Chakri Dynasty fixed the alcohol laws by prohibiting the production of alcohol in homes and consolidating the monopoly system for the production of alcohol for the collection of taxes. This law provides two commands to the Excise master: first, to collect the taxes on production of alcohol; second, to conquer illegal production of alcohol. Hence, alcohol became one of the main sources of revenue for the government in that period, generates almost 51% income for the state in 1895. In early 1900s, the Excise Master System was ended because the indulgence fee decreased unacceptably, this system was replaced by the state-run decentralized system of tax collection in 1909. Nevertheless, the distribution of indulgence was left to the private division. The internal minister ordered the governors of each secretarial region to strictly impose the alcohol tax law for getting back the revenues. During 1927-1948, alcoholic production became a state-run monopoly and there was almost 9% annual increase in the state-run production. After the second world war, the home production was also increased significantly. As a result, the revenue of Alcohol tax raised by threefold in the decade after the world-war [14].

Economic cost is defined as the cost of the society, where the action of one individual affect the action of other individuals [8]. An alcoholic person not only adversely affected by his alcoholic consumption but it also affects others. For example, a drunk person does not drive properly which increases the risk of accidents [19]. Moreover, an alcoholic person involves in different crimes i.e., property crimes, bribery and street crimes etc. So that he can get money for the satisfaction of his needs [15]. All these costs are borne by the society, known as economic costs, usually measured by the cost of health care, productivity cost and the cost of crimes.

Health care cost includes the cost of the treatments of alcoholic patients, cost of health insurance, cost of mental health professionals and the cost of specialty treatment for alcohol abuse. According to the survey, the treatment of alcoholic patient costs almost 24.6 billion dollars, out of

which 43.4% cost is for the specialty treatment of alcohol abuse whereas 20.8% costs is for other medical treatments [25].

Productivity cost includes the cost of excessive drinking that is linked with the impulsive morality and diminished productivity at home and office. Excessive consumption of alcohol tends to increase the office absenteeism, reduce labor participation rate and increase unemployment because a drunk man is unable to work properly, hence terminated from job and become unemployed [22]. Moreover, a drunk man is suffering from many diseases and there might be a possibility that he is admitted to the hospital, hence his participation rate is low and absenteeism rate is high [17]. According to a survey, every year 2.5% reduction in labor force participation is due to the excessive consumption of alcohol.

Costs of crimes include those costs which are linked with the property damages. Criminal justice system involves the cost of police protection, court system and so on, which puts pressure on the economy. According to a survey, almost 15.7% share of the economic costs is linked with the cost of crimes [13].

However, in the summary of above discussion, it is proposed that the alcoholic person pressures his nation's economy and increases the nation's economic burden and there is a need to empirically investigate the impact of excessive alcohol consumption on economic cost which is not investigated yet in the case of Thailand. Therefore, present study aims to investigate the impact of excessive consumption of alcohol on economic cost. The study uses heath care costs, productivity costs and cost of crimes as a measurement of economic costs.

Remaining study has following pattern: section 2 represents the review of existing literature, Section 3 consists of data and methodology, section 4 shows the empirical findings, finally, section 5 is about discussions, conclusions and policy implications.

LITERATURE REVIEW

Criminal justice system involves the cost of police protection, court system and so on, which puts pressure on the economy. According to a survey, almost 15.7% share of the economic costs is linked with the cost of crimes [13]. Excessive consumption of alcohol tends to increase the office absenteeism, reduce labor participation rate and increase unemployment because a drunk man is unable to work properly, hence terminated from job and become unemployed [22]. Moreover, a drunk man is suffering from many diseases and there might be a possibility that he is admitted to the hospital, hence his participation rate is low and absenteeism rate is high [17]. According to a survey, every year 2.5% reduction in labor force participation is due to the excessive consumption of alcohol. In accordance with NIAAA, a total of 538,026,000 gallons of bear was consumed in US in 2010 and the cost of per standard drink was almost $1.90. The Harward's (1998) estimations revealed that economy faces the loss of $148 billion due to excessive consumption of alcohol. This figure was $184.6 billion in 2002 [26] which turns into $235 billion in 2010 [7]. These statistics shows that economy is adversely affected by the excessive consumption of alcohol and alcohol abuse continuously increasing the economic cost of the nation.

Excessive Alcohol Consumption and Health Related Cost

Moss [16] perceived alcohol as a commonly used drug among the adults of US. The study proposed the negative effects of alcohol on the health of individual as it increases the risk of accidents and damages. Moreover, alcoholic people suffer from various psychological and medical problems. Okan et al. [18] examined the effects of alcohol consumption on the road accidents. The study found that the ratio of road accidents of alcoholic patients is high. For instance, the consumption of 1-drink tends to increase the chances of road accident by almost 2%. Ono et al [20] utilized the data of cancer patients and found that most of the patients of liver cancer are alcoholic persons. The study also found that the risk of liver cancer is high in alcoholic males. Osonuga et al. [21] conducted a valuable research. They investigated the reasons behind the consumption of alcohol in adults and investigated the impact of alcohol consumption on the health of adults. For this purpose, the study collected the data from 336 students of private universities. The study revealed that almost 66% students consume by hanging out with friends, 20% students uses alcohol as a remedy for their stress, whereas 12% student consume alcohol for fun. The study further revealed that most of the adults who consumes alcohol faces various health issues such as severe headache, nausea, vomiting, kidney problems and stomach problems. Testino et al. [28] highlighted the adverse effects of alcohol on the liver. The study proposed that increase in 1-drink of alcohol tends to increase the risk of liver diseases by almost 3.4%. The study showed that almost 30-35% liver patients in japan are alcoholic individuals. Teka [27] conducted his research on the adults of haramaya town, who are addicted to alcohol. For this purpose, the study conducted the cross-sectional survey by using mix method data collection. Data were collected from 120 respondents, including married respondents, illiterate respondents, and unemployed respondents. Results of the study depicted that the consumption of alcohol leads to different social problems such as lack of integration with people, different economic problems such as poverty and shortage of resources and various health problems such as headache, vomiting and different liver problems. Bouchery [2] done a valuable work in his study, the study investigated the cost of excessive drinking on the health. The study revealed that almost $223.5 billion are the cost of alcohol on health. Similarly, Sacks et al. [24] also indicated that high cost is associated with the consumption of alcohol. So, after reviewing the above literature, it is proposed that:

H_1: "There is positive relationship between excessive consumption of alcohol and health care cost"

Excessive Alcohol Consumption and Productivity Cost

Rehm et al. [22] investigated the impact of alcohol consumption on unemployment and revealed the positive relationship between the consumption of alcohol and unemployment. The study concluded that there is increased ration of unemployment in alcoholic persons. The study

concluded that a drunk man is unable to work properly, hence terminated from job. Chaloupka, Powell & Warner [6] investigated the labour force participation rate of alcoholic persons. For this purpose, the study collected the data from United states. Results of the study revealed that the labour force participation rate of an alcoholic person is very low. The study concluded that an alcoholic person does not want to work, he just wants to satisfy his needs by taking drinks. Brown & Rhind [4] examined the influence of alcoholic consumption on productivity loss and found the positive association between these two variables. The study concluded that an alcoholic person is unable to concentrate on his work because alcohol make him unconscious. Rhee & Rosenheck [23] perceived that the consumption of drugs putts pressure on the society in various forms and investigated the social cost of drugs. The study revealed that drugs not only affects the health of an individual, but it also affects the individuals of whole society. Excessive consumption of alcohol tends to increase the ratio of road accidents. For instance, 1.6% deaths on daily basis are the reason of road accidents, results with the rash driving of alcoholic persons. Ong & Ward [19] investigated the relationship between seasonal unemployment and drugs. For this purpose, the study utilized the data from national survey of drug use and health, ranges from 2004-2014 and found the casual relationship between these two variables. So, after reviewing the above literature, it is proposed that:

H_2: "There is positive relationship between excessive consumption of alcohol and productivity cost"

Excessive Alcohol Consumption and Cost of Crimes

Gallagher, Raffle& Maulana [9] investigated the impact of drugs consumption on property crimes. For this purpose, the study utilized the data from Philippines. Results of the study showed the positive relationship between drugs consumption and property crimes. The study concluded that the people who consume drugs, become addictive of drugs and they want to satisfy their drugs cravings. Hence, they become involve in property crimes so that they can get money for the consumption of drugs. Laqueur et al. [15] indicated the positive impact of alcohol consumption on the violence. The study proposed that an alcoholic person is not in his senses and thus involves in crimes i.e., violence. Hansen & Waddell [10] examined the impact of drugs consumption on street crimes and revealed that the higher the consumption of drugs, the higher the ratio of street crimes. Wintemute et al. [29] revealed the positive association between bribery and drug's consumption. For instance, 1-unit increase in the consumption of drugs tends to increase the bribery by almost 0.263 units. So, after reviewing the above literature, it is proposed that:

H_3: "There is positive relationship between excessive consumption of alcohol and cost of crimes"

DATA AND METHODOLOGY

Sample and Data

Present study aims to investigates the impact of excessive alcohol consumption on the economic cost in Thailand. For this purpose, the study uses heath care costs, productivity costs and cost of crimes as a proxy of economic cost. Data of modeled variables are gathered from national data bases of Thailand, during the period of 2000-2010.

Variables Description

The study uses excessive alcohol consumption (EAC) is used as independent variable while economic cost is used as dependent variable which is measured through three proxies: heath care costs (HCC), productivity costs (PC) and cost of crimes (CC). Table 1 provides the description of the variables used in the study:

TABLE 1: Variables Description

Variable Name	Symbols	Definition
Dependent Variables: Economic cost (EC)		
1. Health care cost	HCC	1. HCC is used as a proxy of economic cost. HCC consist on the treatment cost of alcoholic patients.
2. Productivity cost	PC	2. PC is also used as a proxy of economic cost, defined as reduction in labor force participation due to the consumption of alcohol
3. Cost of crimes	CC	3. CC is another proxy of economic cost, defied as the cost of property crimes, bribery and crash-related cost under driving
Independent Variable: Excessive alcohol consumption (EAC)		
4.Excessive alcohol consumption	EAC	4. Excessive alcohol consumption (EAC) is uses as an independent variable of the study which is define as excess drinking of alcohol, which means, per occasion 4 drinks of a woman, and 5 drinks of a man [3].

Econometric Techniques

The study uses E-Views software for the empirical estimation of results. Correlation Metrix is used for testing the problem of multicollinearity in the data. Study used regression analysis for testing the proposed hypothesis of the study. Study uses following econometrics model for the empirical estimation of the results.

$$HCC = \beta_0 + \beta_1(EAC) + e \text{----------} (1)$$

$$PC = \beta_0 + \beta_1(EAC) + e \text{----------} (2)$$

$$CC = \beta_0 + \beta_1(EAC) + e \text{----------} (3)$$

Where: "HCC is health care cost, PS is productivity cost, CC is cost of crimes, β_0 -s constant, β_1 is coefficient and e is error term."

Empirical Results

In order to analyze the impact of excessive alcohol consumption (EAC) on health care costs (HCC), productivity costs (PC) and cost of crimes (CC), the study uses correlation and regression analysis, shown in this section.

Correlation Matrix

Table 2 shows the results of correlation matrix which is used to check the issue of multicollinearity in the data. The results depict that there is no issue of multicollinearity in the data. The highest value of correlation is 0.16 which is in between the variables of HCC and CC, while the lowest value of correlation is 0.09, in between EAC and CC, showing that the date are free from multicollinearity.

TABLE 2: Correlation Matrix

	EAC	HCC	PC	CC
EAC	1			
HCC	0.1152	1		
PC	0.1265	0.1075	1	
CC	0.0945	0.1666	0.1457	1

REGRESSION ANALYSIS

Table 3 shows the results of regression analysis which is used to test the impact of excessive alcohol consumption (EAC) on health care costs (HCC), productivity costs (PC) and cost of crimes (CC). There is positive impact of EAC on HCC. Coefficient of EAC in model 1 (0.342) is significant at 1%, showing that 1-unit increase in EAC tends to increase HCC by 0.342 units. Hence, H_1 is accepted. The value of adjusted R^2 shows that 92.3% variations in HCC are explained by EAC. EAC also has significant positive impact on PC. Coefficient of EAC in model 2 (0.233) is also significant, showing 0.233 units increase in PC is due to 1-unit increase in EAC. H_2 is accepted at 1% level of significance. Value of adjusted R^2 is showing that 98.6 % variations in PS are explained by EAC. Similarly, EAC also shows positive impact on CC. Coefficient of EAC in model 3 (0.294) is also significant at the level of 1% which depicts that 1-unit increase in EAC tends to increase CC by 0.294 units. H_3 is also accepted. Value of adjusted R^2 is showing that 92.1% variations in CC are explained by EAC.

TABLE 3: Regression Analysis

Variables	Model 1: HCC		Model 2: PC		Model 3: CC	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
EAC	0.342***	0.000	0.223***	0.000	0.294***	0.000
R^2	0.934		0.993		0.931	
Adj. R^2	0.923		0.986		0.921	
Hypothesis	H_1: Supported		H_2: Supported		H_3: Supported	

CONCLUSION

Alcohol is extensively used as legal drug among individuals since ages. Excessive consumption of alcohol negatively affects the whole society. According to the report of center for disease control and prevention, every year, on average, 79,000 deaths in US are the reason of excessive consumption of alcohol. Moreover, extensive consumption of alcohol is linked with the various adverse health consequences, including liver diseases, cancer, kidney failure, cardiac problems, and digestive problems. It also results impulsive death, increases the cost of health care, increases crime rates, lowers the productivity of individuals, decreases output, reduces the possibility of earning and increases unemployment rate. Therefore, present study aims to investigate the impact of excessive consumption of alcohol on the economic cost. Therefore, present study aims to investigate the impact of excessive consumption of alcohol on the economic cost. For this purpose, the study collects the data from national data bases of Thailand, during the period of 2000-2010. Study applies regression models for the estimation of empirical results. Study use three proxies for measuring the economic cost, including health care cost (HCC), productivity cost (PC) and the cost of crimes (CC).

The findings show that there is positive impact of EAC on HCC. Coefficient of EAC (0.342) is significant at 1%, showing that 1-unit increase in EAC tends to increase HCC by 0.342 units. Hence, H_1 is accepted. EAC also has significant positive impact on PC. Coefficient of EAC (0.233) is also significant, showing 0.233 units increase in PC is due to 1-unit increase in EAC. H_2 is accepted at 1% level of significance. Similarly, EAC also shows positive impact on CC. Coefficient of EAC (0.294) is also significant at the level of 1% which depicts that 1-unit increase in EAC tends to increase CC by 0.294 units. H_3 is also accepted. Conclusively, the study shows positive relationship between heath care cost, productivity cost, cost of crimes and the excessive consumption of alcohol. Results of the study are consistent with prior studies [18, 21, 2, 6, 9]. As the alcohol is produced through fermentation of barriers, grains or some other vegetables and fruits. The excessive consumption of alcohol causes progressive loss of dizziness, flushing and inhabitation, loss of impaired motor skills, coordination, slurred speech, blurred vision, memory impairment, irregular pulse, vomiting and sudden mood

swings. Chronis heavy usage of alcohol leads to high blood pressure, cirrhosis and arrhythmia. The study concluded that the excessive consumption of alcohol adversely affects the economy of Thailand.

Present study has following implications: First, government should arrange health literacy programs for their citizens so that they can get awareness about the disadvantages of alcohol. Secondly, government should impose tax on the excessive consumption of alcohol. Third, government should strictly punish the drunk mans who are involving in criminal activities. Present study has some limitations: First, the study is conducted in Thailand, future studies may have conducted on different nations. Second, study use three different proxies of economic cost, future study may build an index by using different proxies of economic cost. Thirty, the study uses the data of only 10 years, future study may extend the data time period.

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