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Article

The impact of alcohol consumption on economic growth in Thailand

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Abstract: The nighttime economy has always been an important part of tourism in Thailand. The alcohol industry contends that lifting alcohol restrictions will promote tourism and, consequently, generate additional income. Endogenous Growth Theory, however, emphasizes on investing in human capital, innovation, and knowledge as the most important factors that affect economic growth for a nation. Alcohol consumption incurs opportunity costs, as households lose financial resources and time that could be invested in children's development. Relaxing control measures to promote alcohol consumption should impede economic development by diminishing the quality of human resources. The paper, therefore, aims to estimate the impact of alcohol consumption on economic growth by using 1990–2019 annual data from Thailand. By adopting Autoregressive Distributed Lag (ARDL) approach, the results reveal that alcohol consumption has significant and negative effects on economic growth in the long run. The statistic tests demonstrate no presence of serial correlation, heteroskedasticity, as well as, endogeneity problems. The finding has been corroborated in international studies, in which alcohol consumption contributes to substantial social and economic costs of the society.

Keywords: alcohol consumption; beer consumption; spirit consumption; economic growth; Thailand

1. Introduction

Governments globally prioritize economic factors when formulating alcohol policies, as the alcohol sector frequently cites income, job creation, and economic expansion as arguments against the implementation of restrictions on alcohol use. For the case of Thailand, where tourism and the nighttime industry are important to the economy, there are assumptions from both the government and private sectors that lifting alcohol limits will promote tourism and generate revenue.

According to the data provided by the Business Research Company, in 2022, Asia Pacific was the region with the highest alcohol sales, valued at $194.1 billion, accounting for 37.1% of the global alcohol market. This was followed by Western Europe at 24.9% and North America at 23.4%, respectively. When considering only countries in Southeast Asia, the data shows that the alcohol market has the highest revenue in Thailand at $10.09 billion and followed by Indonesia at $6.50 billion (The Business Research Company, 2023). Meanwhile, Malaysia's alcohol industry's revenue is the lowest at $1.60 billion. This fact implies that the alcohol industry is very important to the Thai economy. When the data on drinking is examined, it is found that the alcohol consumption in Thailand has a continuous upward trend since 1990. According to the data provided by World Health Organization, alcohol consumption per capita in Thailand as well as Vietnam in 2020 is 8 liters, the highest among nations in Southeast Asia.

However, numbers of argument indicate an inverse relationship between alcohol

consumption and national economic development, especially, in the long run. Firstly, alcohol consumption reduces productivity and labor force in the economy, due to absenteeism, presenteeism, unemployment and premature death (Macdonald and Shields, 2003; Thørrisen et al., 2019). According to Endogenous Growth Theory, technology is crucial for economic success. Therefore, factors that drive technological development also drive economic growth (Lucas, 1988; Romer, 1990). That is, Endogenous Growth Theory emphasizes on investing in human capital, innovation, and knowledge as the most important factors that affect economic growth for a nation (Schultz, 1961). The results of past studies support this theory (Barro, 1991; Krueger and Lindahl, 2001; Sianesi and Van Reenen, 2003). Alcohol consumption incurs opportunity costs, as households lose financial resources and time that could be invested in children's development. Thus, relaxing control measures to promote alcohol consumption will, in turn, impede economic development by diminishing the quality of human resources.

Next, comprehensive restrictions in terms of taxes and non-tax to reduce alcohol consumption contributes to the quality of the population. In other words, drinking alcohol can lead to structural changes in Hippocampus, which is part of the brain involved in the learning and memory processes. High levels of consumption can permanently impair brain development (Mira et al., 2020). Drinking among teenagers and adults is therefore often associated with depression, poorer academic performance, as well as suicide, as stated by Xuan et al. (2016), for example.

In addition, societies that strictly control alcohol consumption allow young people to grow up in an environment where there is low risk of drinking from parents, guardians, or people in the society. This societal context produces human resource with strong physical and mental health that subsequently becomes human capital that leads to economic growth. Lastly, countries with low alcohol consumption will generate an environment suitable for quality tourism. That is, a country with low risks from drinking alcohol excessively, such as sexual harassment, drunk driving, and homicide, will attract quality tourists and generate income from tourism, especially in the long term. World Bank (2023) explains that the development of quality tourism will give the country the potential to generate sustainable income, which can create jobs, reduce poverty, and generate new public revenue.

Although, theoretically, alcohol consumption could deteriorate economic development, the research on this topic is very limited. The exception is Cesur and Kelly (2013) which used data from the United States between 1971 and 2007 to assess the impact of beer consumption on economic growth, in addition to recent findings of Tchoffo and Nkemgha (2021). Thus, this research tries to fill the gap by exploring the impact of alcohol consumption on economic growth using data from Thailand over the period 1990–2019 both in overall alcohol consumption and by type; beer and spirits. Moreover, investing in education is crucial for enhancing a country's human capital (Schultz, 1961). Numerous studies have shown that economic growth is positively correlated with the average years of schooling (Krueger and Lindahl, 2001; Sianesi and Van Reenen, 2003; Topel, 1999; Temple, 2001). Additionally, a substantial body of literature indicates that trade openness significantly impacts economic growth (Sakyi et al., 2014; Keiho, 2017). Therefore, both education and trade openness are controlled in the analysis. Due to the high correlation (0.64)

between foreign direct investment (FDI) and trade openness, which can cause multicollinearity, FDI is excluded from the analysis. In addition, numbers of literatures recently indicated no relationship between FDI and economic growth of developing nations (Wiredu et al., 2020) as well as strong skepticism of FDI on economic growth (Loungani and Razin, 2001). In sum, although economic theory and some empirical evidences prove that FDI has a positive impact on developing nations, recent studies show some potential drawbacks.

The content of this paper is structured as follows. The methodology of the research is provided in Section 2 and then followed by results in Section 3. Section 4 is the discussion as well as conclusions.

2. Methodology

The study uses annual data for Thailand from 1990–2019. Controlled variables that determine economic growth include mean years of schooling as well as trade openness. Details of each variable and sources of the data are shown in **Table 1**. In the model, a dummy variable, which is the year in which Thailand had a severe economic crisis, namely 1997 and 2008, is controlled as a fixed regressor.

Table 1. Variable description and data source.

Variable	Symbol	Source
GDP per capita growth	growth	World Bank
Alcohol, total per capita (15+) consumption	Alc	
Spirit, total per capita (15+) consumption	Spirit	WHO
Beer, total per capita (15+) consumption	Beer	
Mean years of schooling	School	UNDP
Trade Openness (% of GDP)	Trade	World Bank

The study adopted an approach introduced by Pesaran et al. (2001) called the autoregressive distributed lag (ARDL). ARDL is proper for small samples and in the case in which the variables in the model are I(0), I(1), or mutually cointegrated. To find the association between dependent and independent variables, the models are constructed with t represents the time period from 1990 to 2019 as follows.

$$\text{Growth}_t = \beta_0 + \beta_1 \text{School}_t + \beta_2 \text{Alc}_t + \beta_3 \text{Trade}_t + \varepsilon_t \quad (1)$$

$$\text{Growth}_t = \beta_0 + \beta_1 \text{School}_t + \beta_2 \text{Beer}_t + \beta_3 \text{Trade}_t + \varepsilon_t \quad (2)$$

$$\text{Growth}_t = \beta_0 + \beta_1 \text{School} L_t + \beta_2 \text{Spirits}_t + \beta_3 \text{Trade}_t + \varepsilon_t \quad (3)$$

The dependent variable is economic growth. The independent variables of interest in Equation (1) are alcohol consumption per capita (Alc), in Equation (2) is the beer consumption per capita (Beer), and in Equation (3) is spirits consumption per capita. Control variables include mean years of schooling (School) and the trade openness (Trade) and the dummy (dummy 1 is the year 1998 and 2008, the severe economic crisis and 0 otherwise), while ε represents the error term.

Equations (1)–(3) can be written in ARDL models as follows.

$$\begin{aligned}\text{Growth}_t = \beta_0 + \sum_{k=1}^{n} \beta_1 \text{Growth}_{t-k} + \sum_{k=1}^{n} \beta_2 \text{Alc}_{t-k} + \sum_{k=1}^{n} \beta_3 \text{Trade}_{t-k} \\ + \sum_{k=1}^{n} \beta_4 \text{School}_{t-k} + \sum_{k=1}^{n} \beta_5 D_{t-k} + \lambda_1 \text{Growth}_{t-1} \\ + \lambda_2 \text{Alc}_{t-1} + \lambda_3 \text{Trade}_{t-1} + \lambda_4 \text{School}_{t-1} + \lambda_5 D_{t-1} + \epsilon_t\end{aligned} \tag{4}$$

$$\begin{aligned}\text{Growth}_t = \beta_0 + \sum_{k=1}^{n} \beta_1 \text{Growth}_{t-k} + \sum_{k=1}^{n} \beta_2 \text{Beer}_{t-k} + \sum_{k=1}^{n} \beta_3 \text{Trade}_{t-k} \\ + \sum_{k=1}^{n} \beta_4 \text{School}_{t-k} + \sum_{k=1}^{n} \beta_5 D_{t-k} + \lambda_1 \text{Growth}_{t-1} \\ + \lambda_2 \text{Beer}_{t-1} + \lambda_3 \text{Trade}_{t-1} + \lambda_4 \text{School}_{t-1} + \lambda_5 D_{t-1} + \epsilon_t\end{aligned} \tag{5}$$

$$\begin{aligned}\text{Growth}_t = \beta_0 + \sum_{k=1}^{n} \beta_1 \text{Growth}_{t-k} + \sum_{k=1}^{n} \beta_2 \text{Spirits}_{t-k} + \sum_{k=1}^{n} \beta_3 \text{Trade}_{t-k} \\ + \sum_{k=1}^{n} \beta_4 \text{School}_{t-k} + \sum_{k=1}^{n} \beta_5 D_{t-k} + \lambda_1 \text{Growth}_{t-1} \\ + \lambda_2 \text{Spirits}_{t-1} + \lambda_3 \text{Trade}_{t-1} + \lambda_4 \text{School}_{t-1} + \lambda_5 D_{t-1} + \epsilon_t\end{aligned} \tag{6}$$

3. Results

The descriptive statistics of the variables is given in **Table 2**. Scatter plot between GDP per capita growth and alcohol consumption per capita indicates negative relationship (**Figure 1**). In addition, correlation results between GDP per capita growth and all alcohol variables are clearly negative (**Table 3**). An argument that economic expansion leads to increase in alcohol consumption is, therefore, not suitable for the dataset of Thailand.

Table 2. Descriptive statistics of the variables.

Variables	Obs.	Unit	Mean	Sdt. Dev	Maximum	Minimum
Growth	30	%	3.44	3.64	-8.77	9.35
Alc	30	litre	6.15	6.10	5.00	7.54
Beer	30	litre	1.43	1.64	0.33	2.24
Spirits	30	litre	4.60	4.60	4.00	5.26
Wine	30	litre	0.08	0.02	0.00	0.23
Trade	30	%	112.94	120.42	75.78	140.43
School	30	year	6.64	7.05	4.50	8.70

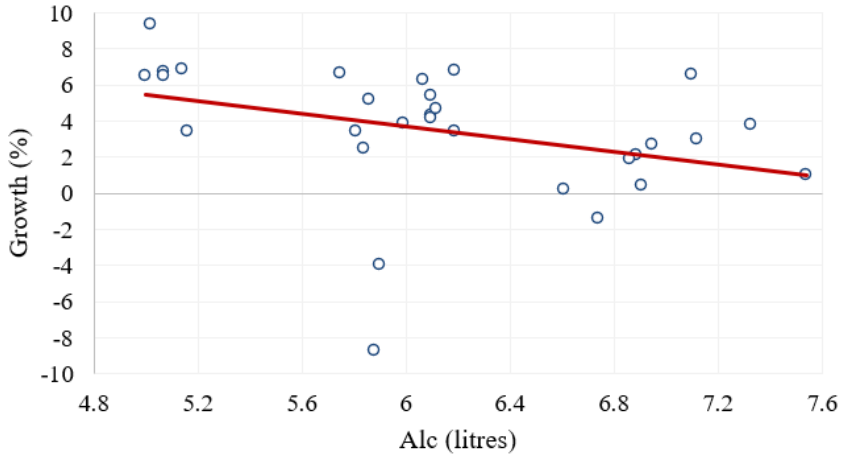

Figure 1. Scatter plot showing relationship between GDP per capita growth and alcohol consumption.

Table 3. Correlation matrix between GDP per capita growth and alcohol consumption by type.

	Alc	**Beer**	**Spirit**
Growth	−0.35	−0.28	−0.13

Before applying the ARDL bound test, the Augmented Dickey–Fuller (ADF) unit root test is incorporated in order to confirm that there are no variables with order of I(2). **Table 4** shows all variables are stationary at order I(1), except GDP per capita growth rate which is stationary at I(0).

Table 4. Unit root tests.

Level			**1st difference**		
Variables	***t*-statistic**	***P*-Value**	***t*-statistic**	***P*-Value**	**Order of integration**
Alc	−2.02	0.28	−6.81	0.00	I(1)
Growth	−4.05	0.00			I(0)
Beer	−0.26	0.92	−5.62	0.00	I(1)
Wine	−0.32	0.91	−10.69	0.00	I(1)
Spirit	−2.75	0.07	−6.56	0.00	I(1)
Trade	−0.99	0.75	−6.79	0.00	I(1)
School	−1.12	0.69	−3.90	0.01	I(1)

Before finding the long-run association between variables, it is important to examine the ARDL bound test (Pesaran et al., 2001). **Table 5** shows the value of F-statistics is larger than lower and upper bound at 1% significance level. Hence, the alternative hypothesis of cointegration is accepted. The ARDL bound test of Model 1 demonstrates the presence of long-run association among GDP per capita growth, alcohol consumption per capita, mean years of schooling, and trade openness. The findings of Model 2 and Model 3 show similar result.

Table 5. ARDL bound test for cointegration.

Model	(1) Alc	(2) Beer	(3) Spirits	k	I(0) Bound	I(1) Bound	Significance level (%)
F-statistic	19.53	6.09	6.23	3	2.37	3.2	10
					2.79	3.67	5
					3.65	4.66	1

The empirical results in **Table 6** reveal that for a long-run association, an increase in alcohol consumption (Model 1), beer consumption (Model 2), as well as spirits consumption (Model 3) in Thailand significantly lead to the reduction of economic growth. A rise of 1 litre in alcohol consumption can reduce GDP per capita growth in Thailand up to about 15%. This statistic results are supported by scatter plot of GDP per capita growth and alcohol consumption per capita in **Figure 1** showing an inverse relationship. In addition, correlation test between GDP per capita growth and alcohol per consumption per capita in **Table 3** shows a negative sign, at −0.35. Thus, simultaneity, the problem when predictor and dependent variable causally influences each other, does not exist in this study. That is, GDP per capita growth does not lead to increase in alcohol consumption per capita as argued. The negative sign of the trade openness variable aligns with the scatter plot of Thailand's data, which illustrates the relationship between trade openness and economic growth rate, showing no positive association. Likewise, the correlation matrix of these two variables was found to be negative at −0.12. This result is in line with some recent studies. Reducing trade barriers to increase trade openness, ironically, leads to deteriorating economic growth in developing countries. For instance, Ulaşan (2015) found a negative relationship between trade openness and economic growth from 1960 to 2000, based on data from over a hundred countries.

Table 6. Long-run estimation of parameters from ARDL models.

Independent Variables	Dependent Variable (Growth)		
	Model		
	(1)	(2)	(3)
Alc	−15.06*** (−10.16)		
Beer		−15.11** (−2.39)	
Spirits			−16.58*** (−4.32)
School	8.89*** (7.63)	−1.58 (−1.10)	1.85* (2.19)
Trade	−0.06** (−2.53)	−0.45** (−3.01)	−0.19*** (−3.78)
Dummy	−11.44*** (−7.97)	−7.70** (−3.43)	−6.43*** (−3.74)
Observations	28	26	27

Note: * Significant at 10%; ** significant at 5%; *** significant at 1%; T-statistics are under the variables coefficients.

The findings of **Tables 7** and **8** suggest that there is no serial correlation and

Heteroskedasticity problems in all models. When the model does not have a serial correlation problem, it also indicates no endogeneity problem to some extent (Ullah et al., 2018). To confirm this hypothesis, endogeneity test was adopted. Alcohol variables were regressed on the remaining independent variables to find the residual value. Then, the growth variable was tested by including the residual value. The results show that P-value of the residual from the Alc model was equal to 0.73, which is greater than 0.10 indicating no endogeneity problem. In addition, the Wald test was also employed and its result clearly confirm no presence of endogeneity problem.

Table 7. Breusch-Godfrey serial correlation test.

	Alc	**Beer**	**Spirits**
F-Statistic	0.73	1.48	0.11
P-value	0.54	0.29	0.89

Table 8. Heteroskedasticity test: Breusch-Pagan-Godfrey.

	Alc	**Beer**	**Spirits**
F-Statistic	1.57	1.24	0.85
P-value	0.30	0.38	0.63

4. Discussion and conclusion

The finding indicates that alcohol consumption among individuals aged 15 and over in Thailand negatively impacts long-term economic growth. When considering the classification by type, the study reveals that beer consumption as well as spirit consumption have a negative impact on long-term economic growth as well. The results of this study are consistent with Cesur and Kelly (2013) which used data from the United States between 1971 and 2007 to assess the impact of beer consumption on economic growth, in addition to recent findings of Tchoffo and Nkemgha (2021) and Rehm et al. (2024).

These outcomes are in line with numbers of international literatures indicating that alcohol causes social and economic damage (Balakrishnan et al., 2009; Gaurav et al., 2019; Magnus et al., 2012; Thavorncharoensap et al., 2009). According to the recent study of Thailand, Luangsinsiri et al. (2023) found that alcohol consumption in Thailand causes economic costs of nearly 170,000-million-baht, equivalent to 1.02% of the gross domestic product.

The economic benefits of reducing alcohol consumption can be explained as follows: alcohol consumption affects health, leading to absenteeism, presenteeism, and premature death, which in turn reduces labor productivity. Additionally, alcohol consumption incurs opportunity costs, as households lose financial resources and time that could be invested in children's development. Regarding tourism, the World Bank (2023) states that by adopting "quality tourism" strategies, developing countries can generate higher quality tourism, create jobs, reduce poverty, and generate new public income. By implementing measures to preserve natural resources and the environment, including limiting excessive alcohol consumption, economic development can be fostered.

Therefore, the government should regulate alcohol consumption in society

through a combination of tax and non-tax measures. Firstly, alcohol taxation is the most effective alcohol policy measure (World Health Organization, 2019). Increasing alcohol prices by raising excise taxes can significantly reduce consumption. Additionally, restricting access to alcoholic beverages based on age, time, and location can yield public health benefits. For example, Bäuml et al. (2022) found that banning alcohol sales at night significantly reduced alcohol-related hospitalizations among young people in Germany while Nakaguma and Restrepo (2018) indicated that a short-term ban on the sale of alcohol decreased road traffic accidents and admission to hospital in Brazil.

The prohibition of advertising, marketing, and promotional activities is also required as alcohol marketing leads to positive attitudes and perceptions towards drinking. The World Health Organization states that more than 21 global studies indicate the relationship between exposure to alcohol advertising and the initiation of drinking among young people, and the progression to heavy drinking for existing drinkers (World Health Organization, 2024). For example, Rossow (2021) studied whether the complete ban on alcohol advertising in Norway since 1975 had any effect on total alcohol sales. The findings indicated that these measures have resulted in a notable decline in alcohol sales, both in the short term and over the long term. Gabrielli et al. (2021) assessed the impact of alcohol advertising on youth drinking. The findings revealed that brand presence on TV programs is associated with youth drinking, drinking initiation as well as hazardous drinking. Implementing extensive restrictions on alcohol advertising and marketing is likely to result in significant public health improvements.

Additionally, a public awareness campaign should educate people about the adverse effects of alcohol consumption on both society and the economy. Urgent law enforcement reforms are necessary for effectively reducing alcohol consumption. This will benefit the economy by fostering a healthier population, leading to increased labor productivity and a reduction in premature deaths. As a result, successfully reducing alcohol consumption will enhance economic sustainability by increasing the country's human capital.

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