MBA AF 636 Applied Econometric Analysis

Fall Semester 2023 Project – Final Submission

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Title: "The Role of Alcohol and Tobacco on Worldwide Mortality"

Abstract:

Alcohol and tobacco consumption are leading risk factors for mortality worldwide, posing a significant public health burden. This study investigates the association between these substances and all-cause mortality across 136 countries, aiming to inform global public health policy and prevention strategies. We employ a multiple regression analysis of data from the CIA World Factbook, examining the relationship between alcohol consumption per capita, tobacco use prevalence, and mortality rates.

Introduction:

Approximately 11 million deaths annually are attributed to alcohol and tobacco use, highlighting their profound impact on global health outcomes. Understanding the multifaceted and geographically diverse relationships between these substances and mortality is crucial for crafting effective public health interventions. While previous studies have established a negative correlation between high consumption and mortality, this research delves deeper, examining specific consumption levels and their association with mortality rates across a wide range of countries.

Relevant Literature:

Previous studies have consistently identified a negative correlation between high consumption of alcohol and tobacco use and mortality. The harmful effects of excessive alcohol consumption and tobacco use on health are well-documented in existing research.

Research Hypothesis

This study hypothesizes that countries in which there is higher consumption of alcohol per capita and a higher percentage of population that engages in smoking will have higher rates of mortality. We anticipate finding a positive correlation between the level of alcohol and tobacco use and mortality rates.

Data:

Data was obtained from the CIA World Factbook, which is a reference resource produced by the Central Intelligence Agency with almanac-style information about the countries of the world. The data includes relevant observations for 136 countries across the globe with most recently available data (2021).

Estimation Equation & Rationale:

We will employ a multiple regression model to estimate the relationship between alcohol and tobacco consumption and mortality. The equation is as follows:

$$Y = \alpha + \beta_1 x_1 + \beta_2 x_2$$

Where:

- Y represents the mortality rate

- x_1 represents alcohol use

- x_2 represents tobacco use

This model allows us to explore the effects of alcohol and tobacco consumption in influencing mortality.

Results and Discussion

A summary of variables used in the analysis is shown in Table 1 below. We obtained 136 observations for each of the three variables, representing 136 countries across the globe.

Table 1: Summary of Variables

Variable Name	Description	# of Obs	Mean	Std Dev	Min	Max
Mortality	Crude death rate (deaths per 1,000 in population)	136	7.76	2.84	2.27	15.17
Tobacco	Percentage of adult population that smokes tobacco	136	20.86	9.90	3.5	48.5
Alcohol	Liters of pure alcohol per capita	136	4.91	3.82	0	12.9

Regression results are shown in Table 2 below. Each additional percent of the adult population that engages in smoking is associated with an increase in mortality of 0.06 deaths per 1,000. Each additional liter of alcohol consumption per capita is associated with an increase in mortality of 0.43 deaths per 1,000. Both results are statistically significant and are in the expected direction based upon our hypothesis. Alcohol consumption shows the largest coefficient in the regression analysis. Standardization of the coefficients confirms that that this variable has the greatest magnitude. One standard deviation changes in the consumption of alcohol results in 0.583 standard deviation change in mortality, while one standard deviation change in tobacco results in 0.209 standard deviation change in mortality.

Table 2: OLS Regression Results for Mortality

Variable Name	Coefficient	Standard Error	P-Value	Beta Coefficient
Tobacco	0.059	0.019	0.002	0.209
Alcohol	0.434	0.049	0.000	0.583
Constant	4.385	0.449	0.000	
R-squared	.4467			

We also wanted to analyze the potential role of gender in mortality rate, considering alcohol and tobacco consumption. Our data contains an additional variable, "pctfemale", which represents the percentage of the population of each country that is female. There are many research studies which suggest that females have a lower mortality rate than males, so we would expect a negative relationship between percentage of female population and mortality rate. However, when we added this variable and performed a regression of mortality on tobacco use, alcohol consumption, and percentage of female population, we received the results shown in Table 3.

Table 3: OLS Regression Results for Mortality, Considering Gender

Variable Name	Coefficient	Standard Error	P-Value	Beta Coefficient
Tobacco	0.050	0.018	0.005	0.173
Alcohol	0.352	0.048	0.000	0.473
PctFemale	43.348	7.992	0.000	0.341
Constant	4.385	0.449	0.000	
R-squared	.4467			

As shown in the data above, the percentage of the population that is female is positively correlated with mortality rate, with a statistically significant value. This is contrary to our hypothesized relationship. There is likely bias in the data, particularly since the data does not include mortality rate by gender, rather a blended rate for the population in general. There could be other causes of this unexpected result. For example, if a country were to be engaged in a war

during the period of data collection, it is possible that many males could have died in the conflict, resulting in a higher percent of female population, but also a higher overall mortality rate. We note that even with the gender variable added, the coefficients for tobacco and alcohol remain in the expected direction and remain statistically significant, suggesting that our hypothesis for these variables is still supported irrespective of the gender variable.

Conclusion

This study confirms prior research finding the consumption of alcohol and the usage of tobacco significantly influences the mortality rate. An important contribution is demonstrating the negative impact of indulging in alcohol and tobacco use. Policymakers could implement more laws to reduce the harmful consumption of alcohol and tobacco use to improve the health and social outcomes of the individuals. Certain examples of helpful tactics are increasing alcohol and tobacco taxes, limiting days of sale, and pushing out health campaigns to large audiences.

Code and Data Appendix

In addition to this narrative, a Stata code set, .do and log file are included with the project submission.

References

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