Using 2010 U.S. Census Demographics to Determine a Predictor for Beer and Wine Consumption

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Introduction

Population and Variable Descriptions

The data for wine and beer production comes from the Alcohol and Tobacco Tax and Trade Bureau who monitors the production and sale of all controlled substances in the US. Our consumption data comes from National Institute on Alcohol and Alcoholism. Our demographic data comes from the US Census Bureau. The 2010 state-level demographics to look at and compare against; beer and wine consumption (per capita) and education level. The variable education has 6 levels; some high school, high school, some college, associate's degree, bachelor's degree, and graduate degree. Other demographics included the variables; percent rural housing and median income salary.

Our target population for both beer and wine data, is United States residents over the age 15. This allows the data to capture the data for underage drinking, 15 years of old is the average age that an individual first consumes beer and/or wine. However, we are focusing on the state-level population and education data on individuals 25 years of age or older.

Univariate Summary Statistics

Variable	Mean	Median	Standard Deviation	Range
High School	0.3822	0.3730	0.0520	0.2420
College	0.2895	0.2860	0.0400	0.1920
Degree	0.2759	0.2640	0.0564	0.319
Percent Rural	0.2750	0.2695	0.1552	0.6696
Median Salary (x1000)	34.36	33.02	4.59	20.76
Capita Beer Consumption	34.4	33.8	6.6	30.9
Capita Wine Consumption	4.1	3.6	2.2	9.9

Purpose

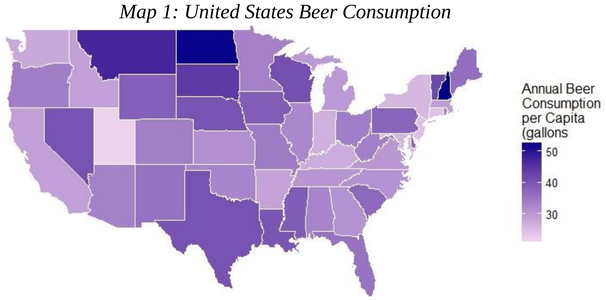
Per capita alcohol consumption is widely accepted as the best possible indicator of alcohol exposure in populations. Its correct interpretation requires the use of additional population-based indicators which stimulates the development of national monitoring systems on alcohol and health involving contributions from a wide range of stakeholders including; alcohol production, trade sectors, and federal spending for national and community education/awareness.

Our aim for this study was to identify trends in education and other demographic data to identify where there was higher wine and beer consumption per capita.

Data Exploration

Beer

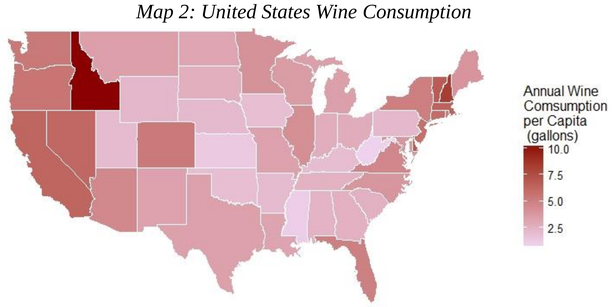
Map 1: United States Beer Consumption



New Hampshire and North Dakota have the highest determined beer consumption per capita in the United States with (52.6) and (52.3) gallons per person. Utah and Connecticut have the lowest beer consumption per capita with (21.8) and (24.0).

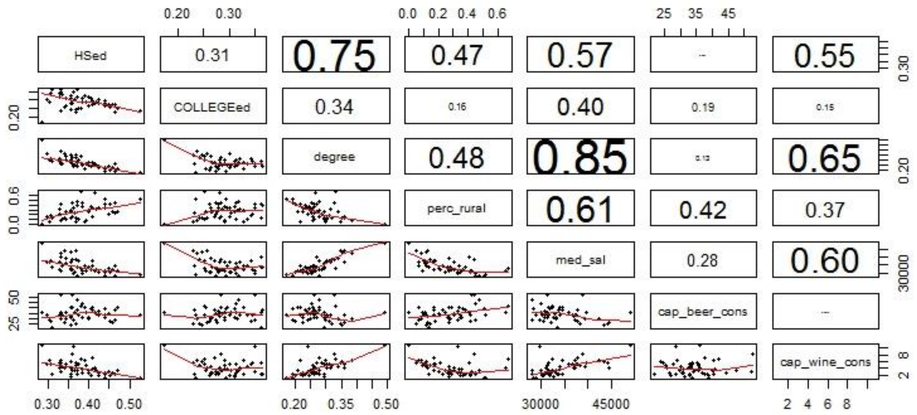
Wine

Map 2: United States Wine Consumption



The District of Columbia and Idaho have the highest wine consumption per capita in the United States with (10.8) and (10.5) gallons per person. West Virginia and Mississippi have the lowest wine consumption per capita with (0.9) and (1.1).

Bivariate Exploration for Predictor Variables



The scatterplot matrix was used to identify possible predictor variables for per capita beer and wine consumption. Beer consumption was found to be uninfluenced by any of the variables.

Per capita wine consumption correlated with high school and degree level education (0.55) and (0.65), respectively. Median salary showed a noticeable correlation of (0.60) compared against wine consumption.

Multiple-Linear Regression

We used linear regression and multiple-linear regression to look at how having a degree affect wine consumption. Model 1 shows that having a degree is significant ($p < 0.0001$). When we add percent rural we see a slight decrease in the coefficient of determination (R^2) but provides greater context for state demographics. A third variable, median salary, was considered but the high correlation of degree and median salary was considered to high to provide meaningful results. This reads that for every percentage point of a population that has a degree, the per capita wine consumption increases by 0.025 gallons per person per year. This relationship explains 40% of the trend.

	Model 1			Model 2		
	ß	SE	P-Value	ß	SE	P-Value
Intercept	-2.7	1.18	0.025	-2.02	1.63	0.221
Degree	24.8	4.18	<0.001	23.4	4.81	<0.001
Percent Rural	--	--	--	-1.1	1.75	0.536
R^2	0.418			0.399		

Results

- One of the strongest predictors of a States per capita wine consumption is the percent of the State's population that have Bachelor and Graduate degrees (degree).
- States with higher levels of Bachelor and Graduate degrees show a strong (0.65) correlation with per capita wine consumption. The linear model explains 39% of the trend in the data.
- Per capita beer consumption was found to be independent of education and demographic data.

Limitations

- The population estimates for each state only included individuals 25 years or older. The population was used as a standardization method across the US, not to arrive at absolute consumption data.
- Alcohol consumption data is estimated for individuals 14 and over.
- Urban and rural data is from number of housing units within a state not the acreage of land used for urban or rural.

Implications

- It is important for alcohol brand markets to know what factors are affecting alcohol consumption among the U.S. population to help identify their target population for marketing purposes.
- As sales across the country continue to increase, it becomes more important for new brands to market in places where they have a high likelihood of succeeding.
- Our data has shown that a significant predictor for wine consumption within a state is the percent of the population that has a Bachelor or Graduate degree.
- Wine distributors should be looking at what States will attract the most Bachelor and Graduate level jobs within the next 5 to 10 years and focus marketing and sales in those areas.

References

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