

# Influences of Alcohol Consumption

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There are a lot of things in the United States that are considered pastimes. Bowling, baseball, and football are all favorites that most Americans love. Yet with those listed there is one activity that takes place everywhere. In every town in every state of the US people drink alcohol. Beer, wine, whiskey, vodka and many others are consumed and it is estimated that 87.6% of Americans have had an alcoholic drink during their lifetime and 71% of them drank within the last year. Alcohol is the #1 pastime in America and its not even close. It's easy too, you don't need to be athletic, tall, or fit. All that needs to be done is removing a bottle cap most of the time. So what influences alcohol consumption besides the stresses of everyday social interactions? Well if you're wondering then you have come to the right place. This paper will show what factors into the consumption of alcohol, and more specifically the per capita consumption rates using gallons.

## Variables

Unemployment is a big factor on how much people drink. Anyone living on the brink needs a way to escape the stress of having limited income and alcohol is an affordable option for many. With alcohol being available at all grocery stores, many gas stations and convenience stores, its easily accessible for this group of people. And as unemployment rates increase we would expect that alcohol consumption would also increase since the stress of not having a job is difficult for many. Now unemployment numbers aren't always the best estimator because if you're unemployed but not actively looking for a job then you're not considered in the unemployment estimation. So instead we will use total employment estimates for each state instead which measures the number of jobs in the state. This means that as total employment increases we would expect alcohol consumption to decrease since citizens will have less stress and feel more secure knowing they have more employment options.

You don't have to be unemployed to feel the need to drink. Even those who do have jobs still have the need for a drink in their lives. And sometimes after paying all those bills and other necessary expenses you'll have very little money left over to do anything fun. So higher incomes tend to mean that an individual has more responsibility resulting in more stress which in some cases leads to increased alcohol consumption. The expectation here is that alcohol consumption would be expected to increase as income increases because increased responsibility with an increased income means more alcohol is consumed.

Drinking impairs a person's ability to make rational decisions and some of these decisions aren't in the best interest of that individual. Crime happens all the time and a lot of it is done under the influence of alcohol. In fact 40% of all violent crimes involve alcohol. So what does this mean? Well if crime increases then it is very likely that alcohol consumption is also increasing.

I've talked about how cheap alcohol is and that anyone can afford it. So it seems very intuitive to assume that there is a negative correlation between alcohol consumption and the price of alcohol. But the price of alcohol varies across the different forms it comes in so instead of listing each individual type we will include the tax of beer and assume that it will have the same effect as the wine tax and spirits tax in relation to alcohol consumption which is negative.

With these variables listed we arrive at an equation that looks like this:

$$\beta(AC) = \text{INCOME}_i - \text{TEMPLOY}_i + \text{CRIME}_i - \text{TAX}_i$$

## Results

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. reg AlcoholConsumptionpercapitab TOTALINCOME TotalEmployment USCrimeRateper100
> k BeerTaxPerGallonm
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Source	SS	df	MS	Number of obs = 51		
Model	4.66302791	4	1.16575698	F( 4, 46) = 6.00		
Residual	8.94354072	46	.194424798	Prob > F = 0.0006		
Total	13.6065686	50	.272131373	R-squared = 0.3427		
				Adj R-squared = 0.2855		
				Root MSE = .44094		

AlcoholCons~b	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
TOTALINCOME	.0000251	8.44e-06	2.97	0.005	8.07e-06	.0000421
TotalEmploy~t	-4.07e-08	1.59e-08	-2.55	0.014	-7.27e-08	-8.63e-09
USCrimeR~100k	.0005932	.0003556	1.67	0.102	-.0001226	.001309
BeerTaxPerG~m	-.3690593	.2270068	-1.63	0.111	-.8260003	.0878817
_cons	1.407008	.3730496	3.77	0.000	.6560985	2.157918

Testing at the level of 95% confidence or an alpha of .05 we can see that at first glance of the regression we can see that all of our selected variables are either significant or fairly close according to their corresponding t-scores (using t-critical=1.67). Our critical p-values tell us a different story, with CRIME<sub>i</sub> and TAX<sub>i</sub> both coming out as insignificant at  $\alpha = .05$ . Although there is not wildly out of proportion they're we can still conclude that they're insignificant by using theory.

The beer tax in most states is relatively low, Wyoming coming in at an outrageous \$0.02 cents per gallon and the highest only getting up to \$1.17. So how much is this costing us as consumers? Well the federal excise tax on beer amounts to about a nickel per drink -- less than seven percent of the average price of a six-pack<sup>(1)</sup>. In fact, the relative cost of beer has declined dramatically in the past 50 years<sup>(2)</sup>. Another factor is that the tax hasn't kept up with inflation with states in control of how much and how often the tax is changed. Had the tax kept up with inflation over the past 50 years, today's \$18 per-barrel tax would total approximately \$63.69, or \$1.15 per six-pack, more than three-and-one-half times the current rate<sup>(3)</sup>.

CRIME<sub>i</sub> is a hard one to think out. Now considering that I used violent crime numbers only could be the reason why it wasn't significant. So one possible solution is that there is a better way to measure crime in comparison to alcohol consumption. And we know that the regression isn't a biblical law or anything so to try to come up with a reason about why there isn't a link between crime and alcohol consumption seems a little outlandish and doesn't seem right theoretically.

Another possible solution to help this model is to consider the possibility of an omitted variable. Before running a test to see if this is true or not we should think about other possible variables. Unfortunately I was unable to come up with anything that helped the model while trying a couple of other variables such as POPi (population by state) and GDPi (gross domestic product by state). Both of these came out as highly insignificant. With only one option left I ran a Ramsey RESET test to see if there were any missing variables. The F-critical value was 2.82 and the F-test gave us an F of 1.28 ( $F(3, 43) = 1.28$ ). So we could not reject the null hypothesis that there was no omitted variables. According to the test there might not be any missing variables and even though we could not reject I still insist that there are missing variables. So with that I put in two new variables into the equation, BARI (Bars per Capita) and DIVORCEDi (Dummy variable, 1 if divorced and 0 otherwise). Giving us an equation that looks like this:

$$\beta(AC) = \text{INCOME}_i - \text{TEMPLOY}_i + \text{CRIME}_i - \text{TAX}_i - \text{DIVORCED}_i + \text{BARI}_i$$

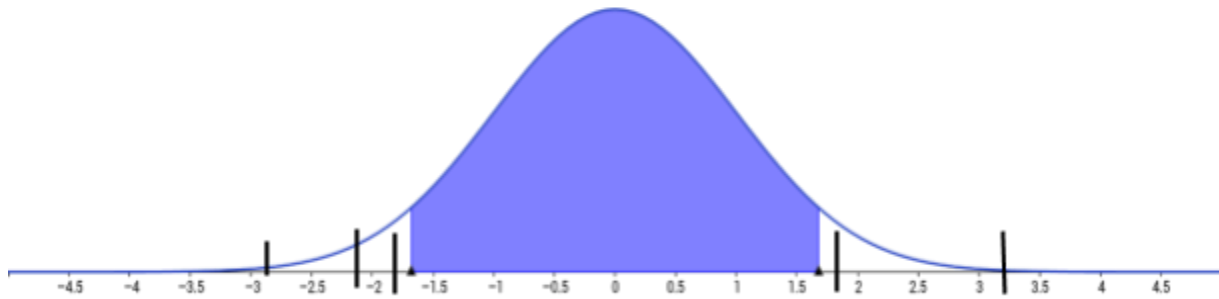
According to this we can see below that the test t scores in comparison to my t-crit of 1.677 are all relevant.

Source	SS	df	MS	Number of obs = 51		
Model	5.75922229	6	.959870382	F( 6, 44) = 5.38		
Residual	7.84734634	44	.17834878	Prob > F = 0.0003		
Total	13.6065686	50	.272131373	R-squared = 0.4233		
				Adj R-squared = 0.3446		
				Root MSE = .42231		

AlcoholCons~b	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
TOTALINCOME	.0000027	8.15e-06	3.32	0.002	.0000106	.0000434
TotalEmploy~t	-4.39e-08	1.54e-08	-2.84	0.007	-7.50e-08	-1.28e-08
USCrimeR~100k	.000662	.0003486	1.90	0.064	-.0000405	.0013645
BeerTaxPerG~m	-.4794911	.22195	-2.16	0.036	-.9268019	-.0321803
PeopleperBa~e	.0000114	5.94e-06	1.92	0.061	-5.61e-07	.0000234
DIVORCED	-.2128306	.1248988	-1.70	0.095	-.4645476	.0388864
_cons	1.313218	.3691507	3.56	0.001	.5692441	2.057193

Here is a t distribution to show the relevancy with the black marks being the t-scores:



Another thing to point out is that the coefficients on  $INCOME_i$ ,  $CRIME_i$ , and  $BAR_i$  are fairly small, but this is a result of the scale of measure so my final revised equation is below with scales adjusted and coefficients added. Running the Ramsey RESET again I find that my f-score(0.51) is much less than the F-critical of 2.83. Giving me some confidence in my model and with this stated I believe that there is a relationship between alcohol consumption and these variables despite the confidence intervals for  $CRIME_i$ ,  $BAR_i$ , and  $DIVORCED_i$  include zero which means they may be insignificant. Concluding that there are more than just social factors such as peer groups, peer pressure, family conflict, family tragedies, and other personal causes that can be seen to have an influence on alcohol consumption.

## Conclusion

With this statistical proof I believe we can say that there is some evidence to conclude that alcohol consumption has a relationship with all of the included variables. Even without the statistical proof the theory behind each one of the variables is strong and the relationships are as expected according to our coefficient signs supporting our theoretical assumptions. T-scores are all significant and p-values are relatively close to  $\alpha = .05$ . But with all this said there are still ways to improve this model even further.

There are several variables that I was unable to find data on including a measure of cloudiness and some dummy variables in which I could not find data on also. Another big influence that was left out is the social factors themselves. I believe that these would affect the model significantly by providing what I believe to be the most important factor when it comes to alcohol consumption(per capita). Now one of the ways to find this data is to look into more sociological studies to find this data or another possibility is to get the data via surveys. So there possible expansion paths for this model and although it won't help anyone make decisions on whether to drink or not, it does show that alcohol consumption is influenced by many different factors.

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