How Much Does Your Next Cup Cost You: Alcohol Abuse as an Indicator for Medical Expenditure

Georgiana Liang

March 6, 2023

1 Introduction

It has long been shown that alcohol consumption and especially alcohol abuse is a key contributor to several diseases such as heart disease and liver problems and is negatively associated with good health (Burton, Robyn and Nick Sheron, 2018). Whether and by how much alcohol consumption increase medical expenditure is more disputed in the literature. Sturm, R et al 2013 concluded that alcohol consumption does not have a statically significant association with medical expenditure, while Nakamura, Koshi 2015 that increasing daily consumption amount does increase medical expenditure. This report aims to analyze the impact of alcohol abuse on total and avoidable medical expenditures. Knowing this can help policymakers and health practitioners understand how to adjust insurance and public health policies to improve public health overall

2 Methodology

I use a log-transformed OLS regression of medical expenditure on the indicator for alcohol abuse, controlling an indicator for being black, an indicator for being female and an indicator for being 55 or older. These are demographic variables that may impact alcohol consumption, but also impact medical expenditure. I also control for drug abuse, people who abuse drugs are also more likely to abuse alcohol, but drug abuse also contributes to medical expenditure.
The regression I used is as follows:

$$ln(Y_i) \sim \beta_0 + \beta_1 X_i + \beta_2 B_i + \beta_3 F_i + \beta_4 A_i + \beta_5 + D_i$$

Where Y_i represents total medical expenditure, X_i represents indicators for alcohol abuse, B_i, F_i, A_i and D_i are indicators for being black, female, 55 or older and drug abuse. Total medical expenditure is log-transformed because the data is highly skewed and this improves regression reliability.

3 Results

I obtained the following result:

Alcohol consumption is a statistically significant contributor to high total medical expenditure. Alcohol abuse increase total medical expenditure by 42%. (Table 1.)

The effect is even more visible for total avoidable medical expenditure, with alcohol abuse increasing total avoidable medical expenditure by 269%. (Table 2.)

The differences can be visibly seen in the box plots below (Fig 1. and 2.).

Alcohol abuse is thus strongly associated with an increase in medical expenditure.

4 Conclusion

We have shown that alcohol abuse is strongly associated with an increase in medical expenditure. We do not yet have enough evidence for casualty, yet given the controls, we can conclude that alcohol and poor health and high health spending is strongly associative. From both the economic and the health

Source	SS	df	MS		
				Number of obs	= 48,784
				F(5, 48778)	= 412.35
Model	8139.51257	5	1627.90251	Prob > F	= 0.0000
Residual	192570.27	48,778	3.94789188	R-squared	= 0.0406
				Adj R-squared	= 0.0405
Total	200709.783	48,783	4.11433866	Root MSE	= 1.9869

lg_cost_t	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
tm1_alcohol_elixhauser	.3522624	.0994097	3.54	0.000	.1574181	.5471068
tm1_dem_black	-.1449364	.0282993	-5.12	0.000	-.2004034	-.0894694
tm1_dem_female	.5048548	.0186588	27.06	0.000	.4682833	.5414262
tm1_drugabuse_elixhauser	1.084454	.1186822	9.14	0.000	.8518355	1.317073
aged	.6464957	.0183275	35.27	0.000	.6105736	.6824178
_cons	7.149391	.0170635	418.99	0.000	7.115947	7.182836

Figure 1: Regression of Total Medical Cost Against Indicator for Alcohol Abuse

Source	SS	df	MS		
				Number of obs	= 48,784
				F(5, 48778)	= 289.94
Model	16974.0114	5	3394.80228	Prob > F	= 0.0000
Residual	571128.424	48,778	11.7087298	R-squared	= 0.0289
				Adj R-squared	= 0.0288
Total	588102.436	48,783	12.0554791	Root MSE	= 3.4218

lg_cost_avoidable_t	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
tm1_alcohol_elixhauser	1.306282	.171199	7.63	0.000	.9707303	1.641835
tm1_dem_black	.7027016	.0487358	14.42	0.000	.6071789	.7982244
tm1_dem_female	.0992279	.0321333	3.09	0.002	.0362461	.1622096
tm1_drugabuse_elixhauser	2.421006	.2043892	11.85	0.000	2.0204	2.821611
aged	.9667006	.0315628	30.63	0.000	.9048372	1.028564
_cons	1.439792	.029386	49.00	0.000	1.382195	1.497389

Figure 2: Regression of Total Avoidable Medical Cost Against Indicator for Alcohol Abuse

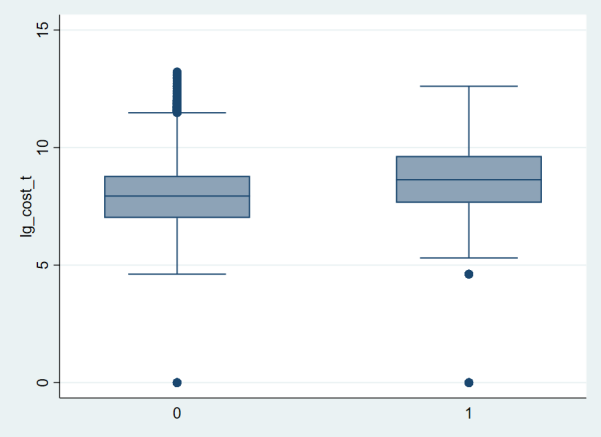

Figure 3: Box plot of log total cost over alcohol consumption

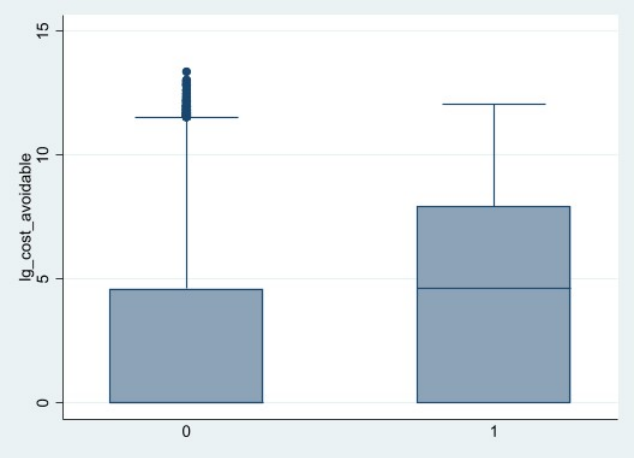

Figure 4: Box plot of log avoidable cost over alcohol consumption

perspective, policy-makers should discourage additional drinking. Future research should be done on investigating casualty and linking alcohol abuse to other contributors to poor health and high health spending.