Drink up to earn more? Perhaps.

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Abstract

When considering the effect of alcohol on one's employment, it can be easy to assume that these simply are two opposing forces. That analysis would certainly appear logical at face value but likely conveys an incomplete narrative. This opposing forces model assumes that the only effects of alcohol consumption are chemical reactions in one's body which lead to an altered mental state, overlooking the cultural payload and benefits of imbibing. Our research seeks to use respondent level data to add nuance to the relationship between alcohol consumption and labor market outcomes. We examine the effects of weekly level of alcohol consumption on wages, the reduction of productivity associated with binge drinking, and how these effects are realized differently across gender, race and level of education.

1. Introduction

Heavy alcohol consumption is commonly understood to negatively affect health outcomes. Since it impairs overall bodily function, one might assume that frequent alcohol consumption also negatively impacts labor market performance, but is that truly the case? What other factors might affect this relationship? The data set that we have assessed includes a range of variables to allow us to control for a variety of factors relevant to this discussion. Annual earnings allow us to assess financial productivity of those surveyed while hours worked per week open the door to examining whether an increase in alcohol consumption makes someone harder to employ full time. Variables for alcohol consumption include how many days per week a respondent drinks per week as well as the number of binge drinking events that occurred in the prior year. The survey defines a binge drinking event to be consuming ≥4 drinks in a single sitting for females and ≥5 drinks for males.

For our research project, we have chosen three distinct research questions to examine. Primarily, we study individual earnings as the outcome variable based on weekly alcohol consumption while controlling for education, gender, age, race and education. This allows us to assess the return, either positive or negative, to weekly alcohol consumption in the labor market. Using our controls, we seek to define the nuance of this issue as surgically as possible to draw causation instead of a mere correlation.

Our second research question works to determine what individual characteristics lead to increased days of binge drinking in a given year. For instance, does someone with a postgraduate degree binge drink less often due to their higher intellect or is the inverse the case, as they are compensating for the workplace stress level of a job that their degree has gleaned for them? These are the types of questions that our dataset and analysis can help us make more clear.

Finally, we create a group of individuals in our dataset that are considered to be alcohol abusers by blending the number of drinks consumed in a single setting, days of drinking per week, and the days of binge drinking per year. Using this group, we examine labor market outcomes among those who use alcohol in a problematic way. This allows us to draw conclusions about the effect of alcoholism on the labor market.

2. Literature Review

Petri and et al (2017) study similar questions and statistics to our given data set[1]. The main focus of the paper asks, is there a link between consumption of alcohol and a subject's ratio of earnings. The paper cites a “Finnish Twin Cohort Study” as their set of data. The data set elevates the research to a higher level of excellence due to the use of twins and the ability to rule out some nurture questions about drinking patterns, as well as some underlying employer biases.

The study is the comparison of same-sex twin cohorts and the variations in their wage earnings strictly compared to their drinking habits. In using the set of twin data, the study is able to separate the variable of home environment and differences in genetics out of the equation, leaving a more succinct line of data. The researchers also follow a strict OLS method of regressing the labor market measures between alcohol consumption for the data sets of twins. They also ran several intensive regressions to siphon out the variation between the sets of twins.

This research found that heavier drinkers have weaker contact to the labor market than that of moderate drinkers, this was explained in the paper due to the factor that extreme drinkers can show a heavy decline in productivity at work the following day and depending on if this is a frequent problem the decline in wage will be more drastic. As well as the heavier drinkers were found to work 1.5 months less than those compared in the data. This 1.5 months can be explained by a spectrum of either health reasons that may be associated with the intense drinking or that they may call in sick more because of the after effect of alcohol. There were several other instances in the paper where moderate drinkers were preferred in the workplace compared to those who were abstinent from drinking. These findings were surprising to the researchers but were explained by the social uses of alcohol in the workplace.

Balsa and French (2022) explore the association between heavy or problematic drinking and labor market outcomes in Uruguay.[2] It is one of the first studies of its kind in South America and the first in Uruguay; most other studies of this nature had been conducted in the USA or Europe. Balsa and French use seven labor market outcomes in tandem with alcohol consumption: labor force participation, employment, self-employment, work intensity, workplace accident, work absence, and days absent from work. They also track a number of socio-demographic control variables and behavioral health indicators as well as labor force participation, unemployment rate, and household equivalent income within each jurisdiction of the country. On average, heavy drinking or drinking to intoxication is positively associated with living in an area that has higher unemployment rates, lower labor force participation, and lower per capita income. Working in construction or in the public sector and working full-time are also associated with heavy or intoxicating drinking.

Using longitudinal data from Russia, Tekin (2004) finds that drinking has an inverse U-shaped effect on employment and wages for men and women, which tracks with other studies. In this case, the U-shaped effects means that the best wage results are found among moderate drinkers. For men, the inverse U-shape is less pronounced and the correlation appears more positive[3]. Charles and DeCicca (2008) look at the effects of labor market outcomes and health and display that negative labor market outcomes that lead to “economic stress” cause negative health effects[4]. The study includes the effects on the body and the mind, which leads to the question of depending on labor market outcomes does the consumption of alcohol also change? Or is it a bell shaped graph, displaying an increase in drinking for extremely negative labor market outcomes as well as with extremely positive outcomes.

These two papers distinguish two different approaches to the general question of “does drinking affect labor market outcomes.” Our research does the same but delves deeper into certain differences that are not controlled by the other papers. Unlike these literary papers based on the Finnish cohorts as well as Balsa and French’s Uruguay data, ours includes the differences due to race. Rather than finding a way around displaying these, our paper will deliberately show the outcome due to likely biases in the workplace. Though unlike the cited research of the Finnish twin study in the “Alcohol Consumption and Long Term Labor Market Outcomes”, the liability of nurture is still included in both our data and that from Balsa and French’s paper. Altogether, these studies agree that a severe increase in alcohol consumption leads to adverse effects in the labor market.

3. Data and Summary Statistics

Our data source for this project came from the Centers for Disease Control’s National Health Interview Survey, which includes individual demographic information, labor market conditions, and alcohol consumption. This allows for a variety of research questions while providing controls for race, gender, age, level of education, etc. Available variables specific to alcohol consumption include days of drinking per week, the average number of drinks consumed at each drinking, and number of binge drinking events in the past year. This dataset is demographically representative of the United States with regards to gender, race and marital status.

The most pivotal variable for our research is that of Days of Drinking per Week. This measures the frequency of the respondent's drinking on a zero to seven scale with a 0.5 value assigned to those who drink once every two weeks. This variable allows us to measure one’s relationship with alcohol, be it a social activity on the low end or a daily dependence on the upper end. We will begin with descriptive statistics to demonstrate the overall distribution and the differences in Days of Drinking per Week between genders and racial groups.

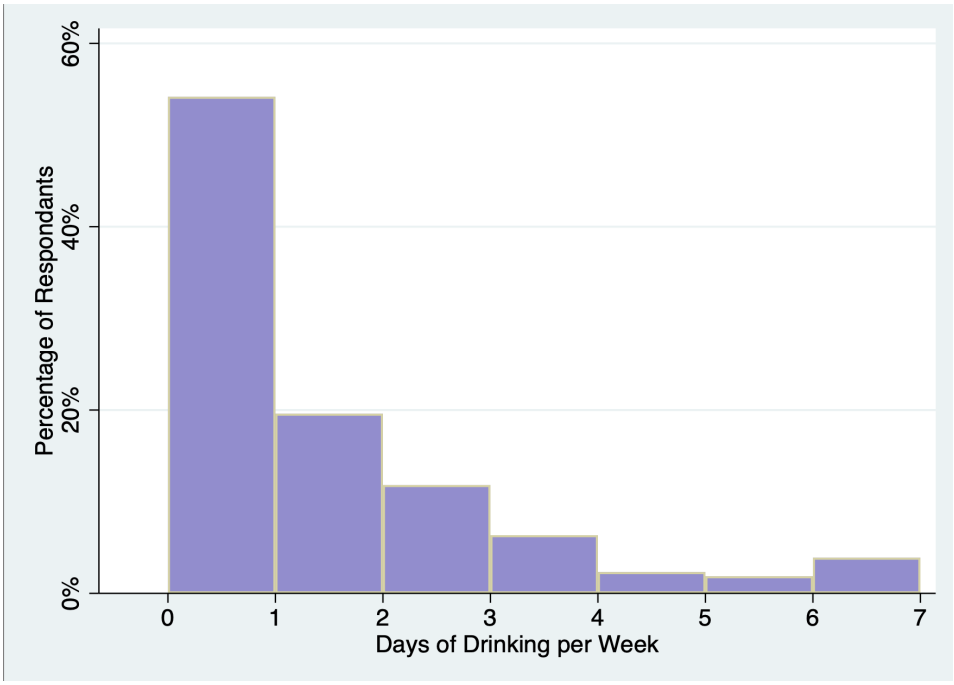

Figure 1. Graph of Days of Drinking per Week responses

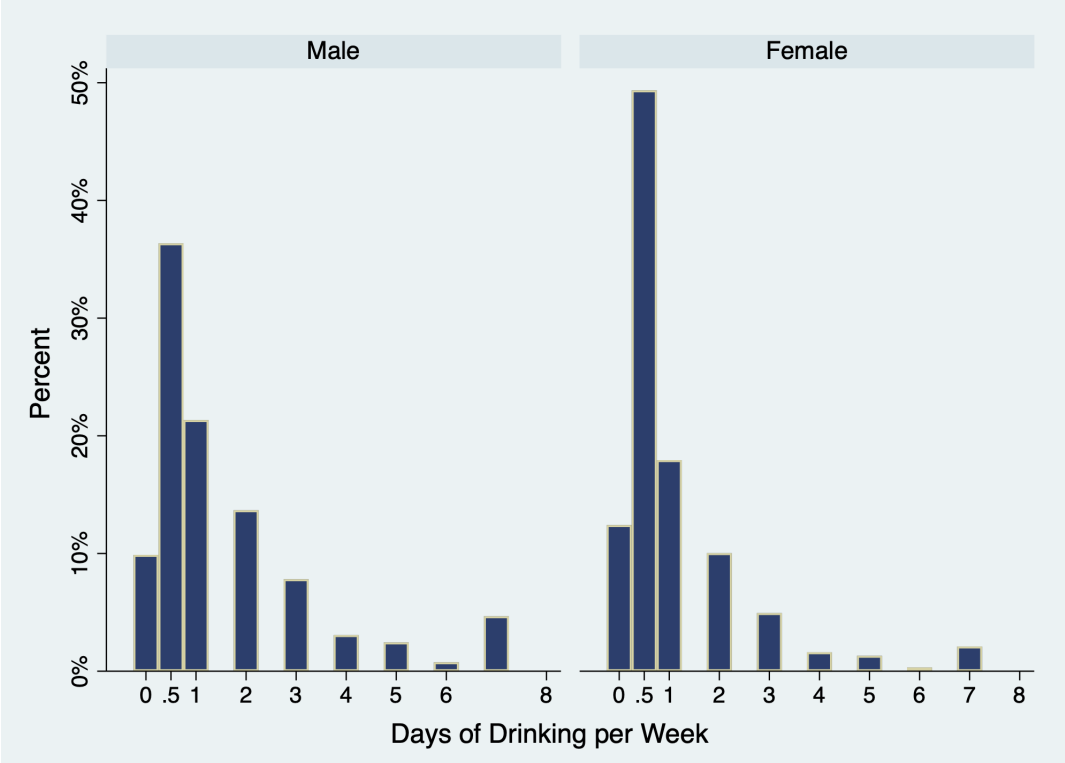

Figure 2. Graph of Days of Drinking per Week responses

In Figure 4. comparing the habits of men vs. women – we see that women are more likely to be infrequent drinkers than men with nearly 50% of respondents reporting less than one drink per week. We also note that nearly twice as many men report drinking on a daily basis than women. In the following graph, we examine this based on race and ethnicity.

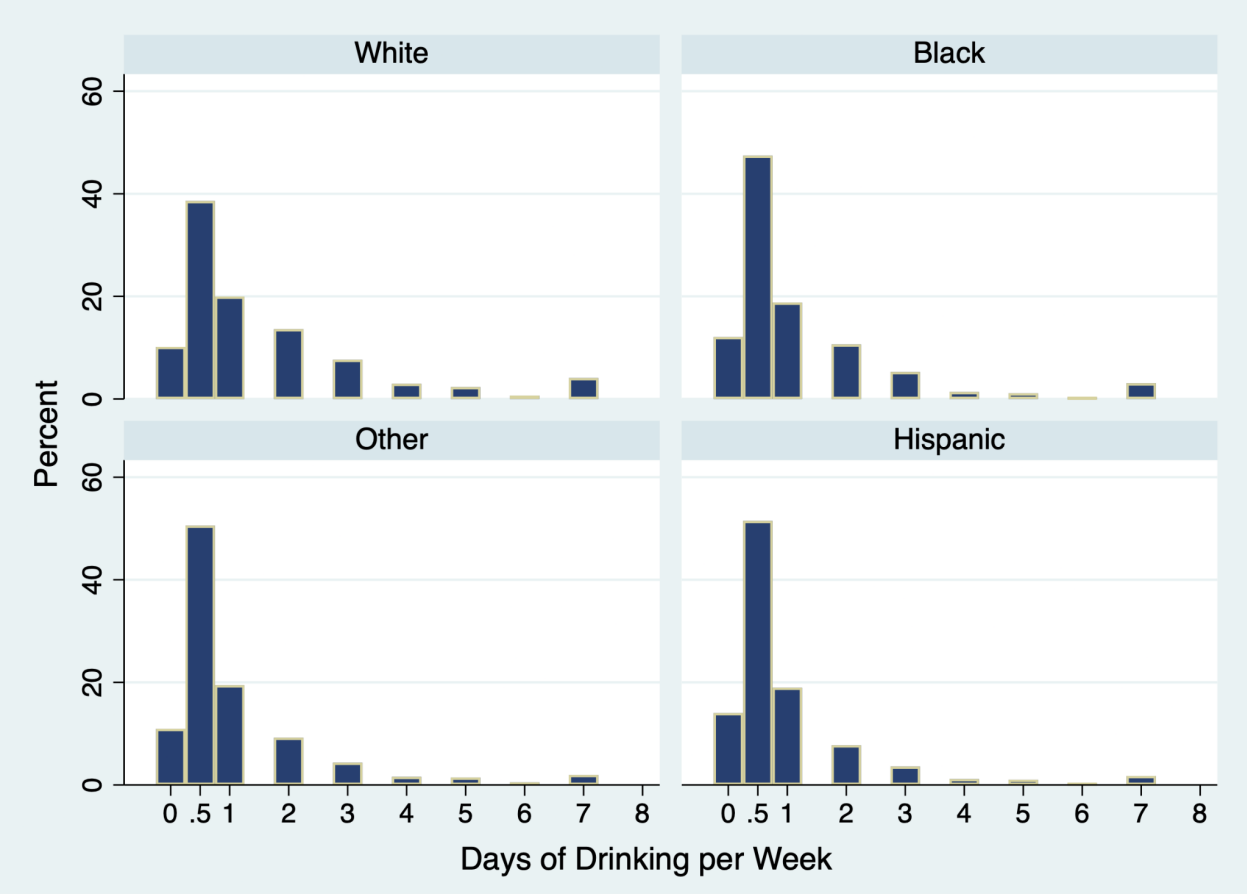

Figure 3. Graph of Days of Drinking per Week, sorted by race

When examining days of drinking per week among racial groups, we find that white respondents are most likely to be frequent drinkers and that non-white respondents are more prone to infrequent drinking. Additionally, we found it interesting in our analysis of Days of Drinking that the amount of individuals reporting seven days per week is higher than those reporting four, five or six days per week. Our assumptive explanation for this is that due to the addictive properties of alcohol if one regularly consumes alcohol more than three days per week, it likely becomes a daily habit.

One interesting trend to note here is how non-white respondents are more likely to be the most infrequent of drinkers – the majority of which consume one drink every two weeks. Our hypothesis is that this may stem from cultural differences surrounding alcohol – especially in Hispanic populations – that may see alcohol as an object of tradition rather than a recreational tool to alter one's mental state or to relieve stress.

4. Theoretical Discussion

We acknowledge that our dataset is limited to US respondents only and as such this research will largely capture the effects of American attitudes and norms around alcohol consumption. In American culture and the labor market which it saturates, alcohol is consumed as both a generic beverage and as a substance to be consumed in the pursuit of social facilitation. One may initially expect alcohol to have a predominantly negative effect on variables like income and working hours, as its depressive effects on the body acutely decrease productivity – mainly at high-intake levels. However, alcohol often plays a strong role in many social situations and is rarely actually consumed in the workplace. Consuming alcohol in a group may help one feel a higher level of comradery with those around them, making them more at ease in social settings, etc. Bars and clubs can serve as gathering points for coworkers outside of the workplace. Based on our research and results, we find this effect to be a stronger force than the negative physiological effects in terms of labor market performance. It follows that workers who frequently enjoy an alcoholic beverage with co-workers may be seen as more jovial and approachable than those who do not. This perception could lead to better relationships with coworkers and therefore better labor market outcomes. If alcohol served no other purpose than its chemical properties as a depressant suggests, we would expect to see only negative results from our regressions. That is clearly not the case.

We do, however, find that alcohol consumption does make a statistically significant negative impact on productivity beyond a certain point. At this point, alcohol's physiological effects become sufficiently acute to outweigh any potential gains. The level of consumption required for this to happen is found among individuals who likely rely on alcohol in order to function, which is an unfortunate reality of addictive substances such as alcohol.

Alcohol could also lend differing effects among demographics like age, race, or gender. Young people may be more likely to consume alcohol frequently and in high amounts, so perhaps alcohol could make a more pronounced impact on their labor market outcomes. Cultural differences surrounding alcohol consumption and perceived differences may lead to different outcomes among certain groups. Men and women may be expected to socialize differently in the contest of alcohol, which may also lead to differences in the relationships between their alcohol consumption and labor outcomes.

5. Empirical Strategies and Results

5.1 Differential Drinking Behavior

To begin, we will address the question of what characteristics make one more likely to drink heavily and face related consequences to employment. To study this question, we will use the following equation:

$$\ln(B_i) = \beta_0 + \beta_1 \ln(W_i) + \beta_2 F_i + \beta_3 A_i + \beta_4 \text{DayExer}_i + \Sigma\delta_j \text{Educ}_{ji} + \Sigma\gamma_j \text{Race}_{ji} + \varepsilon_i \quad (1)$$

For our dependent variable, we have natural log of Days of Binge Drinking per Year – defined as how many days the respondent drank more than 5 drinks in a single setting for men and >4 for women. For our explanatory variables, we include natural log Wage ($\ln(W_i)$),Age(A_i), Days of Exercise per Week ($DayExer_i$), a dummy variable for female (F_i), and a full set of dummy variables for different educational level and for different race groups. Based on our findings in summary statistics and demographic trends, we expect increased binge drinking among young men who exercise rarely.

We find that overall a 1% increase in earnings results in a 5.3% reduction in binge drinking. This may sound marginal, but if you imagine that a respondent engaged in 20 days of binge drinking per year, the results would quickly compound themselves. In terms of who is most likely to engage in binge drinking, we found that men were more likely to be binge drinkers than women and that binge drinking activity diminishes with age, ostensibly due to fewer opportunities (read: college parties) and more responsibilities (read: children). Our results show a slightly negative correlation between days of exercise per week. When controlling for education, there is a lesser effect of additional binge drinking on wage.

Log Annual Days of Binge Drinking Coefficients

	1st	2nd	3rd	4th	5th	6th	7th
Log Wage	-.053***	-0.084***	-0.072***	-0.068***	-0.094***	-0.046***	-0.047***
	(-6.10)	(-9.76)	(-7.76)	(-7.34)	(-10.99)	(-5.13)	(-5.29)
Female		-0.524***	-0.524***	-0.524***	-0.414***	-0.354***	-0.035***
		(-26.13)	(-26.12)	(-26.19)	(-22.48)	(-18.90)	(-12.42)
Age			-0.004***	-0.005***	-0.014***	-0.014***	-0.014***
			(-3.58)	(-3.97)	(-11.63)	(-12.45)	(-12.42)
Weekly Days of Exercise				-0.017***	-0.027***	-0.010**	-0.010**
				(-3.19)	(-5.69)	(-2.10)	(-2.17)
Weekly Days of Drinking					0.340***	0.347***	0.347***
					(-67.31)	(68.86)	(68.48)
Education Fixed Effect						**X**	**X**
Race Fixed Effect							**X**

Table Notes: t-stat in () ***, statistically significant at 99%; ** statistically significant at 95%

Table 1. Results of Binge Drinking Determination Regressions

In our analysis, we found the definition of binge drinking to be a helpful metric but not necessarily sufficient to explain the labor market penalty to varying degrees of heavy drinking. One valid critique to the 4 to 5 drink threshold is that individuals respond differently to level of alcohol consumption. Largely a function of body weight, a three-hundred-pound man would likely see less hit to his productivity after 10 drinks the night before than a one hundred pound woman. To look at this more closely, we looked for a means of testing different thresholds of "high intake" in regards to alcohol.

We chose this equation because we were interested to discern if there were statistically significant trends in the characteristics of individuals that are frequent binge drinkers. The primary variable of interest for us was log of earnings. One could argue that high stress labor market positions that are rewarded with high earnings would be a trigger for binge drinking as a stress relief mechanism. On the other hand, given that alcohol can reduce productivity through cognitive impairment and the risk of hangover, we could envision this negatively impacting earnings at every level, especially so in the long run where alcohol-related disease could lead to disabilities in workers.

5.2 Impacts of Heavy Drinking on Labor Market Outcomes

Using a bivariate mode with only days of drinking and log wage, we predict that seven days of binge drinking per year reduces annual wage by over 10%. Our projected negative impact on wage to increased binge drinking was robust even as we added controls across seven equations. Based on this, we possess a high level of confidence in these implications. We also see that binge drinking declines slightly with age and that women are less likely to binge drink than men. Further research would be helpful to learn about the disparate impact of drinking on wage between men and women. Does consuming ten alcoholic drinks per week show any meaningful degradation of wage or is a higher level of consumption required to start seeing these effects? In pursuit of these results we generated a variable for weekly alcohol consumption by multiplying the variables provided for typical drinks per setting and typical days of drinking per week to create a "Drinks per Week" variable for every respondent in our dataset.

We expect the results of this equation to be largely orthogonal to the results of Equation 1 as for the research question we are targeting the number of drinks consumed per week instead of **days** of drinking per week. An individual could be on the upper bound of days of drinking per week while only consuming seven total drinks per week.

In running these regressions, we found that there is no statistically significant effect on wage at 10 drinks per week and only a moderately statistically significant effect at 15 drinks per week. The significant, yet not surprising, result from our work with this equation is that earnings are significantly reduced when consuming >20 drinks per week (-12%) and even more so at >30 drinks per week (-16.6%). We expect that this decline in slope is a result of the tolerance that is built up from a high level of drinking over time.

$$\ln(W_i) = \beta_0 + \beta_1 HighInTake_i + X_i\gamma + \varepsilon_i \quad (2)$$

In Equation 2, Wi is the natural log of the respondent's earnings and X represents a full set of controls, including gender, age, education, and race. Taking the natural log of the reported earnings in our dataset normalizes the results and allows us to interpret explanatory variables as % change in wage.

Log Wage Coefficients

	>10 drinks	>15 Drinks	>20 Drinks	>30 Drinks
Weekly Days of Drinking	-0.003	-0.065*	-0.12***	-0.166**
	(0.82)	(-3.08)	(-4.59)	(-3.92)
Female	-0.39***	-0.039***	-0.40***	-0.399***
	(-44.24)	(-44.83)	(-45.05)	(-44.97)
Age	0.041***	0.04***	0.041***	0.041***
	(77.76)	(77.73)	(77.81)	(77.83)
Education Fixed Effect	X	X	X	X
Race Fixed Effect	X	X	X	X
Table Notes:	t-stat in ()	***, statistically significant at 99%		

Table 2. Results of wage regressions at different levels of high alcohol intake.

5.3 Impact of Varying Drinking Intensity

Up to this point, we have identified that excess drinking serves as a detriment to wage. That would suggest that to maximize your wage, you abstain from drinking entirely, right? Not quite. Through descriptive statistics using Kernel Density of Log Wage, we see that moderate drinking (between 5 and 15 days of binge per year) yields greater labor market returns than not drinking at all. Note how the green curve below (moderate drinking) is offset to the right compared to the red and blue curves. The income distribution for moderate drinking first order dominates those of the other two groups, which is consistent with the inverse U-shape documented in the literature.

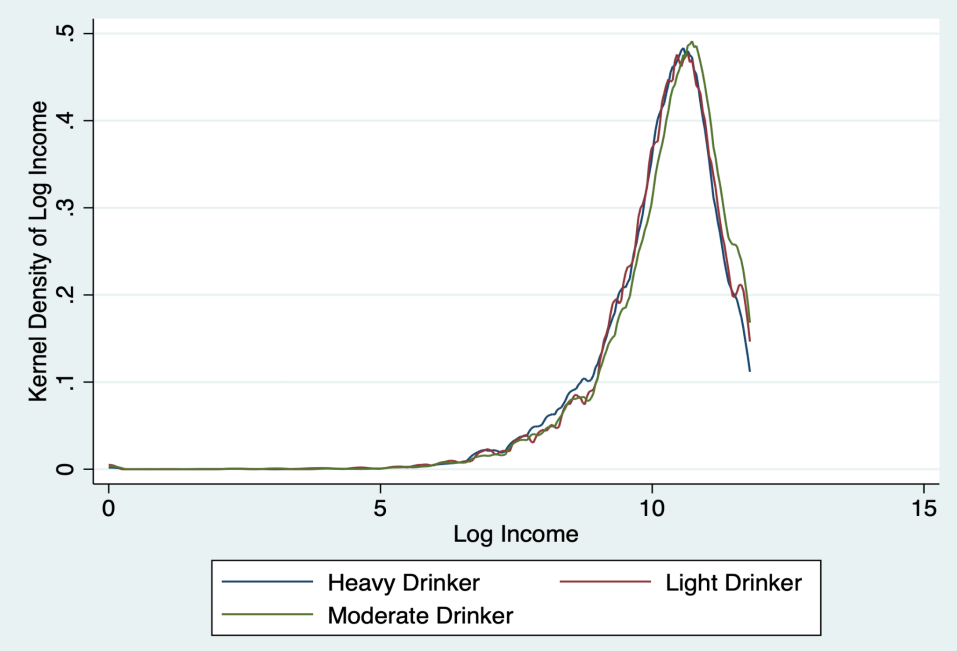

Figure 4. Graph of Kernel Density of Income among levels of alcohol consumption

To look at this in more detail, we devise the regression below. This model allows us to identify differences across gender, race and age to see if the effect of days of drinking per week is received differently. We also have the opportunity to capture the scale of this impact.

$$\ln(W_i) = \beta_0 + \beta_1 DaysDrinking_i + X_i\gamma + \varepsilon_i \quad (3)$$

Log Wage Coefficients

	1st	2nd	3rd	4th	5th	6th	7th
Weekly Days of Drinking	0.077***	0.063***	0.057***	0.051***	0.037***	0.021***	0.018***
	(24.23)	(19.82)	(18.98)	(16.85)	(9.76)	(5.80)	(4.97)
Female		-0.319***	-0.292***	-.292***	-0.34***	-0.41***	-0.41***
		(32.09)	(-31.27)	(-31.27)	(-27.72)	(34.86)	(34.61)
Age			0.044***	0.045***	0.045***	0.041***	0.041***
			(79.55)	(81.94)	(81.92)	(78.36)	(78.35)
Weekly Days of Exercise				0.065***	0.064***	0.024***	0.023***
				(26.19)	(25.92)	(9.85)	(9.40)
Female*Days of Drinking					0.038***	0.024***	0.022***
					(6.12)	(3.83)	(3.78)
Education Fixed Effect						**X**	**X**
Race Fixed Effect							**X**

Table Notes: t-stat in () ***, statistically significant at 99%

Table 3. Wage regression results for weekly days of drinking

When running this as a bivariate model, we find a surprising 7.7% increase in wage for each additional day of alcohol consumption. While intriguing, this model does not capture the full picture of this dataset. To take this further we ran seven regressions, while adding additional controls with each. After adding age, gender, exercise, race and education controls, we found a smaller yet still statistically significant 1.8% premium for each day of drinking per week in the labor market.

One aside to this research question was our interest in identifying how a worker's gender affects their return-to-consumption in earnings. To create an estimator for this, we created an interaction term between our Female dummy variable and Days of Drinking per week and added this to our regression starting in the 5th variation. These results strongly confirmed our hypothesizes – we found that women were rewarded more strongly than their male counterparts for additional days of drinking per week. While this certainly requires further scholarship, one possible explanation for this variance is that there is a double standard for women in the workforce where it is taken as a surprise when they are willing to engage in social drinking.

Log Wage with Female Interaction Variable

	1st	2nd	3rd	4th
Weekly Days of Drinking	0.077***	0.046***	0.041***	0.022***
	(24.23)	(11.50)	(10.76)	(6.06)
Female		-0.379 ***	-0.361 ***	-0.418***
		(-28.98)***	(-29.20)	(-35.73)
Days of Drinking X Female Interaction		0.047***	0.045 ***	0.025 ***
		(7.07)	(7.18)	(4.17)
Age			0.044 ***	0.040 ***
			(79.56)	(77.71)
Education Fixed Effect				X

Table Notes: t-stat in () ***, statistically significant at 99%

Table 4. Wage regression results with female interaction variable.

One other axis of variation that we chose to research is the effect of alcohol consumption based on age – for our purposes a substitute for how far along one is in their career. In our regressions, constrained above and below 35 years of age, we found that the benefit of additional days of drinking per week doubled for respondents under 35. We explain this by positing that alcohol consumption early in one's career is often a setting for professional networking, thus leading to a more successful career in the long run.

Log Wage/Days of Drinking by Age

	Below 35	Above 35
Weekly Days of Drinking	0.041***	0.026 ***
	(9.18)	(7.18)
Female	-0.36***	-0.429***
	(-27.77)	(-34.99)
Education Fixed Effect	X	X

Table Notes: t-stat in () ***, statistically significant at 99%

Table 5. Regression results of days of drinking per week divided by age.

Further scholarship would be helpful to study the variance of this trend between industries/job function, variables that our dataset lacks. For instance, the participating in alcohol-based networking for someone in sales would likely be very different to that of a pilot, a profession not aided by alcohol. We would also be interested to see research in long-term productivity and tenure in stressful roles plotted against alcohol consumption.

One of the social sides of the statistics is race, the variable shows a disproportion between alcohol consumption and economic outcome. Our dataset provides a categorical variable for race grouping by white, black, other, and Hispanic. We used this to create a series of regressions aimed at identifying the differing effects of alcohol consumption on each of these groups. The table describes that there's a greater positive outcome when white individuals have additional days of drinking in comparison to those who are Black or Hispanic. In this series of regressions, we distinguish that there is a significant variance in the effect of weekly days of drinking in females of different races. Though further scholarship is required, we are eager to understand this relationship better.

Log Wage Regression by Race

	White	Black	Other	Hispanic
Weekly Days of Drinking	0.016 ***	0.006	0.035 **	0.008
	(-3.97)	(-0.48)	(-2.08)	(0.78)
Female	-0.472 ***	-0.193***	-0.274 ***	-0.411***
	(-31.83)	(-5.66)	(-5.90)	(-14.98)
Age	0.043 ***	0.038 ***	0.047 ***	0.033 ***
	(-67.05)	(-24.9)	(21.38)	(26.04)
Days of Drinking X Female Interaction	0.026 ***	0.006	0.031	0.078 ***
	(-3.89)	(-0.32)	(1.15)	(4.01)
Weekly Days of Exercise	0.020***	0.039 ***	0.027 ***	0.026 ***
	(-6.86)	(-5.40)	(2.78)	(4.33)
Education Fixed Effect	X	X	X	X

Table Notes: t-stat in () ***, statistically significant at 99%, **, 95%, *, 90%

Table 6. Regression results of days drinking per week divided by race.

6. Conclusion

In this paper, we use Centers for Disease Control's National Health Interview Survey data to study the effect of alcohol consumption on labor market outcomes. We find that there is a robust premium to being a "moderate" drinker in the labor force. This follows our hypothesis that medium, social drinking creates opportunities for one to network and project themselves as a team player in a work environment. As we examine the traits of binge drinkers, we find a positive correlation between increased binge drinking and lower earnings and that being young and male makes one more likely to binge drink more often. Finally, we share robust results that suggest that the labor market mainly penalizes those who drink more than 20 drinks per week on the basis of earnings.

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