

## **Alcohol Use and the Propensity for Self-Employment**

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### Abstract

Considerable controversy surrounds the effects of alcohol use on labor market variables, and, while some issues have been addressed, important questions regarding employment outcomes persist. This article addresses the question of whether drinking leads, in causal ways, to lower rates of self-employment, which has implications for small business development. Using a large sample from the 2006 and 2007 National Survey on Drug Use and Health (NSDUH), an instrumental variable model is developed to estimate the causal impact of alcohol use on the probability of being self-employed. Extensive empirical testing is conducted to verify instrument strength and exogeneity. Results indicate that drinking reduces the probability of self-employment and effects are relatively stable across instrument specifications.

### Introduction

In many health-related and social science fields, there has been considerable concern over the various harmful effects of alcohol use. A potential consequence of alcohol use is the possible reduction in entrepreneurship and its associated economic benefits. Excessive drinking has been associated with age ranges that are closely related to entrepreneurship (Colombo and Delmastro, 2001). For instance, data from the 2006 and 2007 National Survey on Drug Use and Health (NSDUH) found approximately 43 percent of young adults ages 18 – 25 and 20 percent of those 30 – 49 engaged in binge drinking, i.e. the consumption of at least five alcoholic beverages in one sitting, in the past month.

Several reasons might lead heavy drinking to impair entrepreneurship and small business development. Intoxication potentially interferes with the learning process associated with establishing and managing new businesses (Fingarette, 1988). And time spent in activities where drinking occurs

could substitute away from time allocated to running one's own business. Risks stemming from intoxication, such as injury from accidents or fights, family strife, conflicts with law enforcement, and a tarnished reputation can also limit the capability of an individual to start and maintain his own business. Alternatively, social interactions associated with drinking might improve business networking opportunities and provide a means of relieving stress, which, in turn, potentially increases the propensity for self-employment (Lyons et al., 1995).

Some evidence has established a negative relationship between the regularity and intensity of drinking and labor market outcomes such as wages and full-time employment. But distinguishing whether such relationships are causal, such that increased alcohol consumption directly reduces, for example, probable self-employment, or merely correlational, with changes in other confounding variables simultaneously leading to drinking and lower self-employment rates, is a critical issue to resolve before any sensible policy formulations can begin.

Thus, for economists and policy makers, obtaining an accurate estimate of the magnitude of the causal effect that alcohol use has on labor market outcomes should be a priority. This task is a natural one to tackle by using econometric techniques such as instrumental variables (IV) regression – a method specifically designed to estimate the causal impact of a variable that does not otherwise vary independently with other unobserved determinants of the outcome being examined. A primary contribution of this analysis is that such a method is employed to derive a causal link between alcohol use and self-employment.

Why is the potential impact of alcohol use on this employment outcome relevant for business economics disciplines? A rich body of research has established the many benefits society enjoys from entrepreneurship and small business. Statistical evidence supporting the linkage between entrepreneurial activity and economic growth is present in reports generated by the U.S. Department of

Labor and the Small Business Administration (SBA). Although most entrepreneurs enter the market as a sole proprietor or a small business, they are nonetheless impactful because small firms are critical drivers of U.S. economic growth, contributing approximately one trillion dollars to the nation's economy on an annual basis and creating more than fifty percent of all new jobs yearly (U.S. Senate Committee on Small Business and Entrepreneurship, 2009). Furthermore, small firms employ more than one-half of all private sector employees, pay 44% of total U.S. private payroll, and produce 13 times more patents per employee than large firms (U.S. Small Business Administration, 2009). After conducting numerous studies on entrepreneurship, the Ewing Marion Kauffman Foundation reports that innovation leads to job creation, which subsequently leads to economic prosperity. Increased competition emanating from entrepreneurship is often cited as a relevant factor when examining the link between entrepreneurship and economic growth (Wong, Yuen, and Autio, 2005).

### **Related Literature**

While many studies have examined the effects of alcohol consumption on various labor market variables, the impact of drinking on self-employment remains relatively unexplored. However, most of the literature concludes that a negative relationship exists between drinking and labor market outcomes.

Several researchers report a negative correlation between drinking and income (Mullahy and Sindelar, 1993) while others find a positive relationship (Cook, 1991; Gill and Michaels, 1992). A potential explanation for such inconsistent findings is the potential nonlinear relationship between these variables, whereby moderate alcohol consumption is associated with higher incomes, but a decrease is evident with more binge-type drinking (French and Zarkin, 1995). Overall, these studies examine the impact of alcohol use on earnings while specifying drinking as an exogenous variable.

Some studies do address the endogeneity issue. Kenkel and Ribar (1994) use data from the U.S. National Longitudinal Survey of Youth to examine how drinking impacts various socioeconomic outcomes, including earnings. The sample consisted of only young adults, none of whom were older than thirty-one years of age. Although the effects on earnings are determined using a vast array of estimations, instrumental variables are used to address endogeneity. IV results indicate that heavy and problem drinking leads to a significant decrease in earnings, while OLS estimations reveal a lesser overall reduction.

An additional element of the literature investigates the impact of drinking on employment status. Most notable, Mullahy and Sindelar (1996) use IV estimation and conclude that alcohol abuse reduces probability of employment and raises the likelihood of unemployment for both males and females. These results, though, were largely not statistically significant. Stemming from this study, Terza (2002) utilizes a non-linear multinomial logit model and finds similar results that are statistically significant.

Although considerable literature exists on the impact of alcohol consumption on labor market outcomes, studies typically focus on employment, unemployment, and earnings. A primary contribution of this article, therefore, is that it provides the first known empirical evidence of a causal relationship between drinking and self-employment. Other studies typically have smaller data sets, some of which are limited to certain age groups; our data offers a substantially greater number of observations for multiple age categories. In accordance with previous studies on self-employment, our model incorporates variables on gender, education, marital status, race, age and even religion. Comparisons between our results and those of past studies are discussed in the results section.

## Data

The National Survey on Drug Use and Health (NSDUH), sponsored by the Substance Abuse and Mental Health Services Administration (SAMHSA), is annually administered to approximately 55,000 civilian, non-institutionalized individuals age 12 and over, chosen so that the application of sample weights produces a nationally representative sample, with age groups ranging from youths 12-17 years old to adults over 65. Using the years of 2006 and 2007, our data consists of 37,816 observations with age ranging from 19 years old to those over 65. Data from the NSDUH allow for both breadth and depth of coverage on the topic. Breadth comes from the ability to study aspects of employment outcomes using data from an elaborate questionnaire administered on a wide array of employment-related issues. Depth is provided by data on demographics, education and marital status, criminal history and CBSA size, among other variables.

An equally important facet of the NSDUH data is that they are conducive for the use of IV regression methodology to estimate the causal effect of alcohol use on self-employment. Abundant information is collected on experiences related to alcohol consumption, including measures of religiosity and the perceived risks involved in substance use. An assortment of variables are observed, therefore, that have the potential to serve as instruments for the proposed model, in the sense that they are very likely to be highly correlated with alcohol use but would not have any obvious reason to be otherwise associated with self-employment.

## Research Method and Empirical Specification

In determining causation, the primary methodological question is whether drinking is properly specified as an exogenous variable with respect to self-employment or should instead be treated as endogenous. Consider the following equations, in which drinking ( $D$ ) is a function of exogenous factors, and self-employment ( $SE$ ) is a function of some (but not all) of the same exogenous determinants as well as  $D$ ,

$$(1) \quad D = \alpha_0 + Z\alpha_1 + X\alpha_2 + \omega,$$

$$(2) \quad SE = \beta_0 + \beta_1 D + X\beta_2 + \varepsilon.$$

In the above equations, which apply to individual NSDUH respondents (with the corresponding observation-level subscript suppressed), vectors  $X$  and  $Z$  represent sets of exogenous variables that affect both drinking and self-employment ( $X$ ), and drinking but not self-employment ( $Z$ ),  $\omega$  and  $\varepsilon$  are error terms that encompass all factors influencing the corresponding dependent variable that are not explicitly controlled for on the right hand side of the equations, and the  $\alpha$ 's and  $\beta$ 's are parameters to be estimated. Econometrically, alcohol use is exogenous in equation 2 if it is uncorrelated with the error term  $\varepsilon$ . This condition holds, by definition, if none of the unobserved self-employment determinants are related to drinking. If so, there is no need to estimate equation 1; a single equation regression method such as OLS will produce consistent estimates of the causal effect of drinking,  $\beta_1$ .

However, two sources of endogeneity could possibly lead to a nonzero correlation between alcohol use and the error term in (2). One is unobserved endogeneity, which would occur if any of the unmeasured self-employment determinants that are subsumed in the error term  $\varepsilon$  are correlated with alcohol use; the resulting estimate of  $\beta_1$  in (2) would suffer from omitted variable bias, which cannot be eliminated directly because the omitted variables are not recorded in the data. Disruptive financial events that reduce credit scores might simultaneously be responsible for greater alcohol consumption and lower rates of self-employment.

Conversely, unmeasured ability or socioeconomic background could create a positive bias in the estimated drinking effect if higher ability individuals are better able to function

normally after alcohol consumption, or those who have more money to spend on alcohol have greater access to credit, and are therefore more likely to engage in entrepreneurship.

The other potential source of endogeneity is reverse causation. If alcohol use and employment variables are simultaneously determined, self-employment will not only be a function of drinking, as specified in equation 2, but also will be a contributing factor to the decision regarding whether and how much alcohol to consume.

In equation 2, shocks to the error term  $\varepsilon$  that influence employment outcomes will ultimately extend to drinking through the feedback effect of employment outcomes on alcohol consumption, thus creating a correlation between alcohol use and  $\varepsilon$  that renders the estimate of the causal drinking effect  $\beta_1$  inconsistent. To investigate the possibility that alcohol use is endogenous as an explanatory factor for self-employment, and to generate estimated effects of drinking on achievement that can be interpreted as causal, this analysis uses the method of instrumental variables.

To use IV, there must be at least one, preferably two or more, variables (i.e. instruments or IVs) that affect alcohol use but have no direct impact on self-employment (SE). In the case of exactly one instrument  $Z$ , the IV method works by estimating the causal drinking effect  $\beta_1$  as the ratio of the sample correlation between the instrument and self-employment to the sample correlation between the instrument and alcohol use, i.e.

$$(3) \quad \beta_1 = \text{corr} [Z, SE] \backslash \text{corr} [Z, D],$$

where the quantity is estimated from the data and the correlations are estimated while holding constant the vector  $\mathbf{X}$  of explanatory factors. Because the instrument is exogenous and related to self-employment (SE) only through drinking, the sample correlation between the instrument and self-employment is purely a product of that between drinking and self-employment. Thus, the

correlation between the instrument and self-employment merely needs to be standardized by that between the instrument and drinking. Then it can be used as an estimate for a causal effect.

Equation 3 makes transparent the two important conditions that the instrument vector  $Z$  must satisfy in order for IV to produce consistent estimates of the causal drinking effect  $\beta_1$ : First, the instruments must be highly correlated with alcohol use but not correlated with the employment outcome (SE) through any other mechanism besides drinking. The strength of this correlation is judged from the F-statistic for the joint significance of  $\alpha_1$  in equation 1. Minimally,  $\alpha_1$  should be significant at the 1 percent level. Second, if a direct correlation between the instruments and self-employment exists outside of the pathway from the instruments to drinking to self-employment, the numerator in (3) includes variation that is not part of the relationship between drinking and self-employment, and consequently the expression is no longer a consistent estimate of the causal effect of drinking on this outcome. The reason multiple instruments are preferred is that this overidentifies equation 2, which allows for specification tests to determine the empirical validity of excluding the instrument set  $Z$  from (2). Typically, the estimator represented by equation 3 is generated by a two-stage least squares (2SLS) procedure.

One other methodological point merits attention. Although IV estimates are consistent if the instrument strength and exogeneity conditions outlined above are satisfied, they are inefficient relative to OLS if it turns out that alcohol use is truly exogenous with respect to self-employment, in which case the OLS estimates can be interpreted as causal effects. Thus, it is desirable to econometrically test the null hypothesis that drinking is exogenous in the self-employment equation. This is done using a Hausman (1978) test, which proffers that, if drinking and the error term are uncorrelated, IV and OLS estimates should differ only by sampling error. If the null hypothesis of exogeneity is rejected, OLS

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estimates are inconsistent and hence conclusions should be based on IV estimates; failure to reject the null means that OLS estimates are preferable because of their smaller standard errors.

### *Self-Employment*

In the data, self-employment is a binary variable indicating whether the respondent has been self-employed, in either an incorporated or unincorporated business, at any time in the past 12 months. Those unemployed are excluded. The self-employment analysis is conducted utilizing a sample of respondents ranging in age from 19 to 65 and over. Ages 18 and lower are omitted categories in that compulsory attendance laws typically require school attendance up to age 16 and those below 18 presumably have a greatly diminished access to the credit necessary to start and operate their own business.

### *Drinking Variables*

Among the varied alcohol use measures utilized are: the number of days the respondent drank in the past year (which is coded as '0' for nondrinkers and those that consumed no drinks in the previous year) and the number of drinks consumed in the previous month (which is coded as '0' for nondrinkers and those that consumed no drinks in the previous month). Binge drinking is defined as consuming five or more drinks on the same occasion on at least one day in the past thirty days. Although the timing of the number of drinks and binge drinking variables is not an ideal match for the self-employment measures, in the sense that past month consumption cannot literally affect behavior that preceded the past month, this work will follow that of previous studies in assuming that previous month drinking patterns proxy those occurring in the recent period prior to the previous month.

The impact on self-employment from alcohol abuse or dependence in the past year is also examined. This is accomplished by an indicator in the NSDUH of whether respondents exhibited symptoms of alcohol abuse or dependence in the past year. This is retrospectively coded by SAMHSA

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based on responses to questions corresponding to criteria outlined in the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders*, the clinical standard for establishing drug abuse and dependence.

### *Explanatory Variables*

Several variables from the NSDUH data are considered explanatory in the model: age indicators are included for those 19, 20, and 21 years old as well as categories for those 22 or 23, 24 or 25, 26-29, 30-34, 35-49, 50-64, and 65 years old or over (with the age 18 as the omitted category). A binary measure of gender is included as is a binary variable indicating if the respondent graduated from any college. A marriage indicator is coded as '1' if the respondent is currently married and '0' if the respondent is divorced/ separated, a widow/ widower or has never been married. Interestingly, we also include a binary variable that indicates if the respondent has ever been arrested and booked for any crime, excluding minor traffic violations.

Population density is represented by indicators for two categories: a CBSA with one million persons or greater and a CBSA of less than one million persons. For race, indicators are specified for African Americans, Native Americans, Pacific Islanders, Asians and non-white Hispanics and Caucasians.

### *Instrumental Variables*

Several NSDUH variables conceivably influence drinking without having a direct effect on self-employment and are thus candidates to serve as instrumental variables. The specific variables utilized are: perceived risk of bodily harm from smoking a pack of cigarettes a day; whether religious beliefs are important and whether religious beliefs influence decisions.

Risk from smoking is coded as '1' if the respondent perceives moderate or great risk from smoking and '0' if no risk or only slight risk is perceived. While risk aversion has been linked to entrepreneurship in that less risk averse individuals are more likely to leave the protections and

certainty of working for someone else and “go out on their own” and start a business, evidence exists showing that the risk associated with substance use is different from, and not correlated to, the risk associated with self-employment (Heath and Tversky, 1991).

For both religion variables, a binary variable is coded as ‘1’ if religion is important or does influence decisions and ‘0’ otherwise. Religiosity has been linked to drinking behaviors (Kenkel and Ribar, 1994) but the evidence has been mixed and inconclusive with respect to self-employment (Dodd and Seaman, 1998; Kwon, 1997; Martez and Rodriguez, 2004), so there is no a priori reason to assume a direct correlation between self-employment and importance of religion. All instrumental variables undergo extensive testing in the following section.

### **Empirical Findings**

The causal effect drinking has on the probability of being self-employed is estimated using the three instrumental variables listed above. The overidentification statistics aid in revealing whether the instrument set is exogenous with respect to self-employment and an analysis is conducted to determine if some instrument sets are more plausibly exogenous than others. The main results of the IV analysis are also compared with parameter estimates obtained using OLS, while coefficients and standard errors of all exogenous variables for the probability of self-employment are reported and discussed.

Table 1 presents select summary statistics. Mean self-employment is approximately 15 percent. The mean number of days drinks were consumed in the past year is 44.14 while the mean number of drinks consumed in the past month is 11.81. Approximately one-fifth of respondents’ reported binge drinking in the last month and about one-tenth are classified as alcohol dependent, while about one-sixth report being arrested at some point. A vast majority, 73 percent, report their religious beliefs are important and a majority associate great or moderate risk from smoking at least one pack of cigarettes a day. About 90 percent of respondents live in a CBSA, roughly equally split between CBSAs with

populations greater than and less than one million. Caucasians comprise about 64 percent of the sample and African Americans about 13 percent, while non-white Hispanics account for about 16 percent and Asians about four percent.

**Table 1. Descriptive Statistics**  
(n=37,819)

Variable	Mean	Standard Deviation
Respondent is self-employed	0.146	0.354
Number of days drank-past year	44.410	76.071
Number of drinks in previous month	11.814	42.238
Binge drinking in the past 30 days	0.225	0.418
Abuse/ Dependence on alcohol classification	0.102	0.303
Religious beliefs are important in life	0.736	0.441
Religion influences your decisions	0.678	0.467
Respondent perceives great or moderate risk from smoking	0.934	0.247
Respondent is female	0.533	0.498
Respondent is a college graduate	0.179	0.383
Respondent has ever been arrested	0.172	0.377
Respondent is married	0.342	0.474
Age of respondent (19)	0.058	0.234
Age of respondent (20)	0.052	0.223
Age of respondent (21)	0.048	0.214
Age of respondent (22 or 23)	0.095	0.293
Age of respondent (24 or 25)	0.092	0.290
Age of respondent (26-29)	0.060	0.237
Age of respondent (30-34)	0.065	0.247
Age of respondent (35-49)	0.172	0.377
Age of respondent (50-64)	0.069	0.253
Age of respondent (65 and over)	0.037	0.188
Race (Caucasian)	0.637	0.483
Race (African American)	0.126	0.332
Race (Native American)	0.015	0.123
Race (Pacific Islander)	0.005	0.071
Race (Asian)	0.035	0.185
Race (non-white Hispanic)	0.162	0.368
CBSA segment with 1+ million persons	0.410	0.492
CBSA segment of less than 1 million	0.497	0.499

### *First Stage Regression Results*

Table 2 presents the probit results for the drinking measures on the instruments for the sample. Of those who perceive that there is moderate to great risk of harm from smoking a pack of cigarettes a day, the number of days drinking occurred in the past year is lowered by about four days. The number of drinks consumed in the past month is reduced by roughly 2.5, while the likelihood of binge drinking in

the last 30 days falls by 0.02 percentage points. The likelihood of being categorized as abusive/dependent on alcohol falls by approximately 0.01 points.

**Table 2. First stage regression estimates**

(n=37,819)

	number of days	number of drinks	Binge	Abuse/ Dependence
<b>exogeneous variables</b>	drank in past year	in past month	drinking	on alcohol
Religious beliefs are important in life	-5.127 (1.123)	-1.450 (0.697)	-0.022 (0.006)	-0.017 (0.005)
Religion influences your decisions	-14.717 (1.239)	-4.703 (1.239)	-0.071 (0.006)	-0.020 (0.004)
perceived risk from smoking	-4.264 (1.652)	-2.424 (0.930)	-0.016 (0.008)	-0.007 (0.006)
F stat/ chi2-coefficient of joint significance	153.2	49.01	323.14	81.22
P-value of significance level	(0.000)	(0.000)	(0.000)	(0.000)

Importance of religious beliefs reduces alcohol use. For those who say that religion is important in life, the number of days drinking occurred in the past year is lowered by approximately five days. The number of drinks consumed in the past month is reduced by 1.5, while the probability of binge drinking in the last 30 days falls by 0.02 percentage points. The likelihood of being categorized as abusive/dependent on alcohol falls by about 0.02 points.

When religiosity impacts decisions, the effects on the drinking measures are more pronounced. The number of days drinking occurred in the past year is lowered by 14 days. The number of drinks consumed in the past month is reduced by about five, while the probability of binge drinking in the last 30 days falls by 0.07 points. The likelihood of being categorized as abusive/dependent on alcohol falls by 0.02 points. The  $\chi^2$  coefficients and associated p-values indicate that the instruments are jointly significant for all the drinking measures.

*The Effects of Drinking on the Probability of Being Self-Employed*

As shown in table 3, drinking has significant, negative effects on the probability of the respondent reporting self-employment. An additional day increase in the number of past year drinking days reduces the probability by 0.001 percentage points. If a respondent reports drinking 52 days in the previous year, the probability of self-employment in the current period is reduced by 0.052 points compared to not drinking at all.

**Table 3. IV estimates of drinking on the probability of self-employment**

All three instruments

(n=37,819)

Alcohol variables	IV	OLS
<b>number of days drank-past year</b>	-0.001*	-0.0001
Marginal Effect Standard Error	(0.0002)	(0.0000)
P-value of overidentification test	0.843	
Hausman statistic	-5.251*	
<b>number of drinks in past month</b>	-0.003*	-0.0001**
Marginal Effect Standard Error	(0.0007)	(0.0000)
P-value of overidentification test	0.633	
Hausman statistic	-4.746*	
<b>binge drinking</b>	-0.231*	-0.007***
Marginal Effect Standard Error	(0.0461)	(0.0044)
P-value of overidentification test	0.840	
Hausman statistic	-4.912*	
<b>abuse/ dependence on alcohol</b>	-0.595*	-0.004
Marginal Effect Standard Error	(0.1321)	(0.0058)
P-value of overidentification test	0.890	
Hausman statistic	-4.550*	

\*Statistically significant at 1%

\*\*Statistically significant at 5%

\*\*\*Statistically significant at 10%

For each drink increase in the number of drinks consumed in the past month, the probability of self-employment is reduced by 0.003. If the respondent consumes, on average, two alcoholic drinks per day in the past 30 days, the probability of self-employment falls by 0.18 relative to abstaining. For

respondents that reported binge drinking in the previous 30 day period, there is an associated reduction in the probability of self-employment of 0.23. For those categorized as abusive/ dependent on alcohol, the probability is reduced by 0.59 – those that are abusive/ dependent on alcohol are over four times less likely to be self-employed than abstainers.

For all the drinking parameters, the overidentification tests have associated p-values that offer strong evidence in support of the assumption of instrument exogeneity at the 10 percent level. Moreover, the p-values associated with the Hausman coefficients signify that there are statistically significant differences between the OLS and IV parameter estimates for all the drinking measures offering further proof that IV is appropriate as OLS estimates are inconsistent.

The relatively large negative effects could indicate alcohol consumption on the part of the respondent drastically impairs cognitive functioning and the learning process, which, in turn reduces the capability of the person to run their own business. There is also an opportunity cost involved in drinking, which includes reduced time that may be needed to operate a business, and possibly increased devotion of monetary resources to consuming alcohol that could be used in business operations which could, in turn, detract from the prospect of being self-employed. These results imply that those costs are substantial.

#### *Instrument Robustness and the Probability of Self-Employment*

To determine if there is any sensitivity in the main results attributable to changes in the instrument set, regressions are performed with varying pairs of instruments with results presented in table 4. The instrument that is omitted from the IV combination is utilized as an explanatory variable and its coefficient and standard error is reported.

**Table 4. IV estimates of drinking on the probability of self employment using IV pairs**  
(n=37,819)

	religion important and religious decisions	religion important and smoking risk	religious decisions and smoking risk
<b>Alcohol variables</b>			
<b>number of days drank-past year</b>	-0.001*	-0.001***	-0.001*
Marginal Effect Standard Error	(0.0002)	(0.0008)	(0.0003)
P-value of overidentification test	0.911	0.857	0.949
Hausman statistic	-5.227*	-1.431**	-2.748*
Coefficient (Standard Error) of omitted IV	-0.003 (0.007)	-0.002 (0.018)	-0.003 (0.007)
<b>number of drinks in past month</b>	-0.003*	-0.003	-0.003*
Marginal Effect Standard Error	(0.0010)	(0.0020)	(0.0011)
P-value of overidentification test	0.886	0.646	0.799
Hausman statistic	-4.754*	-1.100***	-2.481*
Coefficient (Standard Error) of omitted IV	-0.007 (0.009)	-0.004 (0.015)	-0.005 (0.007)
<b>binge drinking</b>	-0.233*	-0.306***	-0.198*
Marginal Effect Standard Error	(0.0460)	(0.2170)	(0.0750)
P-value of overidentification test	0.873	0.891	0.978
Hausman statistic	-4.888*	-1.268***	-2.568*
Coefficient (Standard Error) of omitted IV	-0.002 (0.007)	-0.006 (0.020)	-0.003 (0.006)
<b>abuse/ dependence on alcohol</b>	-0.601*	-0.497***	-0.682**
Marginal Effect Standard Error	(0.1340)	(0.3160)	(0.3070)
P-value of overidentification test	0.924	0.984	0.944
Hausman statistic	-4.521*	-1.362**	-2.238*
Coefficient (Standard Error) of omitted IV	0.002 (0.008)	0.005 (0.011)	0.003 (0.011)

\*Statistically significant at 1%

\*\*Statistically significant at 10%

\*\*\*Statistically significant at 15%

For all drinking variables, the effects on self-employment are remarkably similar to those in the main regression where all three instruments are employed. Also, the overidentification test results support the hypothesis of instrument exogeneity for all IV pairs. When importance of religious beliefs and smoking risk are paired as instruments, the power of the empirical tests is reduced somewhat: IV coefficients are significant at the 15 percent level save for the past month drinking measure, which loses significance. And the IV coefficient of drinking is slightly higher for binge drinking and slightly lower for abuse/dependence on alcohol. However, tests confirm that these IV's are exogenous with respect to self-employment.

At the ten percent level, all Hausman tests indicate that there are statistically significant differences between IV and OLS estimates in all specifications, except for the importance of religion and smoking risk IV pair where significance falls to 15 percent. Furthermore, the additional instrument not used to identify drinking is never significant in the self-employment equation. That is yet another indication that religiosity and perceived smoking risk do not directly impact self-employment. Overall, the robustness analysis offers strong evidence to support the hypothesis that the instruments are exogeneous.

#### *The Effects of Other Explanatory on the Probability of Being Self-Employed*

As table 5 shows, other variables have significant effects on the probability of the respondent being self-employed. We report these effects only for the binge drinking measure as the other drinking measures yielded similar results. Results from the other drinking measures are available from the authors upon request.

**Table 5. All IV estimates on the probability of self-employment for binge drinking**

(n=37,819)

Explanatory variable	IV coefficient	(Marginal Effect SE)
Binge drinking	-0.231*	0.046
Respondent is female	-0.071*	0.007
Respondent is a college graduate	0.006	0.005
Respondent has ever been arrested	0.064*	0.008
Respondent is married	-0.011***	0.006
Age of respondent (19)	0.019***	0.008
Age of respondent (20)	0.013*	0.007
Age of respondent (21)	0.046*	0.010
Age of respondent (22 or 23)	0.037*	0.007
Age of respondent (24 or 25)	0.053*	0.007
Age of respondent (26-29)	0.054*	0.008
Age of respondent (30-34)	0.081*	0.008
Age of respondent (35-49)	0.099*	0.007
Age of respondent (50-64)	0.124*	0.010
Age of respondent (65 and over)	0.244*	0.022
Race (African American)	-0.068*	0.009
Race (Native American)	0.001	0.016
Race (Pacific Islander)	0.045***	0.026
Race (Asian)	-0.064*	0.012
Race (non-white Hispanic)	-0.042*	0.007
CBSA segment with 1+ million persons	-0.016**	0.007
CBSA segment of less than 1 million	-0.024*	0.007

\*Statistically significant at 1%

\*\*Statistically significant at 5%

\*\*\*Statistically significant at 10%

Our results show that females are less likely than males to be self-employed. Similarly, Beugelsdijk and Noorderhaven (2005) find a positive correlation between male gender and self-employment when using cross-sectional data to examine the characteristics of entrepreneurs. The findings of more recent studies also suggest that the probability of male self-employment is higher (Kim, 2007; Noble et al., 2007). Our results show that racial minorities such as African-Americans and Hispanics are less likely to be self-employed versus Caucasians. These findings are consistent with other

studies. Historically, self-employment among African-Americans has been low when compared to Caucasians (Fairlie and Meyer, 1997; Kim, 2007). Furthermore, Hout and Rosen (2000) found that self-employment was lowest amongst the African-American, Latino, and Asian populations.

We also find that married respondents are less likely to report self-employment as are those that live in larger CBSA segments. There seems to be a lack of consensus in the literature with regard to this variable. The empirical research of Hout and Rosen (2000) revealed that single men are less likely to be self-employed as compared to other groups. Stevenson (1986) found that male entrepreneurs are more likely to be married than female entrepreneurs, while Kim (2007) found that the probability of self-employment is greater for married females. With respect to age, our results indicate that older individuals are more likely to be self-employed than those younger. This is consistent with the empirical research findings of Kim (2007). Other studies suggest that extremely young and extremely old people are not likely to be self-employed (Beugelsdijk and Noorderhaven, 2005; Cowling and Taylor, 2001; Storey, 1994). More specifically, international studies of high-tech entrepreneurs reveal that the age at which entrepreneurs are most likely to establish a business is between 30 and 40 (Autio, et al., 1989; Colombo and Delmastro, 2001). Interestingly, respondents who have been arrested are more likely to be self-employed. This may be ascribed to a respondent's dislike of authority and an employer's reluctance to hire someone with "a record" – if the arrest lead to a conviction. Therefore, these individuals are relegated to "hiring themselves." Overall, the preponderance of literature on the effects of certain demographic variables on the probability of being self-employed is largely consistent with our findings.

### **Concluding Remarks**

This paper contributes to the literature by examining the effects of drinking on self-employment while accounting for unobserved endogeneity. The literature has established a negative link between drinking and key labor market outcomes, but many of these studies do not account for the possibility that the negative correlation between these factors may be the result of unobserved variables that

cause simultaneous increases in drinking and reductions in labor market success. And, for studies that have incorporated unobserved endogeneity, instrumental variable procedures have been subject to criticism. In addition, existing research focuses largely on alcohol use and wages and full-time versus part-time employment decisions, leaving the impact of drinking on the decision to be self-employed largely unaddressed.

This study finds strong evidence that the probability of self-employment is lower when the use of alcohol is more frequent and intense. Binge drinking and abuse of alcohol have the most detrimental impact. Throughout the analysis, overidentification tests generally confirm instrument exogeneity and thus show that alcohol consumption should be treated as endogenous. Also, OLS regression estimates are generally not significant.

The results warrant consideration of policies that prevent or curtail excessive drinking at least from an entrepreneurial standpoint. For example, college entrepreneurship programs might wish to consider educating students about the negative effects alcohol use has on self-employment and entrepreneurial activities. Furthermore, building alcohol awareness into small business training and education programs should prove beneficial. And since the SBA is supportive of policies that serve to increase the creation and growth of small business, perhaps advocacy by the SBA on such alcohol-related policy initiatives should be considered. More general, policy efforts to impose additional restrictions on alcohol advertisements and to promote insurance coverage for the treatment of excessive alcohol use will have economic benefits from an entrepreneurial perspective. Future research might include a further exploration into instruments that properly identify drinking, but the econometric technique employed in this study provides a sound basis for other academicians who wish to further analyze the impact of alcohol use on labor market outcomes such as self-employment.

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