NBER WORKING PAPER SERIES

THE MYTH OF THE DRINKER'S BONUS

Philip J. Cook
Bethany Peters

Working Paper 11902
http://www.nber.org/papers/w11902

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
December 2005

The authors wish to thank Jeremy Arkes, Dhaval Dave, John Mullahy, and researchers in RAND's health-policy group for their suggestions on an earlier draft. The views expressed herein are those of the author(s) and do not necessarily reflect the views of the National Bureau of Economic Research.

The Myth of the Drinker's Bonus
Philip J. Cook and Bethany Peters
NBER Working Paper No. 11902
December 2005
JEL No. I112, J24

ABSTRACT

Drinkers earn more than non-drinkers, even after controlling for human capital and local labor market conditions. Several mechanisms by which drinking could increase productivity have been proposed but are unconfirmed; the more obvious mechanisms predict the opposite, that drinking can impair productivity. In this paper we reproduce the positive association between drinking and earnings, using data for adults age 27-34 from the National Longitudinal Survey of Youth (1979). Since drinking is endogenous in this relationship, we then estimate a reduced-form equation, with alcohol prices (proxied by a new index of excise taxes) replacing the drinking variables. We find strong evidence that the prevalence of full-time work *increases* with alcohol prices – suggesting that a reduction in drinking increases the labor supply. We also demonstrate some evidence of a positive association between alcohol prices and the earnings of full-time workers. We conclude that most likely the positive association between drinking and earnings is the result of the fact that ethanol is a normal commodity, the consumption of which increases with income, rather than an elixer that enhances productivity.

Philip J. Cook
Sanford University of Public Policy
Duke University
Durham, NC 27708-0245
and NBER
pcook@duke.edu

Bethany Peters
bp512213142@gmail.com

1. Introduction

Common sense, backed by a good deal of evidence, suggests that drinking could impair productivity. In fact, estimates of alcohol-related social costs are typically dominated by the value of lost productivity (Harwood, Fountain & Livermore 1998). Historically the concern with the quality and quantity of work provided by the labor force was a major factor in Nineteenth Century temperance movements in the United States and Europe (Roberts 1984; Rumbarger 1989). Clark Warburton (1932) stated the argument concisely:

> Prohibition, if it actually resulted in the cessation of use of alcoholic beverages, might be expected to affect the efficiency of industry in several ways. The principal effect of alcohol is on the central nervous system, and experiments show that a decrease in the consumption of alcohol during, or immediately preceding, working hours is accompanied by greater skill at work. The finer co-ordination made possible by the absence of alcohol tends to reduce the accident rate. The elimination of drinking bouts should tend to eliminate absenteeism, especially on Monday, and irregularity in reporting at work. The impossibility of drinking to excess should result in less sickness and absence on account thereof, and in a longer average working life (195-196).

In recent times a majority of large corporations in the United States have established occupational alcoholism programs or employee-assistance programs to improve productivity (Walsh 1982).

Curiously, however, the link between drinking and reduced productivity (as measured by earnings) does not receive unambiguous support from the econometric work on this subject. In fact, drinkers as a group earn *more* than those who abstain, and that "drinker's bonus" is not necessarily limited to the moderate drinkers (Berger & Leigh 1988; Cook 1991; French & Zarkin

1995; Heien 1996; Hamilton & Hamilton 1997; Zarkin, et al. 1998; MacDonald & Shields 2001; van Ours 2004). These findings are intriguing, and have generated speculation about possible mechanisms. Perhaps drinking confers health benefits, or enhances "networking." But such speculations presume that the statistical association is the result, at least in part, of a causal process flowing from drinking to earnings. A more obvious interpretation is just the reverse – that earnings influence whether and how much someone drinks. Indeed, there is good evidence that ethanol is a normal commodity, with consumption increasing with income (Ruhm 1995; Cook & Tauchen 1982).

A number of analysts have considered the possibility of two-way causation, typically using instrumental variables (IV) methods to remove any influence of earnings on drinking and isolate the putative effect of drinking on earnings. Those studies, reviewed below, have had mixed results, in part because of the questionable specifications used in some of them.

In this paper we estimate a series of earnings equations for youthful (age 21-35) workers based on data from the National Longitudinal Survey of Youth (1979 cohort). As have other analysts, we are able to document the existence of the drinker's bonus in these data, both with and without a long list of controls for personal and labor-market characteristics. We then report the results of a reduced-form analysis using a new index of alcohol-excise taxes, demonstrating that the prevalence of full-time work increases with the state tax level. We conclude that at least for this population (adults prior to middle age) drinking does not improve the quality of labor supply, and may well reduce the quantity. The drinker's bonus is most likely an artifact resulting from the reverse causal process; quite simply, drinking is a normal activity, the likelihood of

which increases with earnings.

Also of possible interest are our ancillary findings concerning individual characteristics -- personality, body mass, and height – and local labor market conditions, as measured by our local wage index.

Here is a brief roadmap of the paper. The next section reviews the literature, with special attention to analyses that attempted to correct for the endogeneity of drinking in the earnings equation. Section 3 then describes the data set and develops our estimation strategy. Here we introduce a new index of local (MSA level) wages, and a new index of alcohol excise taxes. Section 4 documents the drinker's bonus using the NLSY data, finding that it is quite robust to alternative specifications. The following section reports the results of reduced-form estimates. The final section concludes.

2. Evidence that drinking affects productivity

An early effort to estimate the productivity costs of drinking is due to Yale economist Irving Fisher (1926). His view was that drinking slowed down the "human machine" (p. 118), and he noted that "All of us know that industrial efficiency was one of the chief reasons for Prohibition (p. 158)." He supported his claim of impaired productivity by citing experiments which showed that drinking reduces proficiency or speed at some task. In particular, he noted an experiment in which four typesetters were studied over a four-day period; two of them were given drinks, and the other two were used as a control group. The conclusion was that drinking three glasses of beer in a day reduced typesetting output by about 10 percent. Fisher made a

heroic extrapolation from this result, projecting a 5 percent increase in national productivity as a result of reduced drinking caused by Prohibition.

There have been surprisingly few modern-day experiments on how drinking affects work, perhaps because it seems obvious. Several laboratory studies have been conducted on the effects of hangovers on job performance in industrial settings (Mangione, et al. 1999). Subjects drank till intoxicated, slept it off, and then the next morning performed tasks in simulated work situations (Wolkenberg, Gold & Tichauer 1975). Even as much as 18 hours after the drinking bout, experimenters observed residual effects of the drinking bout on reaction time, motor skills, perception, and other performance attributes.

One of the largest observational studies, the Worksite Alcohol Project, found that *problematic* drinking (but not drinking *per se)* was associated with work-related problems. (Mangione, et al. 1999). Sixteen work sites belonging to seven different corporations, spanning the gamut from professional office to factory, were included, with over 9,000 individual survey respondents interviewed in the early 1990s. The respondents were asked about job-related problems during the previous year, including having missed work; done poor quality work; arrived late or left early; done less work than expected; had an argument with a co-worker; or been hurt on the job. The combined frequency of these work performance problems was regressed on self-reported measures of drinking and alcohol-related problems, controlling for demographic characteristics, life circumstances and job characteristics. Three drinking measures had a significantly positive effect: drinking on the job, sometimes drinking to get drunk, and

dependence on alcohol. Given these other measures the weekly quantity of alcohol consumed had no discernible effect on problem frequency.[1]

Finally, several surveys have asked respondents whether their drinking has caused them any problems (Room, Bondy & Ferris 1995). For example, in a national survey conducted in the United States in 1984, 2.9 percent of men stated that their drinking had harmed their employment opportunities, and 0.8 percent reported they had lost or nearly lost a job as a result of their drinking (Hilton & Clark 1987). The corresponding percentages for women were about half those of the men. These percentages seem remarkably small relative to the prevalence of alcohol abuse.

The possibility that drinking is actually rewarded in the labor market was first suggested by economists Mark Berger and Paul Leigh (1988). They compared the hourly wages of drinkers and nondrinkers,[2] finding that for males the drinkers earned 10% more, while for females the drinkers earned 35% more. After controlling for experience, education, occupation, race and marital status, the differences shrank somewhat but remained large.

This finding that abstainers earn less than drinkers, or at least moderate drinkers, has been replicated using a variety of data sets for the United States (Kenkel & Ribar 1994; Heien 1996;

---

[1] Several other studies have analyzed the effect of drinking on absenteeism. Manning et al. (1991) report results from two data sets, the Rand Health Insurance Experiment (HIE) and the National Health Interview Study for 1983. In neither do they find a relationship between quantity consumed by current drinkers and absenteeism. (Using the HIE they find that "former drinkers" have 38 percent higher absentee rates than others.) On the other hand, French and Zarkin (1995), using survey data for workers at four large work sites, find that both overall drinking and frequency of drunkenness are positively related to absenteeism.

[2] They defined “drinker” as someone who reported drinking at least once or twice per week.

Zarkin, et al. 1998; French & Zarkin 1995), Canada (Hamilton & Hamilton 1997), England (MacDonald & Shields 2001), and the Netherlands (van Ours 2004).

How should these results be interpreted? Economists equate earnings (hourly or annual) with productivity, albeit with a number of qualifications (Bowles, Gintis & Osborne 2001; Kenkel & Wang 1999; Mullahy 1993). Accepting that view, the question becomes "why should workers who drink be more productive on average than those who don't?" One answer, of course, is that drinking itself actually enhances productivity; that some people tend to perform better on the job if they are drinkers than abstainers. Several authors have suggested that the beneficial mechanism may be via the health benefits of moderate drinking (Heien 1996; Hamilton & Hamilton 1997). But since those benefits are primarily through heart-disease prevention in middle age, the "health" mechanism does not account for the drinker's bonus among workers in their 20s and 30s. Another possibility is that drinking facilitates social networking, which in turn generates improved job options; most people find their jobs through word-of-mouth, and having a wide network of friends and acquaintances is an important aspect of ones "social capital."[3] In an environment where drinking is a routine aspect of socializing, drinkers may be more productive because they find better jobs on average.

But the "drinker's bonus" may not be "real," in the sense of reflecting the causal effect of drinking on earnings and productivity. The usual problems in analyzing non-experimental data

---

Those who drank less often were lumped in with the abstainers.

[3] This interpretation is developed by MacDonald and Shields (2001) and others. The importance of a social network in job finding is documented by Granovetter (1975 (2nd ed., 1995)). The economic interpretation of social capital is developed by Glaeser, Laibson, and Sacerdote (2002) and by Durlauf and Fafchamps (2004).

arise, including omitted-variables bias. Drinkers and abstainers may differ in hard-to-measure ways that are relevant to labor-market success, such as the ability to get along well with other people, or personal priorities between home life and career. The literature includes heroic efforts to deal with this omitted-variables problem, but the possibility of bias remains (Kenkel & Ribar 1994). In addition to genuine confounders are problems that may arise as artifacts of the measurement process. For example, self-reported drinking may be affected by how trusting the respondent is of the survey interview process. A spurious correlation between drinking and earnings will arise if more trusting respondents are more likely to admit their drinking in the NLSY interviews and also tend to earn more (or be willing to report a higher percentage of their income).

Alcohol dependence and abuse. In addition to the effect of current drinking on productivity, if any, there may also be an effect of past drinking as mediated by the acquisition of human capital and by health status (mental and physical) (Bray 2003; Grossman 1972; Grossman 2000). Several studies have explored this linkage using data on two alcohol-related conditions termed "alcohol dependence" and "alcohol abuse" in the *Diagnostic and Statistical Manual of Mental Disorders* of the American Psychiatric Association. "Alcohol dependence" is defined by symptoms indicating psychological and physical dependence on alcohol and neglect of responsibilities at work or home. "Alcohol abuse" is defined by continued drinking despite alcohol-related problems and risky behavior associated with bouts of heavy drinking.

John Mullahy and Jody Sindelar (1993) utilize data from the Epidemiological Catchment Area survey of the New Haven area, which includes diagnostic questions on mental illness.

Twenty percent of their primary sample (males age 30-59) had at some point in their lives experienced the symptoms defining alcohol dependence or abuse. This group of problem drinkers had a substantially lower employment rate and lower earnings -- results that held up after controlling for other characteristics. (Strangely, alcoholic males in their 20s and 60s actually had higher earnings than non-alcoholics.) In another analysis, Mullahy and Sindelar used Epidemiological Catchment Area survey data for four cities, finding that for both genders, nonalcoholics had higher educational attainment, and were more likely to be working, more likely to have white-collar jobs, and had higher incomes. Alcoholic women were more likely than alcoholic men to never marry, have fewer children, and have more psychiatric disorders (Mullahy & Sindelar 1991).

The problems of causal inference are the same with alcohol dependence as with determining the influence of current drinking status on productivity. While problematic drinking probably affects labor force participation, productivity, and earnings (Mangione, et al. 1999) isolating this effect is not easy from non-experimental data. Mullahy and Sindelar note that "Other factors may cause both employment and alcohol problems; such factors could include psychiatric problems, congenital or chronic health problems, injuries, physical pain, lack of ability to cope, problems with friends or family, frustration of various forms, or an unstable upbringing (Mullahy & Sindelar 1996, p. 413}."

Depending on the data source, it may be possible to use multivariate methods to control for aspects of nature and nurture that lead to drinking problems and have an influence on schooling, acquisition of other forms of human capital, and work. But usually the available

measures in population surveys are inadequate or unreliable.

The statistical challenge is further compounded by the fact that alcohol problems develop over a number of years, influencing life-course outcomes in a variety of ways. There is strong evidence that problem drinking in youth affects school completion (Mullahy & Sindelar 1989; Mullahy & Sindelar 1991; Cook & Moore 1993b; Koch & Kerry Anne McGeary forthcoming) and family formation (Kenkel & Ribar 1994). Hence the contemporaneous effect of problematic drinking on work – controlling for education and family circumstances – may miss much of the long-term effects. Kenkel and Ribar report a series of multivariate-regression results that help make the point: they find that alcohol-dependent women (age 24-34) earned 11percent more than those who were not dependent while alcohol-dependent men earned 10 percent less. But when they add controls for marital status and children, earnings for both males and females are unaffected by alcohol dependence. The apparent reason: alcohol dependence reduces the likelihood of getting married, and marriage has opposite effects on work outcomes for men and women – men work and earn more, women less.

Reverse causation. The drinker's bonus may be in whole or part an artifact of the reverse causal process. When their earnings increase, some drinkers increase their alcohol consumption, and some people who usually abstain become regular drinkers.[4] That possibility is supported by other evidence – we know, for example, that aggregate alcohol sales increase with per capita income.

[4] An alternative possibility for reverse causation is that higher earnings cause drinking initiation because more lucrative jobs tend to have greater stress associated with them, or have other attributes that induce drinking (Trice & Sonnenstuhl 1988).

Summary. Figure 1 provides a schematic diagram that summarizes the causal pathways under discussion (Cook & Moore 2000). In this diagram, "Current drinking" patterns (both on and off the job) affect productivity, which in turn determines individual earnings. The diagram also depicts an indirect effect via the influence of drinking history on the accumulation of human and health capital (Grossman 1972; Grossman 2000). The final link represents "reverse causation," in which current consumption is affected by earnings.

Fig. 1 here

Figure 1 identifies several mechanisms by which current drinking and earnings could be correlated. To isolate the effect of drinking on earnings, a number of analysts have used instrumental-variable estimation techniques, which also may reduce bias due to errors in the measurement of drinking (Kenkel & Ribar 1994). The challenge is to find good instruments, which is to say, variables that satisfy two conditions: (1) they have a strong statistical association with individual drinking; and (2) they are orthogonal to the error process in the earnings equation. A long list of instruments have been utilized by economists working on this problem, as summarized in Table 1. State-level measures of alcohol availability and use, such as excise taxes or *per capita* sales, are plausible candidates to satisfy the requirements of a good instrument, although in some data sets they may not have enough variation to generate the needed statistical power. Some analysts have used certain individual characteristics as instruments, including whether the individual suffers from any of several chronic diseases, characterizations of religious practice, attitudes toward the risk of alcohol and drugs, parents'

smoking, and whether the respondent reports having close relatives who are alcoholic. While all of these variables are correlated with drinking, it is quite likely in each case that they also have a direct effect on work and earnings. For example, people who attend church frequently drink less than others, but their religion may also influence their career choices and performance on the job, and hence earnings. Therefore using some quantitative characterization of religious practice as an instrument does not identify the effect of drinking *per se* on earnings.

3. Data and Estimation Strategy

The primary data source for this study is the 1979 National Longitudinal Survey of Youth (NLSY). The NLSY is managed by the Human Resource Research Center at Ohio State University, with sponsorship from the US Department of Labor and other federal agencies. The initial sample included 12,686 youths between the ages of 14 and 21 in 1979, the first year of the survey. The sampling procedure was designed to include a disproportionate number of racial minorities and youths in poor households. Sample members were interviewed annually until 1994, and bi-annually since then.

The NLSY includes extensive information on work and earnings, together with data on family background, schooling, family formation, and a variety of other matters. We utilize the geocoded version of NLSY data set, which allows us to merge additional variables characterizing the respondent's state, metropolitan area, and county of residence. Questions on drinking were included in 1982-1985 and again in 1988, 1989, 1992 and 1994. Data on work hours and earnings were obtained by questions concerning the previous calendar year that are included in

every wave of the survey; therefore hours and earnings information are available for every year through 1993, and every other year thereafter. As a result, the 1994 wave could not be used – we have drinking items that apply to that year, but not earnings and hours.

There are several items that characterize current drinking. In what follows we use a binary indicator of whether the individual reports having at least one drink in the preceding month, and the number of times the individual reports having 6 or more drinks on a single occasion in the preceding month (available in every wave that includes drinking items except 1992). The key employment-related outcome variables are whether the individual reported working full time in the preceding calendar year, and if so, his or her earnings. We defined "full time" as at least 1,500 hours with earnings of at least $1,000 (1983 dollars). Full-time work and earnings are modeled as outcomes of drinking, personal characteristics, and conditions in the local labor market. Both "short form" and "long form" specifications are used, the difference being which personal characteristics are included. The short form includes only characteristics that are exogenous to drinking decisions by the individual, such as demographics, characteristics of the birth family, aptitude, and so forth. The long form specification expands on this list to include variables that reflect choices made over the life course which may well be influenced by prior drinking, including years of schooling, marital status, health, and work experience.

Thus we have

(1) $p(FT_{itc}) = F(D_{it}, X_{it}, w_{tc}, u_{tc}, e_{itc})$

(2) $E_{itc} = E(D_{it}, X_{it}, w_{tc}, u_{tc}, e_{itc})$

where for an individual i in year t and jurisdiction c, the variables are

D = a vector of variables describing whether and how much the individual drinks

X = a vector of personal characteristics (either short or long)

w = local wage level

u = local unemployment rate

e = a scalar capturing unmeasured characteristics of individual i

The first pass at estimating these equations treats all right-hand-side variables, including the drinking variables, as exogenous. In a subsequent section we treat drinking as endogenous and develop reduced-form estimates. Details of the estimation procedure are given in subsequent sections.

Table 2 lists the key variables used in these estimates together with mean values for male and female respondents over all of the years of interest in which they respond. Of particular note are the two variables that we developed and merged with the NLSY data: the local wage index and the alcohol-tax index.

We computed the wage index for each Metropolitan Statistical Area from 1990 Census data from the one-percent sample IPUMS data. A simple earnings equation was estimated for all respondents age 25-59 who reported full time work in 1989 (and at least $1,000 in earnings): we regressed the natural log of earnings on indicators of age, race, and education, for males and females separately. We then computed the difference between the actual annual earnings number, and the fitted value (both logged), for each of the full-time workers in the sample. The index for an MSA is simply the average of these differences for respondents from that MSA.

This index was merged with NLSY respondents for all years in the working sample, on the assumption that the geographic structure of wages persists over time. NLSY respondents whose residence was not in an MSA were assigned to the nearest MSA.

We also constructed an alcohol-tax index to use as an instrument. It is the average excise tax per ounce of ethanol sold in the respondent's state, adjusted for inflation. One complication is that 18 states monopolize the wholesale distribution of liquor rather than simply impose an excise tax on it; for those states, we imputed the effective tax based on price comparisons with other states. Details are provided in the appendix.

4. The drinker's bonus confirmed: regression estimates

Table 3 compares drinkers and non-drinkers for a number of demographic groups with respect to the fraction who are working full time. In every group, defined here by sex and either age, race, or AFQT score, the drinkers are more likely to work full time than the abstainers.

Table 4 presents the OLS regression results, short and long form, for males and females, with and without binge variables. Note that the regressions are computed on the basis of up to seven years of data on each respondent. The standard errors are robust, corrected for clusters.

The results confirm the existence of the drinker's bonus. For females it amounts to about 6 percent in the short form and 4 % in the long form (which controls for the respondent's education, health, weight, and family circumstances). Females who not only drink but also binge occasionally still have higher earnings unless they binge 4 or more times per month. For males the bonus is positive but somewhat smaller than for females, and declines if the individual

binge drinks. For males who binge 6 or more times per month, the net effect of drinking is significantly negative in the short form.

The other results in the earnings equation are also of interest. Not surprisingly, earnings increase strongly with aptitude (measured by the Air Force Qualification Test), an effect that is somewhat diminished when we control for acquired human and health capital in the long form. Perhaps more surprising, earnings increase strongly with height, about 1.0% per inch for females and 1.8 % per inch for males in the short form. Personality, as represented by self-reported shyness, has little effect. The local labor market, measured by the county unemployment rate and the wage index for the local MSA, has a powerful effect on earnings in the expected direction.[5]

In the long form we confirm the expected patterns with respect to education, marriage (positive for males), and children at home (negative for females, positive for males). We find a strong positive effect of accumulated experience since age 21 and experience in the preceding year. The pattern with respect to the body mass index is surprising. Female earnings are highest for those who are underweight by the normal standard (less than 18.5). Women of normal weight earn 5% less, those who are overweight or obese earn 10% less, and those who are highly obese still less. For males, on the other hand, those in the normal range are paid more than those who are underweight, and earnings actually peak in the overweight range. Only for those who are in the highest obesity category is there some decline.

Table 5 presents the logit regression results for full-time work using the same

[5] If the wage structure were uniform across geographic markets up to a proportional inflation factor, and the wage index were successful in measuring that factor without error, then the estimated coefficient on the wage index should be 1.0. In fact it is about .68 for females and .66

specifications as for earnings. For this outcome the estimated effect of being a drinker are large indeed. In the short form, the odds of a female working full time are about 60 percent higher if she drinks than abstains, and still higher if she binges occasionally.[6] That effect is cut in half in the long form, but is still large. For males, the odds are about 40 percent higher for drinkers than nondrinkers in the short form, and about half that in the long form. Bingeing has little effect.

The other results in the full-time logit regressions are generally similar to the patterns observed for the earnings equations. Aptitude has a particularly strong effect on the odds of a woman working full time, as does height. The county unemployment rate tends to depress the odds of full time work, while there are mixed results with respect to the wage index for the local MSA.

In the long form we confirm the expected patterns with respect to education, marriage (negative for females, positive for males), and children at home (negative for females, positive for males). We find a strong positive effect of accumulated experience since age 21 and experience in the preceding year. But the pattern with respect to the body mass index is quite different for the odds of full time work than it is for earnings. Respondents who are underweight are the least likely to work full time, perhaps because this group includes some who are anorexic or otherwise unwell. Otherwise there is little relationship between weight and working for females except for those who are severely obese (who are most likely to work). For males there is a monotonic relationship between BMI and the odds of working.

---

for males in the long form.

[6] This percentage is computed as the anti-log of the coefficient estimate.

5. The drinker's bonus denied: IV and reduced-form estimates

The estimated effects of drinking on both earnings and full time work are positive, strong in a statistical sense, consistent with the literature, and entirely implausible given all the evidence that among the drinkers are a large subgroup who are drinking in ways that are likely to reduce productivity (due to hangover or impairment on the job). The estimated coefficients could be biased for several reasons discussed above, including errors in the measurement of the key variable (drinking status), omitted variables, and reverse causation. Of those three, reverse causation strikes us as the most plausible explanation. To remedy this possibility, we re-estimated the earnings and full-time equations using instrumental-variables (IV) regression. As instruments we use an index of alcohol-excise taxes (defined in detail in the appendix), the excise tax on cigarettes, and the per capita sales of alcoholic beverages measured in terms of ethanol content per capita. All three of these measures vary at the level of the state and year. In this choice of instruments we follow Mullahy and Sindelar (Mullahy & Sindelar 1996), with two exceptions. First, they used the beer tax instead of our more comprehensive index of excise taxes for beer, wine, and liquor. And second, they included an indicator of whether the respondent reported growing up with alcoholic relatives, a variable that we believe cannot be plausibly omitted from the earnings equation given the evidence that parents' alcoholism may have a variety of negative effects on the children (and not just cause them to drink).[7]

[7] It is also true that the measure of parental alcoholism may be endogenous. In the NLSY, the youthful respondents were asked in the 1988 wave whether each of a list of relatives were alcoholics. Arkes and Cook (2005) reports that in households with more than one NLSY

We estimated both short- and long-form 2SLS models, for both the likelihood of full-time work and for earnings of those who do work full time. Furthermore, we experimented with either the inclusion of two endogenous variables – both a drinking indicator and an indicator of abuse. However, regression diagnostics indicate that the results are not to be trusted. The F-statistic for significance of the excluded instrumental variables is less than 10 in all cases except the female binary drink variable, indicating that our instruments are rather weak. The second-stage results provide some evidence that drinking and bingeing have a negative effect on labor-market outcomes, but the results are often implausible.

Hence we follow the lead of Dave and Kaestner (2002) and others (Cook & Moore 1993b)in adopting a reduced-form estimation strategy. Our tax index, described in the appendix, is the key variable in these estimates. The great advantage in the reduced form approach is that there is no need to characterize drinking patterns directly, thus bypassing the problems of measurement error and of finding an adequate one- or two-variable description of how much and in what pattern an individual drinks. Further, the tax variable is of interest because it is under direct control of policymakers.

Table 6 reports the results of the reduced-form estimates. The estimated coefficients are positive in all eight cases: male and female, earnings and full time, short form and long form. All coefficients in the logit equations (full time work) are statistically significant at the usual level. We take these results as evidence that reduced alcohol consumption, as engendered by

---

respondent where one reports that their father is an alcoholic a sibling disagrees. Furthermore, in cases of disagreement there is a strong pattern to the responses, with respondents who report either abstaining or having problems with alcohol themselves being substantially more likely

higher taxes, increases the quantity and perhaps also the quality of work effort.

The magnitude of the estimated effect on the odds of full time work is not small. The coefficient estimates are around .03, which implies that each additional penny tax (1983 prices) per ounce of ethanol results in a 3 percent increase in the odds of someone working full time. A sample calculation is useful. Suppose that 60 percent of some identified population group works full time, which is then exposed to an alcohol tax increase of 1 cent (1983 prices). Translating this to current (2006) prices and assuming a 50% markup on the beer excise tax, that would imply something on the order of a 2% increase in the price of a cheap 6-pack of beer (containing 3 ounces of ethanol). The 3% increase in the odds of full-time work means for this group an increase in the odds from 1.50 (60/40) to 1.545, which is equivalent to a full-time participation rate of 60.71%. The price elasticity of full-time participation is thus something less than 1.0 in this example.

6. Discussion

There is no question that drinkers earn more than non-drinkers and are more likely to work full time, even after controlling for human capital and local labor market conditions. The proper interpretation of this finding has been contested in the literature. While some have argued in favor of a direct causal interpretation, the mechanism is far from obvious. Further, there is every reason to believe that drinking impairs the productivity of some workers. In this paper we find evidence in support of the "impairment" hypothesis, namely that higher alcohol prices are associated with increased participation in full-time work among those in our sample (young

---

than their siblings to report that their father is an alcoholic.

adults in their 20s or early 30s); there is some evidence of increased earnings for full-time workers as well. A natural reconciliation between these results and the positive association between drinking and earnings is through the reverse causal process: most income for this age group is in the form of earnings, and ethanol is a normal commodity in consumption, so that the main causal mechanism here could be that increased income (in the form of earnings) causes higher alcohol consumption. Of course we cannot claim that that is the only relevant mechanism; for example, it is plausible that work away from home provides opportunities to drink socially that are not so common otherwise, or that work creates stress that is conducive to drinking. In any event, the notion that alcohol is an elixer that enhances productivity seems very unlikely.

Arkes, Jeremy and Cook, Philip J., "Is Dad an Alcoholic? Explaining Disagreement Among Siblings," Santa Monica, CA: RAND Corp., 2005.

Berger, Mark C. and Leigh, J. Paul, "The Effect of Alcohol Use on Wages," *Applied Economics*, *20*, 1988, 1343-1351.

Bowles, Samuel, Gintis, Herbert and Osborne, Melissa, "The Determinants of Earnings: A Behavioral Approach," *Journal of Economic Literature*, *39*(4), 2001, 1137-1176.

Bray, Jeremy W., "Alcohol Use, Human Capital, and Wages," Accepted for publishing in Health Economics, 2003.

Cook, Philip J., "The Social Cost of Drinking," in Olaf G. Aasland, ed., *The Expert Meeting on the Negative Social Consequences of Alcohol Abuse*, Oslo, Norway: Norwegian Ministry of Health and Social Affairs, 1991, 49-81.

Cook, Philip J. and Moore, Michael J., "Alcohol," in A.J. Culyer and Joseph P. Newhouse, eds., *Handbook of Health Economics*, North Holland Press, 2000, 1630-1673.

Cook, Philip J. and Moore, Michael J., "Drinking and Schooling," *Journal of Health Economics*, *12*(4), 1993b, 411-429.

Cook, Philip J. and Tauchen, George, "The Effect of Liquor Taxes on Heavy Drinking," *Bell Journal of Economics*, *13*(2), 1982, 379-390.

Dave, Dhaval and Kaestner, Robert, "Alcohol Taxes and Labor Market Outcomes," *Journal of Health Economics*, *21*(3), 2002, 959-981.

Durlauf, Steven N. and Fafchamps, Marcel, "Social Capital," Cambridge, MA: National Bureau of Economic Research, May, 2004.

Fisher, Irving, *Prohibition at Its Worst*, New York: The MacMillan Company, 1926.

French, Michael T. and Zarkin, Gary A., "Is Moderate Alcohol Use Related to Wages? Evidence from Four Worksites," *Journal of Health Economics*, *14*(3), 1995, 319-344.

Glaeser, Edward, Laibson, David and Sacerdote, Bruce, "An Economic Approach to Social Capital," *Economic Journal*, *112*, 2002, 437-458.

Granovetter, Mark, *Getting a Job: A Study of Contacts and Careers*, Chicago: University of Chicago Press, 1975 (2nd ed., 1995).

Grossman, Michael, "The Human Capital Model," in A.J. Culyer and J.P. Newhouse, eds., *Handbook of Health Economics, Vol. 1A*, New York: Elsevier, 2000, 347-408.

Grossman, Michael, "On the Concept of Health Capital and the Demand for Health," *Journal of Political Economy*, *80*, 1972, 223-255.

Hamilton, Vivan and Hamilton, Barton H., "Alcohol and Earnings: Does Drinking Yield a Wage Premium?" *Canadian Journal of Economics*, *30*(1), 1997, 135-151.

Harwood, Henrick D., Fountain, Douglas and Livermore, Gina, *The Economic Costs of Alcohol and Drug Abuse in the United States 1992*, Washington D.C.: USGPO, 1998.

Heien, Dale M., "Do Drinkers Earn Less?" *Southern Economic Journal*, *63*(1), 1996, 60-68.

Hilton, Michael E. and Clark, Walter, E., "Changes in American Drinking Patterns and Problems, 1967-1984," *Journal of Studies on Alcohol*, *48*(6), 1987, 515-522.

Kenkel, Donald S. and Ribar, David C., "Alcohol Consumption and Young Adults' Socioeconomic Status," *Brookings Papers on Economic Activity Micro*, June 1994, 119-161.

Kenkel, Donald S. and Wang, Ping, "Are Alcoholics in Bad Jobs?" in Frank J. Chaloupka, Michael Grossman and Warren K. Bickel, eds., *The Economic Analysis of Substance Use and Abuse*, Chicago: University of Chicago Press, 1999, 251-278.

Koch, Steven F. and Kerry Anne McGeary, "The Effect of Youth Alcohol Initiation on High School Completion," *Economic Inquiry*.

MacDonald, Ziggy and Shields, Michael A., "The Impact of Alcohol Consumptionon Occupational Attainment in England," *Economica*, *68*, 2001, 427-453.

Mangione, Thomas W., et al., "Employee Drinking Practices and Work Performance," *Journal of Studies on Alcohol*, *60*(2), 1999, 261-274.

Manning, Willard G., et al., *The Costs of Poor Health Habits*, ed. Willard G. Manning, et al., Cambridge, MA: Harvard University Press, 1991.

Mullahy, John, "Alcohol and the Labor Market," in Michael E. Hilton and Gregory Bloss, eds., *Economics and the Prevention of Alcohol-Related Problems*, Washington, DC: National Institute on Alcohol Abuse and Alcoholism, 1993.

Mullahy, John and Sindelar, Jody L., "Alcoholism, Work, and Income," *Journal of Labor Economics*, *11*(3), 1993, 494-520.

Mullahy, John and Sindelar, Jody L., "Employment, Unemployment, and Problem Drinking," *Journal of Health Economics*, *15*(4), 1996, 409-434.

Mullahy, John and Sindelar, Jody L., "Gender Differences in Labor Market Effects of Alcoholism," *American Economic Review*, *81*(2), 1991, 161-165.

Mullahy, John and Sindelar, Jody L., "Life Cycle Effects of Alcoholism on Education, Earnings, and Occupation," *Inquiry*, *26*, 1989, 272-282.

Roberts, James S., *Temperance and the Working Class in Nineteenth Century Germany*, Boston: Allen & Unwin, 1984.

Room, Robin, Bondy, Susan and Ferris, Jacqueline, "The Risk of Harm to Oneself from Drinking, Canada 1989," *Addiction*, *90*, 1995, 499-513.

Ruhm, Christopher J., "Economic Conditions and Alcohol Problems," *Journal of Health Economics*, *14*(5), 1995, 583-603.

Rumbarger, John J., *Profits, Power, and Prohbition: Alcohol Reform and the Industrializing of America 1800-1930*, Albany, NY: University of New York Press, 1989.

Trice, Harrison M. and Sonnenstuhl, William J., "Drinking Behavior and Risk Factors Related to the Work Place: Implications for Research and Prevention," *Journal of Applied Behavioral Science*, *24*(4), 1988, 327-346.

van Ours, Jan C., "A Pint a Day Raises a Man's Pay; but Smoking Blows That Gain Away," *Journal of Health Economics*, *23*, 2004, 863-886.

Walsh, Dana C., "Employee Assistance Programs," *Milbank Memorial Fund Quarterly/Health and Society*, *60*(3), 1982, 492-517.

Warburton, Clark, *The Economic Results of Prohibition*, New York: Columbia University Press, 1932.

Wolkenberg, R.C., Gold, C and Tichauer, E.R., "Delayed Effects of Acute Alcohol Intoxication on Performance with Reference to Work Safety," *Journal of Safety Research*, *7*(3), 1975, 104-118.

Zarkin, Gary A., French, Michael T., Mroz, Thomas A. and Bray, Jeremy W., "Alcohol Use and Wages: New Results from the National Household Survey on Drug Abuse," *Journal of Health Economics*, *17*(1), 1998, 53-68.

Appendix

Calculation of Tax Rates and Prices per Oz. of Ethanol

Tax Rates

The original data set had tax rates in $/gallon in real $ (the year's tax rates divided by the year's CPI/100 (1982-84=1)). The tax rates were in every case the sum of state and federal excises. The real tax rates were then changed to per oz. of ethanol first by multiplying the gallon figure by 100 (to change the rate to cents per gallon) and then dividing by the number of ounces of ethanol in each gallon of beer, wine, or liquor. The number of ounces of ethanol in turn was derived from taking the proportion of ethanol in each gallon of beer, wine, or liquor and multiplying it by 128. Thus for beer, the percentage of ethanol is 4.5% or, for a 128 oz. gallon, 5.76 oz. of ethanol, therefore the tax rate per gallon of beer was divided by 5.76. For wine the alcohol percentage was 8.34, or 15.35 oz. of ethanol, so the per gallon tax rate was divided by 15.35. For liquor, a 100-proof gallon was assumed which is 50% ethanol by content, therefore each gallon tax rate was divided by 64.

Prices

A similar calculation was made for determining the price of each beverage per oz. of ethanol. The ACCRA price figures were first sorted by state and the mean value for all cities in each state for each year (1982-2000) was derived. (The number of cities varied per state from 1 to 32.) The prices were then put in real dollars by dividing each price by the year's CPI/100 (1982-84=1). All prices were then multiplied by 100 to derive prices in cents

instead of dollars.

The price per ounce of ethanol in liquor was computed by dividing the price per .75 liter bottle of 86-proof scotch by 10.7 (the number of ounces of ethanol given ethanol content of 43%).

Calculating the Tax Index

For tax rates a weighted average index measure was calculated from the separate beer, wine and liquor tax rates. Each state tax rate was multiplied by its percentage of ethanol consumed for that product by each state averaged of the period consumption data was available (1970-2000). The three rates were then summed to produce the index. An example of a tax index calculation for one state (Massachusetts) for the year 2000 is below.

	Tax rate (cents per oz. ethanol)	Average % ethanol consumed	Weighted rate	Index
Beer	6.93	44.9	3.11	
Wine	6.12	16.1	0.99	
Liquor	15.92	38.9	6.19	
Sum		100.0	10.29	10.29

The tax index variable could only be calculated where there were beer, wine and liquor tax rates available, namely the 32 license states and the District of Columbia. To create an index value for the control states an imputed liquor tax rate was needed. First the net price, price minus tax, was calculated for 1988 for each license state except Alaska and Hawaii. These net prices were averaged and the average subtracted from the ACCRA price for each of the monopoly states for each year. The result was then adjusted to ounce of alcohol to produce an imputed liquor tax

for each state for every year.

This imputed tax was then placed in the previously missing liquor tax observations for all the control states in the regression data set. The weighted tax index variable was then calculated as before and described in detail above. The imputed spirits tax, the actual beer tax, and the actual wine tax, weighted by the state-specific fraction of ethanol, were summed to produce a tax index figure. The only states now missing an alcohol tax index number were New Hampshire and Utah that also control wine sales and have no wine tax rates available.

Table 1
Summary of economics literature that reports IV or reduced-form estimates of how drinking affects earnings

Article	Data	Instruments	Findings
Kenkel & Ribar 1994	NLSY79, 1989 wave Employed men and women	% of state living in dry counties; Beer price; alcoholic relatives	Instrumented measures of problem drinking have sig. negative effect on male earnings, and sig. positive effect on female hours.
Mullahy & Sindelar 1996	1988 Alcohol Supplement of the NHIS, ages 25-59	State beer excise tax; Cigarette tax; Ethanol sales/cap; Alcoholic relatives	No significant IV results for the effect of drinking or heavy drinking on either employment or unemployment in previous 2 weeks
Heien 1996	1979, 1984 National Household Surveys on Alcohol Use.	Religious preference variables	Annual earnings positively affected by instrumented number of drinks, and negatively by drinks squared
Hamilton & Hamilton 1997	1985 General Social Survey (Canada), males ages 25-59 employed full time	Measures of religious affiliation and participation, prices of wine, beer, & liquor	With selection correction, bingers have earnings profile wrt age, education, and marital status that reverses those of moderate drinkers and abstainers
Zarkin et al. 1998	1991-2 National Household Surveys on Drug Abuse, workers ages 30-54	Indicators of Respondent's assessment of risk of using various substances	Average wage in last month is not significantly affected by alcohol use variables, and instruments failed overidentification test
MacDonald & Shields 2001	1992 -1996 Health Survey for England employed men age 25-65; employed women ages 25-60	1. Indicators for diabetes, ulcers, asthma; # of children (males); urban residence (females) 2. parents smoked + others 3. subjective feelings about own drinking	Occupational attainment (measured by mean wage of occupation) is positively affected by drinks/week, negatively by drinks squared

Dave & Kaestner 2002	Current Population Survey 1979-95 Ages 24-54	State alcohol excise taxes	Reduced form estimates suggest alcohol taxes tend to affect employment and hours negatively, and wages positively. But estimates deemed unreliable
Bray 2003	NLSY79 through 1992 4 youngest cohorts of males	Beer tax, cigarette tax MLDA State expenditures on education	Drinking has no significant effect on returns to education or experience

Table 2
Descriptive Statistics
Weighted NLSY data for 1982-85, 1988-9, and 1992
Respondents age 21 and over. Missing values excluded.

Variable	Definition		Mean Value: Male	Mean Value: Female
		Dependent Variables		
Full time	R's hours>1,500 in previous year with Earnings > $1,000		0.6880	0.5074
Ln Earnings	Total of wages and salary R received in previous year, full time workers (natural log) adjusted for inflation (1982-4 base)		4.1788	3.3583
		Current drinking		
Drink	R had at least one drink in previous 30 days		0.7973	0.6512
Binge	Number of occasion in previous 30 days in which R consumed 6 or more drinks	One, two, or three occasions	0.2808	0.1678
		Four or five occasions	0.0903	0.0309
		Six or more occasions	0.1229	0.0322
		Drank in the past 30 days but did not binge	0.2914	0.4005
		Personal characteristics		
AFQT	Score on Arm Forces Qualification Test		50.0351	47.6451
Age	Individual year indicators for age at time of interview	Age 21		
		Age 22	0.0796	0.0792
		Age 23	0.0802	0.0802
		Age 24	0.0999	0.0997
		Age 25	0.1196	0.1197
		Age 26	0.1004	0.1006
		Age 27	0.0799	0.0791
		Age 28	0.0796	0.0791

		Age 29	0.0603	0.0601
		Age 30	0.0602	0.0606
		Age 31	0.0605	0.0607
		Age 32	0.0407	0.0405
		Age 33	0.0204	0.0205
		Age 34	0.0200	0.0205
		Age 35	0.0205	0.0204
		Overall	26.4256	26.4345
Race/Ethnicity	Black		0.1354	0.1361
	Hispanic (non-black)		0.0486	0.0491
	Other		0.8160	0.8148
Height	In inches		70.3931	64.4709
BMI*	Body Mass Index indicators	Underweight (BMI < 18.5)	0.0124	0.0675
		Normal Weight (18.5 ≤ BMI ≤ 24.9)	0.5587	0.6605
	BMI= Weight*704.5/ Height-squared	Overweight (24.9 < BMI ≤ 29.9)	0.3341	0.1747
		Obese 1 (29.9 < BMI ≤ 34.9)	0.0748	0.0645
		Obese 2 (34.9 < BMI ≤ 39.9)	0.0155	0.0205
		Obese 3 (BMI > 39.9)	0.0044	0.0123
Marital Status*	Married		0.3973	0.4959
Health status*	Respondent has a health limitation		0.0395	0.0557
Personality (self-described)	Extremely shy		0.0108	0.0121
	Somewhat shy		0.2543	0.2452
	Somewhat outgoing		0.5296	0.05445
	Extremely outgoing		0.1598	0.1741

	Family and Childhood			
Parent Information	Respondent lived with parents until age 18		0.6732	0.6494
Parents Education Level	Mother	Less than High School	0.2986	0.3360
		High School	0.4831	0.4532
		Some College	0.1132	0.1123
		College	0.1051	0.0985
	Father	Less than High School	0.3270	0.3461
		High School	0.3589	0.3697
		Some College	0.1170	0.1049
		College	0.1971	0.1793
Siblings	No siblings		0.0330	0.0296
	One siblings		0.1625	0.1482
	Two or three siblings		0.4405	0.4284
	Four or more siblings		0.3641	0.3939
Religion	Religion in which the respondent was raised	Baptist	0.2300	0.2490
		Jewish	0.0136	0.0131
		Protestant	0.2773	0.2673
		Catholic	0.3292	0.3234
		Other Religion	0.1038	0.1122
		No Religion	0.0461	0.0350
Alcoholic relative	Respondent has a relative who is an alcoholic	Female parent figure	0.0374	0.0520
		Male parent figure	0.1658	0.2193
		Other relative	0.2164	0.2599
	Environmental Conditions			
SMSA	SMSA characterization of the region where respondent lives.	SMSA – Central Central	0.1507	0.1367
		SMSA – Not Central City	0.3271	0.3299
		SMSA – Central City	0.2919	0.3081
		Not Known		

		Not in a SMSA	0.2303	0.2253
Children in Household	At least one child lives in respondent's household		0.2852	0.4952
Labor Market Conditions				
Wage index	MSA index of wages (see appendix for definition)		-0.0261	-0.0331
Unemployment (natural log)	Unemployment rate in county of residence		1.9889	1.9976
Acquired Human Capital*				
Education	Highest level of education that respondent has completed.	Less than high school	0.1444	0.1179
		High school (or GED)	0.4550	0.4508
		Some college	0.2301	0.2621
		College	0.1706	0.1692
Experience (natural log)	Sum of hours respondent has worked since age 21		9.0063	8.7325
Experience in previous year (natural log)	Number of hours respondent worked during the previous calendar year		6.6802	5.9039
Instruments				
Alcohol Excise Tax Index	Cents per ounce of ethanol, adjusted for inflation (base = 1982-4)		11.5458	11.6195
Average alcohol consumption (natural log)	Gallons of ethanol per capita (state sales data for beer, wine, and liquor)		0.9132	0.9108
Tobacco excise	Cents per pack, adjusted for inflation (base = 1982-4)		19.3222	19.0893

Table 3. Likelihood of Full Time Work for Designated SubGroups
Drinker vs. Abstainer

	Males		Females	
	Drinker	**Not Drinker**	**Drinker**	**Not Drinker**
Race & Ethnicity				
Black	53.6%	44.7%	44.3%	42.1%
Hispanic, Non-Black	64.9%	57.3%	48.0%	33.2%
Other Ethnicity	69.6%	62.5%	54.6%	40.7%
AFQT Score				
AFQT≤50	64.9%	55.0%	46.7%	38.5%
AFQT>50	69.1%	67.9%	62.5%	49.2%
Age				
Age≤28	62.3%	57.1%	55.3%	40.4%
Age>28	77.3%	67.6%	54.1%	43.6%

Results compiled from the NLSY79 from 1982-1985, 1988, 1989, and 1992.

Table 4
Earnings equations
NLSY 1979 panel data for 7 years
Full time workers age 21 and over
Estimated coefficients and Robust Standard Errors (individual clusters)

A. Females

	Natural log of Annual Earnings			
Independent variables	Short Form 1	Short Form 2	Long Form 1	Long Form 2
Race (*White or other)*				
Black	0.0331	0.0308	0.0549[a]	0.0541[a]
	(0.0213)	(0.0213)	(0.0205)	(0.0206)
Hispanic	0.1155[a]	0.1134[a]	0.1180[a]	0.1171[a]
	(0.0262)	(0.0261)	(0.0240)	(0.0240)
Both parents in home at age 18	0.0504[a]	0.0508[a]	0.0086	0.0091
	(0.0179)	(0.0179)	(0.0177)	(0.0177)
AFQT score/100	0.6714[a]	0.6663[a]	0.4532[a]	0.4515[a]
	(0.0376)	(0.0376)	(0.0378)	(0.0378)
Height (inches)	0.0102[a]	0.0103[a]	0.0049[c]	0.0049[c]
	(0.0030)	(0.0030)	(0.0029)	(0.0029)
Personality (*extremely shy)*				
Somewhat shy	0.1356	0.1388	0.1003	0.1030
	(0.1108)	(0.1103)	(0.0922)	(0.0921)
Somewhat outgoing	0.1724	0.1753	0.1199	0.1222
	(0.1101)	(0.1097)	(0.0916)	(0.0915)
Extremely outgoing	0.1648	0.1694	0.1395	0.1028
	(0.1112)	(0.1108)	(0.1055)	(0.0927)
Body Mass Index *(underweight)*				
Normal Weight			-0.0481[c]	-0.0474[c]
			(0.0273)	(0.0273)
Over Weight			-0.0996[a]	-0.0991[a]
			(0.0320)	(0.0320)
Obese 1			-0.0969[a]	-0.0970[a]
			(0.0370)	(0.0369)
Obese 2			-0.1891[a]	-0.1895[a]
			(0.0467)	(0.0467)
Obese 3			-0.3349[a]	-0.3357[a]
			(0.0859)	(0.0861)

Education *(Less than High School)*				
High School			0.0594[b]	0.0569[b]
			(0.0289)	(0.0290)
Some College			0.1030[a]	0.0994 [a]
			(0.0318)	(0.0319)
College			0.3295 [a]	0.3254 [a]
			(0.0367)	(0.0367)
Married			0.0029	0.0007
			(0.0131)	(0.0132)
One or More Children at Home			-0.0707 [a]	-0.0719 [a]
			(0.0176)	(0.0176)
Poor Health			-0.1037 [a]	-0.1031 [a]
			(0.0366)	(0.0364)
Experience (hours worked since age 21) (ln)			0.2409 [a]	0.2408 [a]
			(0.0185)	(0.0185)
Hours worked in previous year (ln)			0.0748 [a]	0.0746 [a]
			(0.0099)	(0.0099)
County unemployment rate (ln)	-0.0648[a]	-0.0641[a]	-0.0244	-0.0234
	(0.0221)	(0.0222)	(0.0206)	(0.0206)
MSA Wage Index	0.7788[a]	0.7785[a]	0.6774 [a]	0.6767 [a]
	(0.0700)	(0.0701)	(0.0642)	(0.0642)
Drink in last month	0.0617[a]	0.0666[a]	0.0433 [a]	0.0441 [a]
	(0.0145)	(0.0148)	(0.0134)	(0.0137)
Binges in last month *(none)*				
On 1, 2, or 3 occasions		0.0033		0.0158
		(0.0163)		(0.0151)
On 4 or 5 occasions		-0.0558		-0.0467
		(0.0384)		(0.0343)
On 6 or more occasions		-0.0950[b]		-0.0783[b]
		(0.0406)		(0.0370)
N	13,868	13,868	13,851	13,851
R-squared	0.2633	0.2643	0.3617	0.3625

B. Males

	Natural log of Annual Earnings			
Independent variables	Short Form 1	Short Form 2	Long Form 1	Long Form 2
Race (*White or other)*				
Black	-0.1412[a]	-0.1506[a]	-0.0905[a]	-0.0941[a]
	(0.0230)	(0.0229)	(0.0219)	(0.0219)
Hispanic	-0.0404	-0.0416	-0.0441[c]	-0.0444[c]
	(0.0272)	(0.0270)	(0.0247)	(0.0246)
Both parents in home at age 18	0.0603[a]	0.0581[a]	0.0164	0.0162
	(0.0183)	(0.0181)	(0.0166)	(0.0166)
AFQT score/100	0.3765[a]	0.3641[a]	0.2023[a]	0.2001[a]
	(0.0363)	(0.0362)	(0.0380)	(0.0380)
Height (inches)	0.0180[a]	0.0181[a]	0.0129[a]	0.0130[a]
	(0.0029)	(0.0028)	(0.0026)	(0.0025)
Personality (*extremely shy)*				
Somewhat shy	0.1905[a]	0.1816[a]	0.0954	0.0926
	(0.0707)	(0.0697)	(0.0599)	(0.0599)
Somewhat outgoing	0.2364[a]	0.2307[a]	0.1167[b]	0.1155[c]
	(0.0699)	(0.0690)	(0.0592)	(0.0593)
Extremely outgoing	0.2474[a]	0.2453[a]	0.1281[b]	0.1287[b]
	(0.0724)	(0.0715)	(0.0615)	(0.0616)
Body Mass Index *(underweight)*				
Normal Weight			0.1681[a]	0.1688[a]
			(0.0550)	(0.0552)
Over Weight			0.2106[a]	0.2120[a]
			(0.0558)	(0.0560)
Obese 1			0.1911[a]	0.1920[a]
			(0.0586)	(0.0587)
Obese 2			0.0968	0.1000
			(0.0730)	(0.0730)
Obese 3			-0.0584	-0.0587
			(0.0924)	(0.0929)
Education *(Less than High School)*				
High School			0.1576[a]	0.1544[a]
			(0.0216)	(0.0216)
Some College			0.1975[a]	0.1930[a]
			(0.0280)	(0.0280)

College			0.4354[a]	0.4286[a]
			(0.0336)	(0.0337)
Married			0.1619[a]	0.1581[a]
			(0.0149)	(0.0151)
One or More Children at			0.0482[a]	0.0478[a]
Home			(0.0163)	(0.0163)
Poor Health			-0.1322[a]	-0.1359[a]
			(0.0362)	(0.0361)
Experience (hours			0.2207[a]	0.2199[a]
worked since age 21) (ln)			(0.0165)	(0.0165)
Hours worked in			0.0649[a]	0.0647[a]
previous year (ln)			(0.0075)	(0.0075)
County unemployment	-0.0617[a]	-0.0612[a]	-0.0533[a]	-0.0535[a]
rate (ln)	(0.0215)	(0.0214)	(0.0199)	(0.0198)
MSA Wage Index	0.6543[a]	0.6529[a]	0.6594[a]	0.6586[a]
	(0.0695)	(0.0694)	(0.0640)	(0.0641)
Drink in last month	0.0226	0.0523[a]	0.0356[b]	0.0452[a]
	(0.0165)	(0.0171)	(0.0152)	(0.0158)
Binges in last month				
(none)				
On 1, 2, or 3		-0.0303[b]		-0.0067
occasions		(0.0150)		(0.0140)
On 4 or 5 occasions		-0.0490[b]		-0.0029
		(0.0223)		(0.0206)
On 6 or more		-0.1397[a]		-0.0662[a]
occasions		(0.0221)		(0.0206)
N	18,555	18,555	18,533	18,533
R-squared	0.2432	0.2470	0.3370	0.3379

Notes: Observations for the years 1982-85, 1988-89, and 1992. "Full time workers" defined as respondents who reported working at least 1,500 hours in the previous year and had earnings of at least $1000. Standard errors are Huber-White cluster-corrected for repeated observations on the same individual. All regressions include the following covariates in addition to those shown: Individual-year indicators for age, from age 22 to age 37; indicators for each of the 8 years; indicators for father's and mother's education; indicators for number of siblings (one, 2-3, 4+); indicators for religious faith in which respondent was raised; indicators of whether the respondent lives in central city, other SMSA, or outside SMSA; and missing-data indicators for father's and mother's education, AFQT, religious faith, number of siblings, height, personality indicators, unemployment rate, and SMSA region. In the long form, missing-data indicators are also included for marital status, children at home, experience, hours worked, schooling, and BMI info. The long form also contains information on whether or not the respondent had an alcoholic relative. All observations weighted by NLSY sampling weights.

Table 5
Odds of being a full-time worker
NLSY 1979 panel data for 7 years
Sample includes all person age 21 and older
Estimated logit-regression coefficients and Robust Standard Errors (individual clusters)

A. Females

	Ln odds of being a full-time worker			
Independent variables	Short Form 1	Short Form 2	Long Form 1	Long Form 2
Race (*White or other)*				
Black	-0.0320	-0.0238	0.0203	0.0238
	(0.0661)	(0.0662)	(0.0650)	(0.0652)
Hispanic	0.1569[c]	0.1641[c]	0.2109[a]	0.02131[a]
	(0.0862)	(0.0864)	(0.0819)	(0.0820)
Both parents in home at age 18	0.1422[a]	0.1419	-0.0371	-0.0363
	(0.0541)	(0.0541)	(0.0519)	(0.0518)
AFQT score/100	0.9903[a]	1.0066[a]	0.0659	0.0690
	(0.1141)	(0.1140)	(0.1176)	(0.1176)
Height (inches)	0.0385[a]	0.0384[a]	0.0184[b]	0.0184[b]
	(0.0089)	(0.0089)	(0.0087)	(0.0087)
Personality (*extremely shy)*				
Somewhat shy	-0.1521	-0.1561	-0.2663	-0.2656
	(0.2084)	(0.2089)	(0.2255)	(0.2256)
Somewhat outgoing	-0.0042	-0.0090	-0.2543	-0.2543
	(0.2056)	(0.2061)	(0.2232)	(0.2234)
Extremely outgoing	-0.0333	-0.0396	-0.3973[c]	-0.3962[c]
	(0.2108)	(0.2113)	(0.2272)	(0.2274)
Body Mass Index *(underweight)*				
Normal Weight			0.1624[b]	0.1615[b]
			(0.0806)	(0.0806)
Over Weight			0.1180	0.1166
			(0.0926)	(0.0925)
Obese 1			0.1813	0.1784
			(0.1147)	(0.1150)
Obese 2			0.1796	0.1740
			(0.1699)	(0.1702)
Obese 3			0.4875[b]	0.4825[b]
			(0.2082)	(0.2083)

Education *(Less than High School)*				
High School			0.3336[a]	0.3298[a]
			(0.0853)	(0.0853)
Some College			0.1898[b]	0.1866[b]
			(0.0946)	(0.0948)
College			0.7061[a]	0.7029[a]
			(0.1127)	(0.1128)
Married			-0.2886[a]	-0.2887[a]
			(0.0471)	(0.0476)
One or More Children at Home			-0.5042[a]	-0.5052[a]
			(0.0558)	(0.0559)
Poor Health			-0.5772[a]	-0.5754[a]
			(0.0898)	(0.0897)
Experience (hours worked since age 21) (ln)			0.5869[a]	0.5872[a]
			(0.0528)	(0.0528)
Hours worked in previous year (ln)			0.8478[a]	0.8470[a]
			(0.0582)	(0.0582)
County unemployment rate (ln)	-0.4134[a]	-0.4129[a]	-0.1025	-0.1012
	(0.0690)	(0.0691)	(0.0673)	(0.0673)
MSA Wage Index	0.0260	0.0327	-0.4124[b]	-0.4079[b]
	(0.2133)	(0.2131)	(0.1963)	(0.1961)
Drink in last month	0.4754[a]	0.4369[a]	0.2393[a]	0.2234[a]
	(0.0406)	(0.0419)	(0.0436)	(0.0458)
Binges in last month *(none)*				
On 1, 2, or 3 occasions		0.1566[a]		0.0956
		(0.0530)		(0.0594)
On 4 or 5 occasions		0.1385		0.0150
		(0.0981)		(0.1121)
On 6 or more occasions		-0.0285		-0.1306
		(0.1201)		(0.1186)
N	29,520	29,520	28,259	28,259
R-squared	0.0599	0.0604	0.3203	0.3205

B. Males

	Odds of being a full-time worker			
Independent variables	Short Form 1	Short Form 2	Long Form 1	Long Form 2
Race (*White or other)*				
Black	-0.6125[a]	-0.6162[a]	-0.1429[b]	-0.1399[b]
	(0.0722)	(0.0724)	(0.0671)	(0.0673)
Hispanic	-0.0825	-0.0853	0.0036	0.0016
	(0.0882)	(0.0881)	(0.0796)	(0.0795)
Both parents in home at age 18	0.1422[b]	0.1412[b]	0.0104	0.0103
	(0.0574)	(0.0574)	(0.0545)	(0.0545)
AFQT score/100	0.2147[c]	0.2104[c]	0.1364	0.1380
	(0.1137)	(0.1135)	(0.1213)	(0.1211)
Height (inches)	0.0197[b]	0.0197[b]	0.0043	0.0041
	(0.0089)	(0.0089)	(0.0087)	(0.0087)
Personality *(extremely shy)*				
Somewhat shy	0.4720[a]	0.4742[a]	0.2740	0.2788
	(0.1811)	(0.1810)	(0.1819)	(0.1818)
Somewhat outgoing	0.6274[a]	0.6308[a]	0.3035[c]	0.3075[c]
	(0.1774)	(0.1773)	(0.1793)	(0.1792)
Extremely outgoing	0.5690[a]	0.5748[a]	0.2445	0.2492
	(0.1828)	(0.1827)	(0.1851)	(0.1849)
Body Mass Index *(underweight)*				
Normal Weight			0.3996[c]	0.3958[c]
			(0.2154)	(0.2157)
Over Weight			0.5826[a]	0.5769[a]
			(0.2177)	(0.2180)
Obese 1			0.5157[b]	0.5100[b]
			(0.2320)	(0.2323)
Obese 2			0.5853[b]	0.5797[b]
			(0.2699)	(0.2700)
Obese 3			0.6144[c]	0.6056[c]
			(0.3555)	(0.3559)
Education *(Less than High School)*				
High School			0.3653[a]	0.3662[a]
			(0.0672)	(0.0674)

Some College			-0.0068	-0.0046
			(0.0839)	(0.0844)
College			0.7134[a]	0.7188[a]
			(0.1057)	(0.1063)
Married			0.4290[a]	0.4330[a]
			(0.067)	(0.0674)
One or More Children at Home			0.0730	0.0731
			(0.0715)	(0.0716)
Poor Health			-0.6811[a]	-0.6798[a]
			(0.1075)	(0.1075)
Experience (hours worked since age 21) (ln)			0.7031[a]	0.7037[a]
			(0.0520)	(0.0519)
Hours worked in previous year (ln)			0.5184[a]	0.5179[a]
			(0.0357)	(0.0357)
County unemployment rate (ln)	-0.4213[a]	-0.4202[a]	-0.3339[a]	-0.3322[a]
	(0.0711)	(0.0711)	(0.0691)	(0.0692)
MSA Wage Index	0.0818	0.0820	0.0613	0.0643
	(0.2134)	(0.2135)	(0.2022)	(0.2026)
Drink in last month	0.3403[a]	0.3455[a]	0.1996[a]	0.1862[a]
	(0.0504)	(0.0548)	(0.0521)	(0.0575)
Binges in last month *(none)*				
On 1, 2, or 3 occasions		-0.0076		0.0029
		(0.0530)		(0.0563)
On 4 or 5 occasions		0.0561		0.1116
		(0.0779)		(0.0806)
On 6 or more occasions		-0.0707		0.0117
		(0.0702)		(0.0742)
N	28,473	28,473	28,137	28,134
R-squared	0.0763	0.0766	0.2318	0.2320

Notes: Observations for the years 1982-85, 1988-89, and 1992. "Full time workers" defined as respondents who reported working at least 1,500 hours in the previous year and had earnings of at least $1000. Standard errors are Huber-White cluster-corrected for repeated observations on the same individual. All regressions include the following covariates in addition to those shown: Individual-year indicators for age, from age 22 to age 37; indicators for each of the 8 years; indicators for father's and mother's education; indicators for number of siblings (one, 2-3, 4+); indicators for religious faith in which respondent was raised; indicators of whether the respondent lives in central city, other SMSA, or outside SMSA; and missing-data indicators for father's and mother's education, AFQT, religious faith, number of siblings, height, personality indicators, unemployment rate, and SMSA region. In the long form, missing-data indicators are also included for marital status, children at home, experiences, hours worked, schooling, and BMI info. The long form also contains information on whether or not the respondent had an alcoholic relative. All observations weighted by NLSY sampling weights.

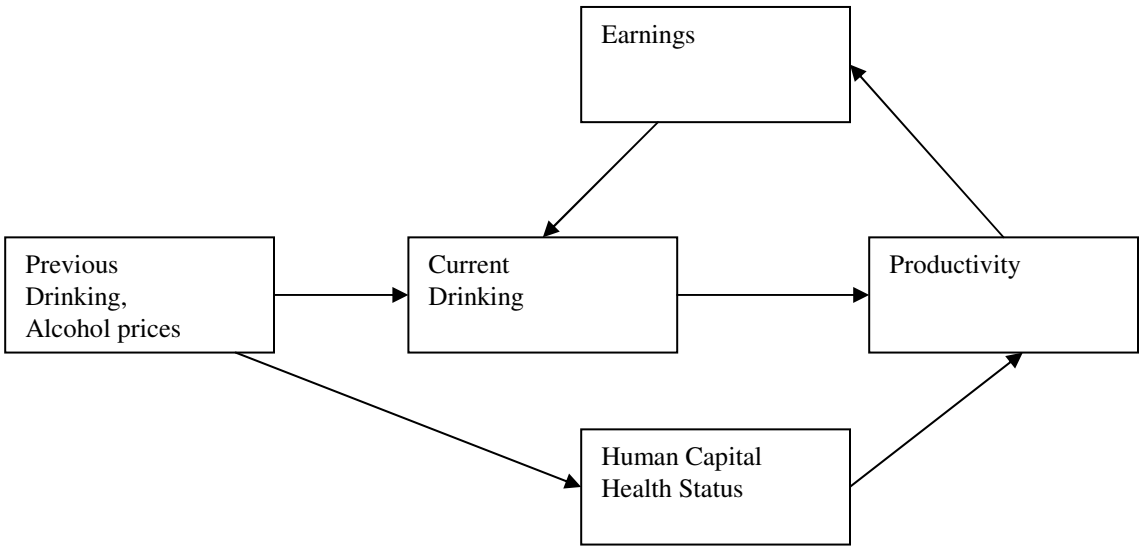
Table 6
Reduced Form Estimates
Effect of the alcohol tax index on individual earnings and odds of full time work

Estimated Coefficients and standard errors

	Ln Earnings		Ln Odds of Full Time	
	Short Form	Long Form	Short Form	Long Form
Females	.01014[b]	.00595	.0348[a]	.0222[c]
	(.00412)	(.00397)	(.0119)	(.0118)
R^2	.2654	.3029	.0568	.1390
N	13,848		30,112	
Males	.00373	.00368	.0342[a]	.0366[a]
	(.00409)	(.00385)	(.0121)	(.0122)
R^2	.2468	.2985	.0725	.1177
N	18,208		28,083	

Note: All regressions include the variables listed in Tables 4 and 5, excluding the drinking variables.
References

Figure 1 : A Causal Model of Drinking and its Consequences



Source: Cook & Moore 2000