Habit and Heterogeneity in College Students Demand for Alcohol [a]

by

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MOTIVATION

- the focus on this research is on understanding the intertemporal dimension of drinking behavior for college students

- we take as a starting point the following facts:
  - initiation into alcohol use generally occurs before college, and
  - patterns of alcohol use established early in life tend to persist over time

- while the fact that current drinking is positively related to past drinking may be obvious, the mechanism driving this relationship is not: both habit formation (state dependence) & individual specific heterogeneity are possible explanations

- whether persistence in drinking is caused by habit or heterogeneity is of significant interest from a policy perspective

- this research disentangles the effect of habit from unobserved heterogeneity in explaining the relationship between past and current drinking of college students

EMPIRICAL FRAMEWORK

- a simple two period empirical model of drinking behavior (D_{it})

1) $D_{i2} = \gamma_0 + \gamma_1 D_{i1} + \gamma_2 P_{i2} + \gamma_3 X_i + \gamma_4 Y_{i2} + \varepsilon_{i2}$ (college)

2) $D_{i1} = \beta_0 + \beta_1 X_i + \beta_2 Z_{i1} + \varepsilon_{i1}$ (high school)

3) $\varepsilon_{it} = \alpha_i + \upsilon_{it}$

- equation 1 is the structural relationship of interest

- due to the presence of the unobserved heterogeneity term, α_i, D_{i1} is correlated with ε_{i2}.

- we use AGLS (an IV approach that accounts for the limited dependent nature of D_{i2}) when D_{i1} is continuous

EMPIRICAL FRAMEWORK -continued

- for the case of a binary endogenous variable, we specify a reduced form model for D_{i1}^{*}, and explicitly model the correlation between the error terms in the high school and college drinking equations:

2) $$D_{i1}^{*} = \beta_0 + \beta_1 X_i + \beta_2 Z_{i1} + \varepsilon_{i1}$$

(2a)
$$D_{i1} = 1 \text{ if } D_{i1}^{*} > 0$$
$$= 0 \text{ otherwise}$$

$$(\varepsilon_{i1}, \varepsilon_{i2}) \sim \textit{Bivariate Normal}(0,0,\sigma_{\varepsilon 1}, \sigma_{\varepsilon 2}, \rho_{\varepsilon 2 \varepsilon 1})$$

if D_{i2} is continuous$\rightarrow$ treatment effects model

if D_{i2} is binary$\rightarrow$ bivariate model

DATA

- we use individual level data on college students drinking from the 1997 and 1999 waves of the College Alcohol Survey (CAS) conducted by the Harvard School of Public Health

- CAS is a nationally representative study of alcohol use among full-time students at 4 year colleges

- CAS contains retrospective information on drinking during the final year of high school and whether the student went to high school in the same state as they attend college (1997&1999)

- we temporally match state level policies to high school drinking for those did not move

- measures of college drinking: average number of drinks on a drinking occasion, the number of times drunk in the last 30 days, binge drinking in the last 2 weeks

- measures of high school drinking: average number of drinks on a drinking occasion in the final year of high school, typically binge when drink in the final year of high school

IDENTIFICATION

- candidates to identify the effect of high school drinking on college drinking include state level alcohol policy variables → only looking at students who did not move

- we use youth Blood Alcohol Concentration (BAC) laws, as there is substantial variation in this variable over the time period that the sample is completing high school and going college

- we also use variables related to the students' home environment before they entered college – mother's and father's drinking behavior while the student was growing up

- using parents' drinking behavior as instruments for high school drinking may be more reasonable for older students, so we examine the sub-sample of students aged >20, in addition to the full sample in our empirical analysis

STRUCTURAL MODEL RESULTS

- in all models we reject the null that high school drinking (average number of drinks consumed on a typical drinking occasion, typically binging) is exogenous

- estimated correlations between the errors in the high school and college drinking equations are negative and significant

  → models that fail to account for the endogeneity of high school drinking underestimate its effect on college drinking

  →comparison of OLS and 2SLS estimates confirms this

- Using the full sample, we cannot be reject the null that the exclusion restrictions are valid for models using **the average number of drinks in consumed on a typical drinking occasion** as the measure of high school drinking

- Using the older sample all models pass the instrument test

Table 4A: Structural Models of College Drinking- Full Sample*

Number of Drinks Usually Consumed in High School is Endogenous

(Estimated Coefficients and Standard Errors)

	AGLS	2SLS	OLS/Probit**
Usual Number of Drinks (N=15117)			
High school usual number of drinks	2.002 [a]	1.079 [a]	0.553 [a]
	(0.144)	(0.078)	(0.008)
beer tax	-0.314 [b]	-0.147 [b]	-0.170 [d]
	(0.129)	(0.070)	(0.061)
Current adult BAC limit	1.088	0.027	-1.417
	(4.857)	(2.680)	(2.338)
Current youth BAC limit	-5.269 [a]	-2.802 [b]	-1.224
	(2.003)	(1.101)	(0.942)
less than 21 years old	-0.363 [a]	-0.126 [c]	-0.163 [a]
	(0.122)	(0.067)	(0.059)
pub on campus	0.151 [c]	0.066 [d]	0.063
	(0.086)	(0.047)	(0.041)
no. of alcohol outlets/bars within a mile	0.042 [a]	0.024 [a]	0.027 [a]
	(0.012)	(0.007)	(0.006)
p-value for exogeneity test	<0.001	<0.001	----------
p-value for overidentification test	----------	0.0530	----------

b. Statistically significant at 5%, two-tailed test; c. Statistically significant at 10%, two-tailed test; d. Statistically significant at 10%, one-tailed test

Table 4A: Structural Models of College Drinking- Full Sample*

Number of Drinks Usually Consumed in High School is Endogenous

(Estimated Coefficients and Standard Errors)

	AGLS	2SLS	OLS/Probit**
Number of Times Drunk (N=14994)			
High school usual number of drinks	2.933 [a]	1.046 [a]	0.567 [a]
	(0.257)	(0.112)	(0.012)
beer tax	-0.360 [d]	-0.096	-0.117
	(0.228)	(0.100)	(0.095)
Current adult BAC limit	-12.796 [d]	-9.860 [a]	-11.193 [a]
	(8.494)	(3.815)	(3.615)
Current youth BAC limit	-8.188 [b]	-3.727 [b]	-2.309 [d]
	(3.509)	(1.564)	(1.453)
less than 21 years old	-0.501 [b]	-0.151 [d]	-0.179 [b]
	(0.217)	(0.096)	(0.091)
pub on campus	0.422 [a]	0.207 [a]	0.208 [a]
	(0.150)	(0.067)	(0.064)
no. of alcohol outlets/bars within a mile	0.090 [a]	0.033 [a]	0.036 [a]
	(0.022)	(0.010)	(0.009)
p-value for exogeneity test	<0.001	<0.001	----------
p-value for overidentification test	----------	0.375	----------

b. Statistically significant at 5%, two-tailed test; c. Statistically significant at 10%, two-tailed test; d. Statistically significant at 10%, one-tailed test

Table 4A: Structural Models of College Drinking- Full Sample*

Number of Drinks Usually Consumed in High School is Endogenous

(Estimated Coefficients and Standard Errors)

	AGLS	2SLS	OLS/Probit**
Binge (N=15230)			
High school usual number of drinks	0.562 [a]	0.176 [a]	0.103 [a]
	(0.050)	(0.015)	(0.002)
beer tax	-0.058 [d]	-0.016	-0.026 [a]
	(0.045)	(0.014)	(0.016)
Current adult BAC limit	-0.081	-0.078	-0.346
	(1.683)	(0.526)	(0.616)
Current youth BAC limit	-1.456 [b]	-0.460 [b]	-0.221
	(0.693)	(0.217)	(0.249)
less than 21 years old	-0.176 [a]	-0.053 [a]	-0.078 [a]
	(0.042)	(0.013)	(0.015)
pub on campus	0.025	0.008	0.011 [d]
	(0.030)	(0.009)	(0.011)
no. of alcohol outlets/bars within a mile	0.020 [a]	0.006 [a]	0.008 [a]
	(0.004)	(0.001)	(0.002)
p-value for exogeneity test	<0.001	<0.001	----------
p-value for overidentification test	----------	0.039	----------

b. Statistically significant at 5%, two-tailed test; c. Statistically significant at 10%, two-tailed test; d. Statistically significant at 10%, one-tailed test

DISCUSSION

- We find that the persistence exhibited in our sample of college students drinking is attributable to habit formation.

- We also find evidence of a moderating effect of heterogeneity in the relationship between high school and college drinking.

- A few cautions : 1. we are using retrospective information on high school drinking behavior
  2. the sample is limited to students who went to high school and college in the same state.

- In term of policy implications, our finding present a double-edged sword to policy makers because habit and heterogeneity work in the opposite direction.

- Given theses opposing influences, alcohol policies which have a uniform effect across all age groups, such as increasing prices through taxation, may be the preferred policy approach to reducing problematic drinking behavior among both the general population and college students.