

# Alcohol Consumption and Domestic Violence Against Mothers

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## Abstract

**Background:** A recent high-profile murder case and the passage of the Unborn Victims of Violence Act have focused policymakers' attention on domestic violence against pregnant women and new mothers. The link between men's alcohol consumption and spousal abuse has led some to suggest that more stringent alcohol regulations could ameliorate domestic violence.

**Aim of Study:** (i) To examine the correlation between men's alcohol consumption and domestic violence against new mothers and test how sensitive the correlation is to assumptions about unobserved heterogeneity, (ii) To test whether higher liquor taxes and more stringent alcohol control regulations are associated with a lower incidence of domestic abuse.

**Methods:** Using the Fragile Families and Child Wellbeing Study, I estimate ordinary least squares, bivariate probit, two-stage least squares, and fixed effects models to test the relationship between alcohol consumption and domestic violence.

**Results:** My findings suggest that while there is a strong positive association between men's alcohol consumption and the commission of domestic violence against new mothers, this correlation is highly sensitive to assumptions about unobservables. There is little evidence that higher liquor taxes or more stringent alcohol regulations will significantly reduce domestic violence.

**Discussion and Limitations:** The empirical results suggest evidence for an "unobserved bum hypothesis." That is, unobservable characteristics of the father may be correlated with both the likelihood that he abuses pregnant women (or new mothers) and that he drinks heavily. While the findings of this paper cannot rule out the possibility that men's alcohol consumption has some effect on domestic violence, there is little evidence to suggest that the impact is large in magnitude. Moreover, there is little evidence that higher liquor taxes or stricter alcohol supply regulations reduce the incidence of domestic abuse. However, greater policy heterogeneity across states and over time would be beneficial in further exploring this issue.

**Implications for Health Policy:** Alcohol regulations, such as higher liquor taxes, are rather ineffective policies at reducing domestic violence against pregnant women and new mothers. Moreover, because policies that regulate alcohol availability or tax

its consumption will harm non-violent drinkers, such policies may also be target inefficient. Rather than using non-credible, indirect mechanisms such as alcohol regulation, increasing criminal penalties for harming pregnant women or their unborn children may be a more direct method reducing domestic violence.

**Implications for Further Research:** Future research that attempts to estimate the impact of alcohol consumption on the likelihood of domestic violence must carefully consider how unobservables may impact both drinking and abuse. Future work should utilize a longer panel dataset with greater within-state alcohol policy variation to allow for more robust tests of the impact of alcohol regulations on the prevalence of domestic violence.

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## Introduction

In April 2004, President George W. Bush signed the Unborn Victims of Violence Act, which criminalized the harming of a fetus during the commission of a federal crime against a pregnant woman. This new law reflects policymakers' concerns about domestic violence against pregnant women and their unborn children. Much of this new awareness in the United States has been driven by the high profile murder of Laci Peterson, a pregnant Californian whom police allege was beaten and murdered by her husband.

Estimates from the Fragile Families and Child Wellbeing Study show that over five percent of unmarried pregnant women were victims of domestic abuse from the unborn child's father.

The well-established link between husbands' alcohol consumption and spousal abuse<sup>1-7</sup> has led some policymakers to suggest that policy interventions that reduce alcohol consumption will ameliorate domestic abuse against pregnant women and new mothers. A number of studies<sup>8,9</sup> have suggested that the psychopharmacological effect of alcohol consumption impairs the mental judgment of men, causing them to abuse their partners. This paper will examine the association between alcohol consumption and domestic abuse and will explore how sensitive the correlation between drinking and abuse is to assumptions about omitted variable bias.

Using cross-section estimators across two waves of The Fragile Families and Child Wellbeing Study, I find that there

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is a strong positive association between a male partner's alcohol consumption and the probability that a pregnant woman or new mother reports that he committed domestic violence against her. However, this positive association is not necessarily evidence of a causal relationship between drinking and abuse. To probe further, I estimate alcohol consumption equations for fathers. The evidence suggests that (i) state liquor taxes are negatively associated with the probability of a father being a heavy drinker, and (ii) the number of retail outlets in a father's state that are licensed to sell alcohol for on or off-premise consumption per 1000 drinking-age population is positively associated with the probability of a father being a heavy drinker.

These policy variables provide exogenous variation in a father's alcohol consumption that is uncorrelated with the probability of his committing domestic abuse. Hence, reduced-form domestic violence equations for pregnant women and new mothers are estimated, where the determinants of alcohol consumption are substituted into the structural production function for domestic abuse. Using this approach, I find little evidence that fathers' alcohol consumption causes a large increase in the domestic abuse of pregnant women or new mothers. Estimates from bivariate probit, two-stage least squares, and fixed effects models generally confirm these findings. Moreover, state liquor taxes and state alcohol licenses are not significantly associated with large reductions in the probability of abuse.

While the findings of this paper cannot rule out that men's alcohol consumption has some effect on domestic violence, there is little evidence to suggest that the impact is large in magnitude. Moreover, there is little evidence that higher liquor taxes or stricter alcohol supply regulations reduce the incidence of domestic abuse. Taken together, this paper provides some evidence for an "unobserved bum hypothesis." That is, unobservable characteristics of the father – for example, that he is a "bum" – are correlated with the likelihood that he abuses pregnant women *and* drinks heavily.

## Background

### Literature

While most work in the economics literature has focused on spousal abuse as a good that is avoided or purchased with income transfers,<sup>10-12</sup> only one paper in the literature has examined the association between alcohol consumption on spousal abuse. Markowitz<sup>7</sup> examines the impact of the price of alcohol on spousal abuse using three waves (1985-1987) of the National Family Violence Survey (NFVS). Using fixed effects models that control for unobserved time-invariant, state-specific unobserved heterogeneity, she finds that a one-percent increase in the price of pure alcohol is associated with a 5.3 percent reduction in the probability of wife abuse.

While the Markowitz study is an important contribution to the literature, there are two limitations. First, though there is strong empirical evidence of a negative relationship between

alcohol prices and alcohol consumption,<sup>13,14,15</sup> the paper does not establish this relationship in the sample. Moreover, we do not know the relationship between alcohol consumption and abuse in the sample. Hence, we cannot evaluate the identifying power of alcohol price. Second, the measure of price used is questionable. The "composite price" measure used assumes that an ounce of pure alcohol is equivalent across different types of alcoholic beverages. This may mask variation in the prices of different types of alcohol. Price variation could be important if (i) it explains differences in the types of alcohol consumed, and (ii) different types of alcohol raise the probability of violence differently.

Other studies have examined the impact of alcohol prices on child abuse. Using one wave of the NFVS, Markowitz and Grossman<sup>16</sup> find that a 10 percent increase in beer taxes reduced the probability of overall child abuse by 2.3 percent and severe child abuse by 1.2 percent. A 2000 paper by Markowitz and Grossman<sup>17</sup> extended this work to include the second wave of the NFVS. Using the second wave of data allowed the authors to estimate a fixed effects model, which controlled for unobserved state-level heterogeneity. Their findings confirmed their earlier paper, showing that a 10 percent increase in beer taxes reduced the proportion of mothers who abuse their children by approximately 2 percent.

A series of papers has looked at the impact of alcohol taxes on violent crime. Using data from Uniform Crime Reports, Cook and Moore<sup>18</sup> employ state-level fixed effect models to show that higher beer taxes would significantly reduce rapes and robberies, but have no effect on homicides and assaults. Sloan *et al.*,<sup>19</sup> however, finds that higher alcoholic beverage prices significantly lower the homicide rate. Using cross-section data from the National Household Survey on Drug Abuse, Saffer<sup>20</sup> shows that higher beer taxes were associated with lower crimes rates, especially for those under age 21.

In an international study, Markowitz<sup>21</sup> finds that countries with higher alcohol prices have lower incidences of robbery, assault, and sexual assault. However, these results disappear with the inclusion of country fixed effects, indicating the possibility of unobserved country-level heterogeneity driving the association. Still, using a panel study of college students, Grossman and Markowitz<sup>22</sup> estimate that a 10 percent increase in beer prices reduced violence by approximately 4 percent.

Taken together, these studies reflect that the price of alcohol is negatively associated with some measures of violence. My paper will contribute to the literature in two key ways. First, this will be the first paper to examine the impact of alcohol consumption on domestic abuse of pregnant women and new mothers. This is especially important because of costs that may be imposed on the unborn child during abuse. Furthermore, the safety of pregnant women and new mothers has been increasingly important to policymakers due to high profile murder cases, and lobbying efforts of advocacy groups such as the World Health Organization. Second, because of the data available in the Fragile Families study, I am able to estimate the relationship between fathers' alcohol consumption and

mothers' report of abuse as well as the association between state alcohol regulations and fathers' alcohol consumption. This approach will provide a more complete and compelling argument for the identification assumptions.

### Theoretical Predictions

Markowitz and Grossman<sup>16</sup> cite three plausible theories to explain the link between alcohol use and domestic violence. First, alcohol consumption can increase a fathers' excitability, boost his courage, or numb his moral senses through a chemical or psychopharmacological effect, thereby increasing the likelihood of domestic violence.<sup>8,9</sup> Second, drunkenness may be used as an excuse for violence since crime commission under the influence of alcohol is often seen as more excusable than sober crime commission.<sup>5,23</sup> Lower social costs of drunken crimes may increase the likelihood of fathers' drinking before committing domestic abuse. Drunkenness may also decrease the likelihood of fathers being punished for domestic abuse if mothers' blame the assault on alcohol and fail to report the crime. Third, there may be unmeasured characteristics of fathers that make them more likely to drink heavily and abuse pregnant women – the “unobserved bum hypothesis.”

The theoretical model of domestic abuse is adapted from economic models of crime.<sup>24,18,16</sup> A father chooses levels of domestic violence ( $V$ ), alcohol consumption ( $A$ ), consumption of all other goods ( $X$ ), and tastes ( $t$ ) to maximize utility,

$$U = U(V(A, t), A, X, t) \quad (1)$$

subject to a budget constraint,

$$Y = P_a A + \pi(A)CV + X \quad (2)$$

where  $Y$  is total income,  $P_a$  is the price of alcohol,  $\pi$  is the probability of punishment for domestic violence, and  $C$  is the cost of domestic violence, including costs imposed on the unborn child. The price of all other goods is normalized to one. I assume that  $\partial V/\partial A > 0$  and  $\partial \pi/\partial A < 0$ . The latter holds if the “excuse theory” described above holds. Solving the maximization problem yields (i) an alcohol demand equation and (ii) a reduced-form violence equation in which the key determinants of alcohol consumption are substituted into the structural production function for domestic violence:

$$A = A(P_a, C, Y, t) \quad (3a)$$

$$V = V(P_a, C, Y, t) \quad (3b)$$

With regard to alcohol demand in equation (3-3a), theory predicts that  $\partial A/\partial P_a < 0$  and  $\partial A/\partial C < 0$ , and  $\partial A/\partial Y > 0$ , assuming that alcohol is a normal good. With regard to the reduced-form violence in equation (3-3b), if  $\partial A/\partial P_a < 0$ ,  $\partial \pi/\partial A < 0$ , and  $\partial V/\partial \pi < 0$ , then  $\partial V/\partial P_a \leq 0$ . That is, when the price of alcohol rises, alcohol consumption will fall, thus increasing the likelihood of a father being punished for abuse, and decreasing the likelihood of domestic abuse. In the case where violence is not a choice variable – an assumption of the “chemical effects hypothesis” – then the

same negative relationship between the price of alcohol and violence will emerge since  $\partial A/\partial P_a < 0$  and  $\partial V/\partial A > 0$ .

To identify the impact of alcohol consumption on domestic violence, it is necessary to find exogenous variation in alcohol consumption that is uncorrelated with violence. This identification will come from factors that affect  $P_a$  – state liquor taxes, state laws on liquor availability, and state laws on drunk driving.\* By using these instruments – as well as fixed effects models, which account for time-invariant tastes ( $t$ ) correlated with fathers' alcohol consumption and commission of domestic violence – the “unobserved bum hypothesis” can be tested.

Finally, the sign on  $\partial V/\partial Y$  is ambiguous. If alcohol is a normal good, then an increase in income will increase alcohol consumption, decrease the likelihood of a father being punished for abuse, and increase the likelihood of domestic abuse. However, if the increase in father's income is due to a transfer of income from the mother for the purpose of avoiding abuse, then there will be a negative relationship between father's income and abuse.

### Data

The primary data source for this analysis come from the Fragile Families and Child Wellbeing Study, a national survey that follows a birth cohort of parents and their children over a five-year period. Parents were interviewed immediately after the birth of the child and then again 12 months later. Two waves of data are publicly available, so these waves are used in the analysis. The first wave took place during the 1999-2000 period, and the second wave one year later.

The study used a stratified random sample of all U.S. cities with populations of 200,000 or more.† First, cities were sampled, second, then hospitals within cities were sampled, and finally, births within hospitals were sampled.\* Mothers and fathers were interviewed separately.

Sampling of mothers takes place at hospitals, where there is a higher response rate than from using birth records. Work by Levine and Bryant<sup>25</sup> found that the 1988 National and Maternal Infant Health Survey, which used birth record data, completed interviews with only 80 percent of mothers. Since the Fragile Families study focused on non-marital births, birth record data would have likely led to an even smaller completion rate. Moreover, by sampling at hospitals, the study improved upon response rates of fathers, relative to those studies that sampled at the prenatal clinic level (53 percent versus 70 percent).

\* Empirical testing of this model will be based on mothers' reports of fathers abuse rather than fathers' reports of his own abuse.

† The study's authors note that stratification was not geographic, but according to policy environments and labor marker conditions. However, weights are not available for 28 percent of the sample.

\* The 20 U.S. cities included in the survey were Oakland, San Jose, San Antonio, Austin, Corpus Christi, Milwaukee, Chicago, Indianapolis, Nashville, Detroit, Toledo, Pittsburgh, Richmond, Jacksonville, Newark, Boston, New York City, Philadelphia, Baltimore, and Norfolk.

While most existing data on unwed fathers are flawed due to (i) high rates of missing fathers and (ii) lack of information on the selection process by which fathers participate in these surveys, the Fragile Families Study is a population-based survey with a low rate of missing fathers.

The data include information on child health and development, father-mother relationships (including domestic abuse measures), marriage attitudes, government programs, health behavior (including alcohol consumption), education, employment, income, and demographic characteristics.

### Dependent Variables

I construct two measures of abuse from the Fragile Families data – severe abuse and any abuse. A mother is defined as being *severely abused* if she reports being “cut, bruised, or seriously hurt in a fight with the father.” She is defined as having been the victim of *any abuse* if she is severely abused or if she reports the father “slapping, kicking, or [hit]ting with a fist or an object that could hurt.” The proportion of mothers reporting any or severe abuse rises after the birth of the child. While 2.7 percent of mothers reported severe abuse by the father during pregnancy, 4.2 percent reported severe abuse during the year after the child’s birth.\*

Questions on alcohol consumption varied in the two waves, so different measures were constructed in each. In wave one, fathers are asked about their alcohol consumption. 3.3 percent of fathers report that they drank “nearly every day” during the past three months. 11.3 percent of fathers report drinking several times per week during the past three months, and a further 27.1 percent report drinking several times per month. 28.6 drink less than once per month and 29.7 percent do not drink at all.

In wave two, the question on alcohol consumption to fathers was, “In the past month, how many days did you have five or more drinks in one day?” I refer to this as a measure of *episodic heavy drinking*. The mean number of days per month that a father had consumed five or more drinks in one day was 1.00. 8.7 percent of fathers in the sample consumed at least five drinks four or more times in the last month. These fathers are defined as *episodic heavy drinkers*.

### State Laws

State liquor excise taxes were obtained from the Federation of Tax Administrators and will be used as one of the primary identifying variables. Theoretically, the state liquor tax is expected to provide exogenous variation in alcohol consumption that is uncorrelated with the commission domestic abuse, except through its effect on drinking behavior. The state liquor tax is measured in dollars per 750 ml, a common size of liquor container available to consumers. The mean state liquor tax per 750 ml container in

\* A similar trend was seen for any abuse – 5.0 percent reported any abuse during pregnancy and 6.9 percent reported such abuse in the year after the child’s birth. The proportion of abused pregnant women and new mothers in my sample are broadly consistent with what Markowitz finds for all women using the NFVS measures, derived from the Conflict Tactic Scale.

2000 dollars is \$0.66. The minimum liquor tax was \$.20 in Philadelphia and Pittsburgh and the maximum tax was \$1.47 in New York City.\*

To control for alcohol supply, I include (i) the number of retail outlets in a state that are licensed to sell alcohol for on or off-premise consumption per 1000 drinking-age population, (ii) whether grocery stores or supermarkets in the state are permitted to sell liquor for off-premise consumption, and (iii) whether the state has a monopoly state store system. These data come from *Adams Liquor Handbook*.<sup>26</sup> The mean number of licenses granted per 1000 was 2.74, with the highest number in Milwaukee (4.46) and the lowest in Nashville (0.53). 41.5 percent of fathers in the sample lived in cities that permitted the sale of liquor in supermarkets or grocery stores, and 17.9 percent lived in states with a monopoly store system.

State laws on punishments for drunk-driving might also affect fathers’ drinking behavior. Hence, I include state laws on maximum length of jail time for being convicted of driving while intoxicated, which are available from *Alcohol Policies in the United States: Highlights from the 50 States*, produced by the University of Minnesota’s Alcohol Epidemiology Program.<sup>27</sup> In the sample, the mean jail time for a first offense DWI conviction is 261 days (0.714 years).

Many studies have found a positive association between alcohol consumption and drug consumption.<sup>28,29</sup> Hence, whether a state has decriminalized marijuana use, thus lowering its shadow price, may be an important control. 27.2 percent of sampled fathers resided in cities that had decriminalized marijuana.†

### Individual Characteristics

Other explanatory variables used in the analysis are individual-level characteristics to capture income and tastes – father’s wage rate,\* mothers’ and fathers’ education, age,

\* Models that included the state beer tax *instead* of the state liquor tax as well as models including *both* the beer tax and liquor tax were estimated. The state beer tax was never significant in any of the alcohol consumption regressions, indicating that beer taxes did not identify heavy or frequent drinking behavior in this sample. The model presented here includes only liquor taxes because of the strong collinearity between state beer taxes and liquor taxes, which are often jointly determined by legislators. Cities in Michigan and Virginia were dropped because the state does not have liquor taxes, but rather charges a percentage of price plus markup on liquor sales. However, estimated taxes in Pennsylvania and Ohio, also monopoly control states, are available from The Alcohol Epidemiology Program at the University of Minnesota.

† However, Pacula *et al.*<sup>30</sup> note that decriminalized states cannot be identified solely through statutory fines and penalties. They show that it is unclear whether individuals in decriminalized states actually face lower sanctions than those living in non-decriminalized states. Therefore, the interpretation of results on the impact of these laws should be met with caution to extent that this variable fails to capture the true cost of marijuana use.

\* Wage rates are measured as the wage reported by the father in his most recent job. 9 percent of the sample of fathers had missing wages. For these fathers, predicted wages were calculated using individual characteristics—age, race, education, and marital status—and local labor market conditions—median metropolitan service sector wage rate and local unemployment rate. Models using only the sample with non-missing wages were also estimated, producing similar results as reported in the next section.

race, employment status, religious affiliation, marital status, sex of the newborn, and familial history. I also include information on the alcohol consumption habits of other members of the father's family. Father's reports of whether his mother or father had an alcohol problem are included in the analysis.

Sample means and standard deviations for the dependent variables, state alcohol laws, and individual-level characteristics are presented in **Table 1**.

## Methods

Initially, alcohol consumption equations for the father are estimated. The probability that a father is a heavy drinker or an episodic heavy drinker is estimated via probit,

$$A_{jst} = \gamma Z_{st} + \kappa X_{jt} + \tau X_{it} + \nu_{jst}; \quad \nu \sim N(0, 1) \quad (4a)$$

where  $A$  is the alcohol consumption of father  $j$  with partner  $i$  in state  $s$  at time  $t$ ;  $Z$  are state-level alcohol policies;  $X$  are individual characteristics of the father and his partner; and  $\nu$  is a random disturbance term.

Additionally, because the data provide five drinking categories – ranging from never drinking to drinking every day – I estimate an ordered probit for alcohol consumption,

$$A_{jst}^* = \gamma' Z_{st} + \kappa' X_{jt} + \tau' X_{it} + \nu_{jst}; \quad \nu \sim N(0, 1) \quad (4b)$$

where  $A^*$  is the latent continuous metric underlying the observed five drinking categories,  $p$ . Thus,

$$A = p \Leftrightarrow \mu_{p-1} < A^* = \mu_{p-1} \quad (4c)$$

and,

$$Pr\{A = p\} = \phi(\mu_p - \gamma' Z_{st} - \kappa' X_{jt} - \tau' X_{it}) + \phi(\mu_{p-1} - \gamma' Z_{st} - \kappa' X_{jt} - \tau' X_{it}) \quad (4d)$$

where  $\phi$  is the standard normal cdf. The ordered probit model allows me to examine the impact of policies and socioeconomic characteristics on the frequency of alcohol consumption by fathers.

Next, I estimate the association between a pregnant woman's report of any domestic abuse (or severe abuse) and father's alcohol consumption. Letting  $D_i$  be domestic abuse reported by pregnant woman  $i$  (or new mother  $i$ ), the probit model is given by,

$$D_{ijt} = \beta A_{jt} + \alpha X_{it} + \lambda X_{jt} + \varepsilon_{ijt}; \quad \varepsilon \sim N(0, 1) \quad (5)$$

The estimate of the impact of father's alcohol consumption on mother's report of being domestically abused,  $\beta$ , will be biased if there are unobservable characteristics in the disturbance term,  $\varepsilon$ , that are correlated with both father's alcohol consumption and with his reported commission of domestic abuse. This will be the case if there are characteristics of the father not captured in  $X_j$  that make him more likely to consume alcohol ( $A$ ) and abuse the mother of his child ( $B$ ), which is the assumption underlying the "unobserved bum hypothesis."

One way to address the problem of omitted variable bias is

to find policy variables that provide exogenous variation in alcohol consumption that are uncorrelated with the rates of domestic abuse. State liquor laws ( $Z$ ) are expected to provide such exogenous variation. The reduced-form domestic abuse equation is re-estimated as,

$$D_{ijst} = \beta' Z_{st} + \alpha' X_{it} + \lambda' X_{jt} + \omega_{ijst}; \quad \omega \sim N(0, 1) \quad (6)$$

If  $E(\omega|Z) = 0$ , then  $\beta'$  will be an unbiased estimate of the impact of state alcohol regulations – and, implicitly, fathers' alcohol consumption – on the probability of domestic abuse. However,  $\beta'$  may not be an unbiased estimator if there are unobservable individual-level characteristics correlated with the instruments and with the measured outcome.

A second way to address the bias caused by unobservables impacting alcohol consumption and domestic abuse is to estimate equations (4) and (5) jointly. While a fully simultaneous probit model may not be appropriate because the reduced form may not exist for some proposed structural models,\* Angrist<sup>32</sup> shows that a two-stage least squares model (2SLS) using linear probability models may be appropriate in the presence of a dichotomous endogenous variable. Thus, equation (4a) is estimated, with liquor taxes and other state alcohol policies used to identify the alcohol consumption equation. Then, the woman's report of domestic abuse is regressed on the predicted probability of alcohol consumption:

$$D_{ijt} = \beta^{2SLS} \widehat{A}_{jt} + \alpha X_{it} + \lambda X_{jt} + \varepsilon_{ijt}; \quad \varepsilon \sim N(0, \sigma_{ij}) \quad (7)$$

A third method of estimation to address omitted variable bias is a bivariate probit model. In this model, equations (4a) and (5) are jointly estimated, allowing for the disturbances of the alcohol and abuse equations to be correlated, where the disturbances are jointly normally distributed:  $\nu \sim N(0, 1)$ ,  $\varepsilon \sim N(0, 1)$ , and  $\text{cov}(\nu, \varepsilon) = \rho$ . Again, the alcohol consumption equation is identified through state liquor taxes and other state alcohol policies. One advantage of the bivariate probit model is that it does not suffer from the logical inconsistency problems of the 2SLS model:

A final way to address omitted variable bias is to exploit the panel nature of the data to control for unmeasured time-invariant individual-level heterogeneity.† The fixed effects model is given by,

\* A two-stage least squares (2SLS) approach using probit models would be less appropriate in this model because both outcomes of interest – fathers' alcohol consumption and mothers' report of domestic abuse – are binary variables. Estimating a simultaneous probit model would result in the problem of logical inconsistency. Without logical consistency, the reduced form will not exist for some proposed structural models. That is, there is no underlying probability distribution able to rationalize the model. In Heckman,<sup>31</sup> "Dummy Endogenous Variables in a Simultaneous Equation System," this problem is discussed at length. However, Angrist<sup>32</sup> shows that under some circumstances, using linear probability models for estimating simultaneous equations with dichotomous endogenous variables may be appropriate. Hence, those models are estimated here.

† Because alcohol consumption levels are measured very differently in each wave, only the reduced form abuse equation is presented.

Table 1. Means of Dependent and Independent Variables, Waves I, II, and Panel

	(1) Wave I	(2) Wave II	(3) Panel*
<b>Dependent Variables</b>			
Father Drinks Nearly Every Day	0.033 (0.179)	–	0.032 (0.176)
Father Drinks Several Times/Week	0.113 (0.317)	–	0.106 (0.308)
Father Drinks Several Times/Month	0.271 (0.444)	–	0.272 (0.445)
Father Drinks Less Than Once/Month	0.286 (0.452)	–	0.296 (0.456)
Father Never Drinks	0.297 (0.457)	–	0.294 (0.456)
Father Episodic Heavy Drinking	–	0.087 (0.281)	–
Mother Any Domestic Abuse	0.050 (0.217)	0.069 (0.253)	0.047 (0.213)
Mother Severe Domestic Abuse	0.027 (0.163)	0.042 (0.200)	0.026 (0.160)
<b>State Policies</b>			
State Liquor Tax (\$)	0.662 (0.338)	0.640 (0.323)	0.658 (0.333)
State Alcohol Licenses	2.736 (0.851)	2.574 (0.760)	2.738 (0.854)
Marijuana Decriminalized	0.272 (0.445)	0.266 (0.442)	0.260 (0.439)
Max DWI Jail Time (Years)	0.714 (0.617)	0.707 (0.617)	0.707 (0.618)
Monopoly Control State	0.179 (0.384)	0.175 (0.380)	0.174 (0.379)
Grocery Store Restrictions	0.415 (0.493)	0.448 (0.497)	0.411 (0.492)
<b>Individual Characteristics</b>			
Mother's Age	25.42 (6.10)	26.71 (6.15)	25.40 (6.06)
Father's Age	27.87 (7.21)	29.15 (7.14)	27.85 (7.14)
Mother Black	0.396 (0.489)	0.381 (0.486)	0.382 (0.412)
Mother Hispanic	0.313 (0.449)	0.311 (0.463)	0.309 (0.462)
Mother Other Race	0.041 (0.199)	0.042 (0.200)	0.042 (0.201)
Mixed Race Pair	0.149 (0.356)	0.149 (0.357)	0.149 (0.356)
Mother < HS Ed	0.328 (0.470)	0.320 (0.466)	0.320 (0.466)
Mother HS Ed	0.293 (0.455)	0.288 (0.453)	0.290 (0.454)



→ Table 1. Means of Dependent and Independent Variables, Waves I, II, and Panel

	(1) Wave I	(2) Wave II	(3) Panel*
<b>Individual Characteristics</b>			
Mother Some College	0.245 (0.430)	0.248 (0.432)	0.248 (0.432)
Father Black	0.432 (0.495)	0.415 (0.493)	0.415 (0.493)
Father Hispanic	0.326 (0.469)	0.326 (0.469)	0.324 (0.468)
Father Other Race	0.055 (0.229)	0.055 (0.227)	0.054 (0.226)
Father < HS Ed	0.328 (0.470)	0.317 (0.466)	0.317 (0.465)
Father HS Ed	0.319 (0.466)	0.316 (0.465)	0.318 (0.466)
Father Some College	0.247 (0.433)	0.251 (0.434)	0.250 (0.433)
Father Less Ed Mother	0.263 (0.441)	0.260 (0.439)	0.262 (0.440)
Father Same Ed Mother	0.505 (0.500)	0.510 (0.500)	0.509 (0.500)
Mother Work Last Yr	0.686 (0.464)	0.528 (0.499)	0.693 (0.461)
Father Work Last Wk	0.816 (0.388)	0.800 (0.400)	0.826 (0.379)
Father Wage	13.98 (11.57)	15.20 (13.61)	13.57 (11.77)
Mother 2 Bio Parents	0.459 (0.498)	0.466 (0.499)	0.462 (0.499)
Father 2 Bio Parents	0.513 (0.500)	0.505 (0.500)	0.505 (0.500)
Married	0.297 (0.457)	0.396 (0.489)	0.309 (0.462)
New Child Male	0.523 (0.500)	0.518 (0.500)	0.519 (0.500)
Mother Catholic	0.338 (0.473)	0.340 (0.474)	0.340 (0.474)
Mother Baptist	0.217 (0.413)	0.210 (0.408)	0.211 (0.408)
Father Catholic	0.327 (0.469)	0.330 (0.470)	0.330 (0.470)
Father Baptist	0.199 (0.399)	0.197 (0.398)	0.193 (0.397)
Father's Dad Drink Problem	0.174 (0.379)	0.184 (0.388)	0.185 (0.388)
Father's Mom Drink Problem	0.053 (0.223)	0.055 (0.228)	0.056 (0.231)
Mother # Other Kids	1.12 (1.31)	1.10 (1.28)	1.09 (1.27)
N	2778	2436	2362

(1) Standard deviations in parentheses

(2) \* Panel sample includes only individuals who were in both waves; Variables measured at baseline

(3) Omitted categories: M/FWhite, Same Race Pair, M/F College Grad, MF Oth Religion

Table 2a. Probit Estimates of the Impact of Alcohol Policies on Father's Alcohol Consumption<sup>1</sup>

	Wave I Drink Every Day		Wave II Episodic Heavy Drinking	
	(1)	(2)	(3)	(4)
State Liquor Tax	-0.013 (0.009)	-0.023** (0.012)	-0.041*** (0.015)	-0.049** (0.022)
State Alcohol Licenses	-	0.001 (0.004)	-	0.016** (0.007)
Max DWI Jail Time	-	-0.016*** (0.005)	-	-0.015 (0.011)
Grocery Store Restrictions	-	-0.010 (0.006)	-	-0.010 (0.012)
Monopoly Control State	-	0.014 (0.013)	-	-0.005 (0.019)
Dependent Mean	0.030	0.030	0.087	0.087
N	2778	2778	2436	2436

<sup>1</sup> Estimates presented are marginal effects; Robust standard errors in parentheses. Models (1) and (3) include no covariates. Models (2) and (4) include the full set of covariates described in **Table 1**. Estimates of individual characteristics available from author upon request.

\*\*\* Significant at 1%; \*\* Significant at 5%; \* Significant at 10%

$$D_{it+1} - D_{it} = \beta^{FE}(Z_{st+1} - Z_{st}) + \alpha^{FE}(X_{it+1} - X_{it}) + \lambda^{FE}(X_{jt+1} - X_{jt}) + (\omega_{it+1} - \omega_{it}) \quad (8)$$

which is estimated via OLS, assuming normally distributed heteroskedastic disturbances.\* The fixed effects estimate  $\beta^{FE}$  will be unbiased if and only if there are no time-varying unmeasured characteristics that are correlated with changes in the instruments and changes in reports of domestic abuse.

## Results

**Table 2a** presents estimates of the association between state alcohol policies and the probability that a father drinks every day (“heavy drinking”).† The estimates presented are marginal effects with robust standard errors. Robust standard errors allow for heteroskedasticity-adjusted regressions, using the standard White correction, which may be important in the presence of systematically correlated disturbances. The first two columns present results for the first wave of data and the second column for the second wave. Columns (1) and (3) include no covariates except for state liquor taxes, while columns (2) and (4) contain the full set of covariates.

The results in **Table 2a** show that state liquor taxes are associated with a significantly lower probability that a father

drinks every day. While the simple correlation is not significant (column 1), controlling for state alcohol policies and socio-economic covariates (column 2), I find that a one dollar increase in state liquor tax per 750 ml of liquor is associated with a 2.3 percentage point decrease in the probability that a father drinks every day. The findings for the second wave of data are consistent with the first wave. A one dollar increase in the state liquor tax is associated with a 4.1 to 4.9 percentage point decrease in the probability that a father is an episodic heavy drinker. Each of these results is consistent with theory, which suggests that higher alcohol prices are associated with lower consumption. The findings also consistent with much of the empirical literature.<sup>(13,14,15)</sup>

There is also some evidence that the number of retail outlets that are licensed by the state to sell alcohol for on or off-premise consumption per 1000 drinking-age population is positively associated with alcohol consumption. In wave two, I find that a one unit increase in state alcohol licenses granted is correlated with a 1.6 percentage point increase in the likelihood of binge drinking. The sign of the association between state licenses and heavy drinking is in the expected direction, but is not significant.\* These state license findings are consistent with the hypothesis that higher exogenous alcohol supply is associated with higher drinking rates.

**Table 2b** presents the marginal effects from ordered probit models. The dependent variable ranges from fathers’ report that he “never drinks” (dependent variable = 1) to “drinks

\* The subscripts *s* and *j* are suppressed from the dependent variable and the error term for simplicity.

† 87 percent of fathers in the sample were legal-age drinkers. Separate models including only legal-age (age 21 or older) drinkers and only underage drinkers were estimated, with results similar to those presented here.

\* However, in results not presented in the tables, I find that an increase in the number of licensed outlets by 1 per 1000 is associated with a 2.1 percentage point higher likelihood of a father drinking several times per week or more. Hence, there is some evidence that the state license issuance rate may influence alcohol consumption.



Table 2b. Marginal Effects from Ordered Probit Estimates of the Impact of Liquor Taxes on Father's Alcohol Consumption, Wave 1<sup>1</sup>

	Alcohol Consumption <sup>2</sup>		
	(1)	(2)	(3)
State Liquor Taxes			
for y = Never	0.056*** (0.020)	0.102*** (0.003)	0.080*** (0.028)
for y = < 1/month	0.007** (0.003)	0.012*** (0.003)	0.010*** (0.004)
for y = Several/month	-0.025*** (0.009)	-0.046*** (0.011)	-0.037*** (0.013)
for y = Several/week	-0.026*** (0.009)	-0.047*** (0.011)	-0.037*** (0.013)
for y = Every day	-0.012*** (0.004)	-0.022*** (0.005)	-0.016*** (0.006)
State Alcohol Licenses			
for y = Never	-	-0.017* (0.010)	-0.013 (0.010)
for y = < 1/month	-	-0.002* (0.001)	-0.002 (0.001)
for y = Several/month	-	0.008* (0.004)	0.006 (0.005)
for y = Several/week	-	0.008* (0.004)	0.006 (0.004)
for y = Every day	-	0.004* (0.002)	0.003 (0.002)
Monopoly Control State			
for y = Never	-	0.050** (0.023)	0.036 (0.024)
for y = < 1/month	-	0.004*** (0.001)	0.003** (0.002)
for y = Several/month	-	-0.023** (0.011)	-0.017 (0.011)
for y = Several/week	-	-0.022** (0.010)	-0.016 (0.010)
for y = Every day	-	-0.010*** (0.004)	-0.007 (0.004)
N	2778	2778	2778

<sup>1</sup> Coefficient estimates and robust standard errors presented.

<sup>2</sup> Dependent variable = 1 if never drink, = 2 if drink less than once/month, = 3 if drink several times/month, = 4 if drink several times/week, and = 5 if drink every day. Models (1) includes no covariates; Models (2) includes the set of policy covariates; Model (3) includes all covariates described in Table 1. Estimates of individual characteristics available upon request of author.

\*\*\* Significant at 1%; \*\* Significant at 5%; \* Significant at 10%

every day” (dependent variable = 5). Coefficient estimates and cutpoints are included in **Table 2b**, with column (1) including only liquor taxes as a covariate, column (2) including all alcohol policy variables, and column (3) including all policy and socioeconomic covariates. I find robust evidence that higher liquor taxes are associated with lower levels of alcohol consumption. Across all models,

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higher liquor taxes are associated with significantly lower probabilities of being in the “drink everyday” category and the “drink several times per week” category. They are also associated with significantly higher probabilities of being in the “drink several times per month,” “drink less than once per month,” and “never drink” categories. Findings on other policy variables were less robust. Taken together, the ordered

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probit estimates are consistent with the findings of the simple probit model.

**Table 3** presents OLS, reduced form (RF), and 2SLS estimates of the correlates of domestic abuse in the first wave of data. Columns (1)-(5) show estimates for reports of any domestic abuse and columns (6)-(10) for severe domestic abuse.

Columns (1)-(3) show a consistent positive association between a father drinking every day and the likelihood that his pregnant partner reports domestic abuse. The first two columns compare heavy drinkers to all other drinkers or non-drinkers. The third column includes multiple drinking categories, with non-drinkers serving as the omitted category.

Relative to non-heavy drinkers, fathers who drink every day are 6.0 percentage points more likely to have pregnant partners who report that their baby's father has committed domestic abuse against them. Pregnant women with heavy drinking partners are 4.6 percentage points more likely to report domestic abuse relative to pregnant women with non-drinking partners.

The association remains positive and significant for pregnant women's reports of severe abuse, as shown in columns (6)-(8). A father's drinking every day is associated with a 3.6 percentage point higher probability of severe abuse, relative to non-daily drinking fathers. Relative to non-drinkers, fathers who drink every day have a 3.0 percentage point higher probability of their partner reporting severe abuse. Similarly, fathers who drink several times per week have a 1.7 percentage point higher likelihood of severe abuse, relative to non-drinkers. These strong positive associations between drinking and abuse are consistent with much of the empirical literature.<sup>1-7</sup>

However, these associations cannot credibly be interpreted causally if there are unobservables correlated with both a father's alcohol consumption and a pregnant woman's report of domestic abuse. As described in the methods section above, there are four ways to address this concern given these data – (i) using state alcohol policies as instruments, (ii) estimating a 2SLS model via linear probability models, (iii) estimating the alcohol and abuse equations jointly via a seemingly unrelated bivariate probit model, which allows for correlated disturbances, and (iv) estimating fixed effects models, which control for unobserved time-invariant individual-level heterogeneity.

First, state liquor taxes and state alcohol licenses seem to provide credible exogenous variation in fathers' alcohol consumption that is uncorrelated with the likelihood of committing domestic violence. Each of these policy variables were significant predictors of fathers' drinking and there is little reason to believe that these policies would impact the likelihood of domestic abuse except through their impacts on alcohol consumption. Hence, they may be good candidates for instruments.\* Moreover, alcohol taxes are commonly used as instruments in the alcohol literature.<sup>33-37,7</sup>

\* Tests show that liquor taxes and state alcohol licenses are jointly significant in three of the four models.

However, using cross sectional variation in state laws for identification could be problematic for two reasons. First, since state policies result from the legislative political process, these policies may be correlated with unobserved determinants of the outcome of interest. However, in my case, state alcohol control policies and domestic violence are sufficiently distinct outcomes that there is little reason to believe that the political process would generate a policy endogeneity problem.

Second, there may be a problem of incidental correlation; that is, there is some correlation between the state policy and unobserved determinants of the outcome. This problem could be important in the presence of weak instruments. While I cannot dismiss the potential concern of incidental correlation, there is no a priori reason to believe that stricter alcohol policies – such as higher taxes and alcohol supply restrictions – are adopted in states with higher rates of domestic abuse. The Fragile Families data do not show systematic patterns of abuse by region of the country.

The third concern arises because of data limitations. By construction, the dataset contains fewer than 20 states; in fact, in the data used in this analysis, there are 14 states included. Hence, policy variation comes from a smaller set of states than would be preferred for a dataset of this size, resulting in estimates that may be imprecisely estimated. However, because the Fragile Families dataset is one of few national datasets to include information on both alcohol consumption and domestic abuse against pregnant women, the results presented are an important contribution to the literature.

Columns (4) and (9) in **Table 3** present the estimates using liquor taxes and state alcohol licenses as regressors, as expressed in equation (6). Using this set of instruments, I find no significant association between state liquor taxes and domestic abuse and no significant association between state alcohol licenses and domestic abuse. The interpretation of these findings must be met with some care. Given the precision of the estimates, I cannot rule out some effect of alcohol consumption on domestic abuse. However, the evidence suggests that even if alcohol regulation did have an impact on domestic abuse, the effect would be quite small in magnitude.

For example, from the estimates in **Table 2a**, I found that a one dollar increase in liquor taxes would reduce the probability of daily drinking by 2.3 percentage points. Consider a large policy change – a 25 percent increase in the average liquor tax from \$0.66 to \$0.825. This tax hike would reduce daily drinking by -0.0038. If the OLS estimate of the impact of daily drinking on any domestic abuse is not subject to omitted variable bias, then a 25 percent increase in liquor taxes would reduce the probability of any domestic violence by 0.00017, which represents a mere 0.38 percent reduction in the abuse rate. Hence, changes in liquor taxes appear to be an ineffective way to ameliorate domestic violence.

Columns (5) and (10) of **Table 3** present the 2SLS estimates of the association between predicted alcohol consumption and domestic abuse, using linear probability models. I find little evidence of a significant relationship between fathers' predicted drinking and domestic abuse against pregnant mothers. As shown in the table, standard

Table 3: Ordinary Least Squares (OLS), Reduced-Form (RF), and Two-Stage Least Squares (2SLS) Estimates of the Association Between Alcohol Consumption and Domestic Abuse, Wave 1<sup>1</sup>

	Any Domestic Abuse				Severe Domestic Abuse					
	(1) OLS	(2) OLS	(3) OLS	(4) RF	(5) 2SLS	(6) OLS	(7) OLS	(8) OLS	(9) RF	(10) 2SLS
Drink Every Day	0.060** (0.032)	0.060** (0.030)	0.046** (0.028)	-	-	0.039** (0.026)	0.036** (0.023)	0.030** (0.021)	-	-
Drink Several Times/Week	-	-	0.019 (0.014)	-	-	-	-	0.017** (0.011)	-	-
Drink Several Times/Month	-	-	0.007 (0.009)	-	-	-	-	0.003 (0.007)	-	-
Drink Less Once/Month	-	-	-0.007 (0.008)	-	-	-	-	-0.005 (0.006)	-	-
State Liquor Tax	-	-	-	0.011 (0.010)	-	-	-	-	0.005 (0.007)	-
State Alcohol Licenses	-	-	-	0.001 (0.004)	-	-	-	-	0.003 (0.003)	-
Predicted Ev day Drinking	-	-	-	-	-0.010 (0.298)	-	-	-	-	0.086 (0.215)
Dependent Mean	0.050	0.050	0.050	0.050	0.050	0.027	0.027	0.027	0.027	0.027
N	2778	2778	2778	2778	2778	2778	2778	2778	2778	2778

<sup>1</sup> Estimates presented are marginal effects; Robust standard errors in parentheses. Models (1) and (6) include no covariates. Models (2)-(5) and (7)-(10) include socioeconomic characteristics. Models (3) and (8) include all drinking categories with non-drinkers serving as the omitted category. Models (5) and (10) are estimated via linear probability.  
 \*\*\* Significant at 1%; \*\* Significant at 5%; \* Significant at 10%

Table 4. OLS, RF, and 2SLS Estimates of the Association between Alcohol Consumption on Domestic Abuse, Wave II<sup>1</sup>

	Any Abuse			Severe Abuse		
	(1) OLS	(2) RF	(3) 2SLS	(4) OLS	(5) RF	(6) 2SLS
Episodic Heavy Drinking	0.031** (0.017)	–	–	0.038*** (0.016)	–	–
State Liquor Tax	–	–0.022 (0.014)	–	–	–0.009 (0.010)	–
State Alcohol Licenses	–	0.005 (0.006)	–	–	0.003 (0.004)	–
Predicted Heavy Drinking	–	–	0.158 (0.115)	–	–	0.286** (0.139)
Dependent Mean	0.066	0.069	0.069	0.042	0.042	0.042
N	2436	2436	2436	2436	2436	2436

<sup>1</sup> Estimates presented are marginal effects; Robust standard errors in parentheses. All models include the full set of covariates. Models (3) and (6) are estimated via linear probability model.

\*\*\* Significant at 1%; \*\* Significant at 5%; \* Significant at 10%

errors are quite inflated, indicating potentially imprecise estimates. However, the sign is negative for the association between predicted daily drinking and any domestic abuse, indicating less than convincing evidence of a causal relationship between drinking and abuse.

**Table 4** shows estimates of the correlates of domestic abuse for wave two of the data. Columns (1) and (4) show estimates of the association between fathers' episodic heavy drinking and new mothers' report of any or severe domestic abuse. Consistent with findings for pregnant women, I find a positive correlation between fathers' episodic heavy drinking and new mother's domestic abuse. A father's episodic heavy drinking is associated with a 3.1 percentage point higher probability of domestic abuse and a 3.8 percentage point higher probability of severe domestic abuse.\*

In columns (2) and (5), I present the associations between alcohol regulations and the probability of any domestic abuse and severe domestic abuse. In column (2), I find that while state liquor tax is negatively associated with the probability of domestic abuse, this association is not significant at the 10 percent level. Moreover, state alcohol licenses do not significantly predict the probability of abuse. Similarly, in column (5), liquor taxes and alcohol licenses are not significantly correlated with severe domestic abuse. Taken together, the findings of the second wave generally confirm those of the first wave, but contrast with those of Markowitz.<sup>7</sup>

Columns (3) and (6) of **Table 4** show the 2SLS estimates. Here I find some evidence of a significant positive association between predicted fathers' episodic heavy

\* An alternative specification of this model included the continuous episodic heavy drinking variable—the number of days in the last month that the father consumed five or more drinks. These models produced similar results as those described here, though without statistically significant identifiers.

drinking and severe domestic abuse. While this may indicate some evidence of a causal relationship between alcohol consumption and domestic abuse, no other estimate in this study can provide corroboration for this finding. Hence, a causal interpretation should be met with care.

To further examine the role of unobservables in the association between alcohol consumption and domestic violence, a seemingly unrelated bivariate probit model is estimated, which allows unobservables in the alcohol and abuse equations to be correlated. The estimated marginal effects of drinking on abuse are found in **Table 5**. State liquor taxes and state alcohol policies are included in the alcohol consumption equation and excluded from the abuse equation, thereby identifying the model.\*

I find that unobservables correlated with both alcohol consumption and domestic abuse may upwardly bias OLS estimates. Jointly estimating the alcohol and abuse equations, I find that there is no statistically significant relationship between heavy, frequent, or rare drinking and the report of any domestic abuse. A similar pattern holds for severe domestic abuse.†

The findings in **Table 5** contrast with the consistent positive associations reported in **Table 4**. The bivariate probit estimates may suggest that unobservables correlated with alcohol consumption and domestic abuse may be important to understanding the true relationship. That is, an

\* Bivariate probit estimates of the impact of alcohol regulations on consumption were similar to those obtained using binary probit models. Though not presented in the tables, coefficient estimates are available upon request of the author.

† Estimates of the rho parameter were positive, consistent with an “unobserved bum hypothesis” – unobservables were positively correlated with heavy drinking and domestic abuse. However, t-statistics on rho estimates were around 1.5, never achieving statistical significance at conventional levels.

Table 5. Bivariate Probit Estimates of the Association Between Alcohol Consumption and Domestic Abuse<sup>1</sup>

	Any Domestic Abuse		Severe Abuse	
	(1)	(2)	(3)	(4)
Drink Every Day	-0.071 (0.080)	-	-0.020 (0.054)	-
Drink Several Times/Week or More	-	-0.011 (0.018)	-	0.001 (0.009)
Dependent Mean	0.050	0.050	0.027	0.027
N	2778	2778	2778	2778

<sup>1</sup> Estimates presented are marginal effects; Robust standard errors in parentheses.

All models include the full set of covariates.

\*\*\* Significant at 1%; \*\* Significant at 5%; \* Significant at 10%

unobserved third factor – such as the male partner being a “bum” – may lead him to be a heavy drinker *and* to abuse his partner. This provides some indirect evidence of the “unobserved bum hypothesis”.\*

Finally, I utilize the panel nature of the data to estimate an individual fixed effects model, as expressed in equation.<sup>8</sup> This will control for unobserved time-invariant individual-level heterogeneity. The panel sample is restricted to only those men and women who have observations in both waves of data.

Because the second wave of data was collected only one year after the baseline survey, there is not a great deal of policy variation over this period. In fact, there were no nominal changes in state liquor taxes during this year. However, there was some variation in two measures of alcohol supply. First, 6.2 percent of fathers in the sample was unable to purchase liquor at grocery stores in the first wave, but was able to do so by the second wave.† Second, there was some variation in state alcohol licenses granted per 1000 drinking age population granted over the period; the value fell from a mean of 2.74 in the first wave to 2.57 in the second wave. 15.0 percent of the sample lived in cities where per capita alcohol licenses rose.

The results of the fixed effects model are found in **Table 6**. Columns (1) and (2) show cross-section estimates for the panel sample. These findings are consistent with the full sample. Column (1) shows that a father’s drinking several times per week or more is positively correlated with a pregnant woman’s report of severe domestic abuse; column (2) shows the positive relationship between fathers’ frequent drinking and pregnant women’s report of severe domestic

abuse.\* On observables, the panel sample is not significantly different from the full sample.

Columns (3) and (4) show results from the fixed effects models. Controlling for unobserved time-invariant individual-level heterogeneity, I find no association between changes in any of the alcohol policy measures and changes in domestic abuse. This is not surprising given that no association was found in the cross-section.

While I cannot rule out some effect of alcohol consumption on domestic abuse, the evidence I present suggests that (i) the correlation is likely small in magnitude, and (ii) unobservable characteristics that impact both alcohol consumption and abuse may be more important in understanding the drinking-abuse association. The instrumental variable, two-stage least squares, bivariate probit, and fixed effects estimates suggest that the strong positive association between fathers’ alcohol consumption and mothers’ report of domestic abuse may be partially explained by unmeasured individual-level characteristics correlated with both drinking and abuse.

## Conclusion

Recent public attention to the problem of domestic abuse against pregnant women has induced policymakers to explore policies that will reduce the incidence of such crimes. The strong link between alcohol consumption and domestic abuse has lead some to conclude that reducing rates of alcohol consumption among fathers-to-be and new fathers may be one such mechanism. This paper has endeavored to more closely examine the association between drinking and abuse to determine how sensitive the correlation is to assumptions about unobservables.

\* Separate models for unmarried and married partners were estimated, though the marital sample became quite small. Married women were abused significantly less often than unmarried women, leading to problems of perfect prediction with some of the state-level covariates. Estimates using only the unmarried sample were similar to what is presented here.

† These were fathers residing in Newark, NJ.

\* Estimates of the impact of liquor taxes and alcohol regulations on fathers’ alcohol consumption using the panel sample were similar to those found using the full sample.

Table 6. Fixed Effects Estimates<sup>1</sup>

	OLS		Panel	
	Any Abuse (1)	Severe (2)	Any Abuse (3)	Severe (4)
Drink Several Times/Week or More	0.024** (0.013)	0.017*** (0.009)	–	–
Grocery Store Restrictions	–	–	–0.006 (0.019)	–0.019 (0.013)
State Alcohol Licenses	–	–	0.033 (0.034)	0.018 (0.030)
Dependent Mean	0.047	0.026	0.023	0.016
N	2359	2359	2359	2359

<sup>1</sup> Estimates presented are marginal effects; Robust standard errors in parentheses.

All models include the full set of covariates.

\*\*\* Significant at 1%; \*\* Significant at 5%; \* Significant at 10%

The evidence suggests that while one cannot rule out the possibility that alcohol consumption has some effect on domestic violence, this association is likely small and driven by unobservable characteristics of the father. That is, “bum” fathers drink heavily and beat their wives. I find that stricter alcohol regulations, such as higher liquor taxes, are rather ineffective policies at reducing domestic violence against pregnant women and new mothers. Because policies that regulate alcohol availability or tax its consumption will harm non-violent drinkers, such policies may also be target inefficient.

Rather than using incredible, indirect mechanisms such as alcohol regulation, increasing criminal penalties for harming pregnant women or their unborn children may be a more direct method reducing domestic violence. In fact, these types of laws are becoming more common.\* Research focusing on the impact of these policies will be an important future contribution to this literature.

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\* For instance, in April 2004, the California Supreme Court strengthened the state’s fetal homicide law by making it a crime for a man to harm an unborn child, even if he does not have perfect knowledge that the woman is pregnant.

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