A PANEL DATA ANALYSIS OF THE CRAFT BREWING INDUSTRY AND NORTH CAROLINA DRUNK DRIVING RATES

by

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Abstract

This paper reviews the history of academic literature relating to the economic effects of drunk driving and applies these theories and methods to a panel dataset of drunk driving rates across the North Carolina counties over fourteen years from 2001 to 2014. Findings suggest that even when controlling for demographic and macroeconomic variables, the increase in craft breweries has a statistically significant effect on the amount of drunk driving throughout the state. My study uses four different models to analyze this effect, including a fixed effects model that controls for county and time fixed effects.

Introduction

A basic premise of economics is that incentives matter. This contention has been studied time and again when analyzing rational and irrational human behavior. The decision to drink and drive doesn't escape the bounds of this economic foundation. When someone under the influence is deciding to get behind the wheel of a car, they consciously or subconsciously weigh their options. Does the utility derived from driving home outweigh the costs of getting into an accident or getting arrested? Does this utility change if the individual knows there was a reduction in the number of police officers this past year? Other incentives might affect an individual's decision to get inebriated in the first place. Has this person recently lost a job? Or, alternatively, has the person received a raise that has increased their disposable income? Changes in any of these variables may alter the amount of drunk driving rates we will see.

Drunk driving is a serious problem for lawmakers, and understanding the nature of such incentives can play a role in the effectiveness of deterrent public policy. I look at the academic literature in an attempt to qualitatively analyze some of the policies as they relate to deterring drunk driving. The nature of the dataset limits my ability to quantify any findings about deterrent policies within North Carolina. Since I am using a panel data of the 100 counties in North Carolina and any state drunk driving laws or minimum drinking age requirements equally affect these counties, I wouldn't be able to see any comparative results regarding legislation. Instead, I will be focusing my quantitative study on the effect of the prominent rise of the craft brewing industry on drunk driving rates. My hypothesis is that the rise in the number of breweries results in a statistically significant rise in the number of alcohol-related accidents.

The craft brewing industry has taken the stage by storm in America in the past 25 years. Today, craft brewing represents a double-digit percentage of the share of beer sold compared to traditional macro brewing ("2014 Craft Beer Data Infographic," 2015). In recent years, North Carolina has become a hub of brewing in the southeast (Purvis, 2015). *Graph 1* shows the increase in total statewide number of breweries per year from 1994 to 2015. The figure shows exponential growth in the years from 2008 to 2015.

With the emergence of an industry specifically related to the consumption of alcohol, it would make sense to see some increase in the amount of drunk driving rates. This is what I find when I regress the number of alcohol related crashes per county, per year in North Carolina on the number of breweries that open per county, per year. Different demographic and macroeconomic variables are controlled for in each model. The use of the different models takes into account the peculiarity of panel, or longitudinal data. Considering panel data measures multiple entities (counties) over multiple time periods (years), Ordinary Least Squares regression does not quite capture either the correlation of an entity over time or its independence across entities. I circumvent this problem by running Fixed Effects models that hold county and time effects constant.

Literature Review

The purpose of this paper is not a direct study of any deterrent effects that policy can have on drunk driving, the body of information, however, is so crucial in the history of study of the economics and criminology of drunk driving that I feel it warrants a review. Since the end of prohibition, curbing the social problem of drunk driving has been a priority for private groups and lawmakers alike. A number of different attempts have been put into law with differing results.

In a report to the National Highway Traffic Safety Administration, Klein (1989) states that the effects of laws that would go on to be called Administrative License Suspension (ALS) laws. If passed, this law allowed the police to suspend drivers licenses to drivers who are arrested for a DUI or refuse to submit to a breath tests. They found 11 of the 36 states showed statistically significant reductions in drunk driving after these laws were passed for drivers over 21 years of age. A similar study tested the effectiveness of ALS laws in concurrence with Blood Alcohol laws and First-Offense laws (Zador et. Al., 1989). This study found that ALS laws had the most effect, statistically significantly reducing the percentage of fatal crashes by 5%. Voas and Tippetts (1998) studied DUI recidivism in the years following Ohio's 1993 ALS laws that found that strict enforcement of these laws effectively limited the ability of defendants to appeal their license suspensions. This helped to provide further evidence that ALS laws worked at reducing first and multiple offense DUIs.

Elder et. Al. (2002) hypothesized that police enforcement had some effect on drunk driving and tested this via drunk driving checkpoints. In an international study, they found that both random and selective (probable cause) breath testing at checkpoints were able to help prevent alcohol-related car accidents. Fell et. Al. (2014) studied enforcement more broadly and found that improving DUI arrest efficiency was effective at reducing the odds of driving under the influence.

A study by the NHTSA conducted in 1991 looked at the implementation of California's new Blood Alcohol Concentration (BAC) and Administrative Per Se laws ("The Effects Following the Implementation of an 0.08 BAC limit and an Administrative Per Se Law in California", 1991). California enacted its BAC law at the beginning of 1990, lowering the legal blood alcohol limit from 0.10 to 0.08. An administrative per se law (another term for ALS) was enacted in the same year. The study found that the BAC law significantly reduced the number of alcohol related driving fatalities by 12%. The study did not find a statistically significant change due to the Administrative Per Se law. Another NHTSA study by Voas and Tippetts (1999) analyzed other BAC changes across the United Sates in conjunction with new Administrative Per Se laws. They found significant reductions in fatal alcohol-related crashes as a result of the combination of the new laws without differentiating between the two. Dang (2008) found the same result measuring a multitude of deterrent policies, BAC limits included.

A study of drinking age changes (Douglas, Filkins, and Clark, 1974) looked at states that lowered their legal drinking ages following the passing of the 26th Amendment in 1971. The study found that there was a significant increase in the number of alcohol-related accident following the lowering of the drinking age.

Although much of the literature on drunk driving comes from a deterrent viewpoint, there are some that, like this study, attempt to find ulterior variables that effect drunk driving rates. Saffer (1994) found that there was a significant positive relationship between alcohol advertising by running a Two Stage Least Squares model of probability of a highway fatality against the demand for advertising. He also found that time binary variables are generally significantly positive for the regression.

A study of gas prices also found a relationship with drunk driving crashes. (Chi et. Al., 2011). The study uses cross-sectional data of Mississippi drunk driving data to find that drunk driving is statistically significantly reduced as gas prices rise. They also measure the effect of alcohol consumption and found that certain demographic variables like gender and race had significant positive effects of drunk driving crashes.

The last paper analyzing a causal relationship between a determinant variable and drunk driving did so with designated driver services in Korea (Chung, Joo, and Moon, 2014). According to the authors, designated driver services have become a popular method of transportation on evenings of social drinking. This rise in designated driver services has led to a decrease in alcohol-involved traffic fatalities. The study uses a fixed defects model similar to the one in this study to correct for regional and time fixed effects.

In addition to literature examining non-deterrent relationships with drunk driving, there is also literature that provide theoretical evidence for some of my determinant variables. Berger and Snortum (1985) studied alcohol preferences in a sample of United States drivers. They found that those who preferred beer were more likely to drink and drive. This is consistent with my hypothesis that an increase in the number of beer-selling establishments, like breweries, would lead to increased rates of drunk driving.

Economic conditions have also been studied as they relate to alcohol. Catalano et. Al. (1993) used panel data to determine that alcohol abuse was greater among those who had lost their jobs. Dee (2001) further found a countercyclical relationship between the state of the economy and binge drinking. If higher levels of drinking are associated with economic troughs, there may be credence to the argument that macroeconomic trends effect drunk driving rates.

Data

My hypothesis is that the rise in the craft brewing industry has an effect on drunk driving in North Carolina. To study this, I had to find a quantifiable measure of the rise in the craft brewing industry. As it stands now, no database exists that differentiates consumption or sale of beer between the craft or micro version of beer and the more traditional or macro counterpart. I attempted to capture this difference by using the number of breweries that were opening per year. I aggregated this data myself using a comprehensive list of all the breweries open in North Carolina on RateBeer (2016). This statistic isn't without its weaknesses. As you can see in *Figure 1,* over half the counties do not yet have a brewery while some counties have more than 20. This isn't to say that these counties do not see any effect, just that the current statistic will not be able to as accurately measure the effect of the craft industry that may come through sales of distributed craft beer or citizens travelling across county borders.

Measuring drunk driving can be just as tricky. For my study, I will be using the number of alcohol-related accidents. North Carolina crash data was available because of a dataset assembled by the UNC Highway Safety Research Center and the North Carolina Governor's Highway Safety Program (2014). The main problem with this data is it is not beer-specific. This problem is the same across all drunk driving measures, though, because there is no way to determine which type of alcohol, whether beer, wine, or hard liquor, that a drunk driving incident is related to.

Demographic and macroeconomic variables are also added to my study to provide a set of controls. My demographic variables included are population, percent of the population that is male and percent that is not white, and median age. These were all retrieved from the North Carolina Office of Budget and Management (2014). My two macroeconomic variables are unemployment rate and income and they both come from the United States Bureau of Labor Statistics (2016). My data represent all 100 North Carolina counties for the years 2001-2014, for a panel of 1400 observations. *Table 1* provides the definitions and means of all the variables.

Models

My hypothesis is that an availability of craft beer will cause an increase in drunk driving incidents. Said differently, annual drunk driving rates are a function of the number of craft breweries open and other controlling factors. I will be using four models to estimate this hypothesis. We are testing these models on a set of panel data because cross-sectional data provides an inefficient measure across time. In measuring the same units over a range of time, we get a multi-dimensional dataset. The first model I test is the pooled OLS model:

$$C_{it} = \alpha + \theta B_{it} + \beta' D_{it} + \psi' E_{it} + \varepsilon_{it}$$
$$i=1,2,3,\ldots,N;\ t=1,2,3,\ldots,T$$

where C_{it} denotes the number of alcohol related automobile accidents in county i at year t, B_{it} is the number of breweries operating, D_{it} is a vector containing all the demographic variables, and E_{it} is a vector of the macroeconomic variables. While almost any model has some sort of error term used to attribute unobserved variables, the OLS model assumes homogeneity across counties and years. My panel data allows for us to measure heterogeneity, so the OLS model is adding measureable variation to the error term. Thus, this model is simply used for comparison purposes.

The next model I use is the Fixed Effects model that captures unobserved heterogeneity across individuals. This model is:

$$C_{it} = \alpha_i + \theta B_{it} + \beta' D_{it} + \psi' E_{it} + \varepsilon_{it}$$
$$i=1,2,3,\ldots,N;\ t=1,2,3,\ldots,T$$

where α_i average of the county fixed effects for each county. These fixed effects are unobservable and unrelated to time. An example of an unobservable affecter could be county attitudes about drinking alcohol that affect who drinks or how much they drink. This social stigma does not drastically change over time but affects the actions of the people in said county. My third model is also a Fixed Effects model but adds $\varphi' Y_t$ that denotes a vector of binary variables representing time fixed effects to capture any heterogeneity across time. In the same way that county fixed effects are removed from the error term because they are measurable in panel data, so are time fixed effects.

My final model is the Random Effects model that assumes county effects are independently distributed. The Random Effects model is:

$$C_{it}=\theta B_{it} + \beta' D_{it} + \psi' E_{it} + \varepsilon_{it}$$
$$i=1,2,3,\ldots,N;\ t=1,2,3,\ldots,T$$

where the unobserved county effects are included in the error term, $\varepsilon_{it.}$ Like the name implies, the Random Effects model assumes that any unobserved variance among the counties is random instead of being correlated with the variables. Thus, the unobserved county effects, if there are any, are seen as general unobservable variables measured in the error term.

Results

Table 2 displays the estimates for each of my models. As I have mentioned earlier, the Pooled OLS model is generally an inefficient estimator for panel data and is used as a baseline. The Breusch-Pagan Lagrange Multiplier test is used against the OLS residuals to ensure that both the Fixed and Random Effects models are more efficient estimators (Breusch and Pagan, 1980). The Random effects model estimated similar results to the OLS model. This isn't necessarily unusual considering both models assume there are no county fixed effects. I used the Hausman test to determine whether the Random Effects model or the Fixed Effects model is more efficient (Hausman, 1978). A statistically significant Hausman statistic means we reject orthogonality between the regressors and random effects. Thus, the Fixed Effects model is more consistent than the Random Effects model.

With the individual-specific Fixed Effects model, only the population variable and the variable for median age are statistically insignificant. The number of breweries that open, real income, and percentage of the population that are non-white are all statistically significant at the 1% level. Based on this model, one brewery opening in a county in a year will lead to just under 6 more alcohol-related car accidents per year in that county. *Figure 2* shows this six additional crash estimate as a percentage of the total number of 2014 accidents for each county. For example, six accidents is 10.71% of the 2014 accident total for Watauga county. The estimator for percent non-white is interpreted as a 1% increase in non-white population leading to a decrease in the number of alcohol-related accidents by about five. The percentage of male population variable is significant at the 5% level. A 1% increase in the male population increases the number of annual drunk driving crashes by a third of an accident. Increases in the average real income in a county by $1,000 would increase the crash total by a little over one. The unemployment variable is significant at the 10% level with an increase in the unemployment rate of a county by one decreasing the amount of accidents by about two thirds of an accident.

I then used an f-test on joint significance of the individual-specific Fixed Effects model and the Fixed Effects model with individual and time effects. With a significant p-value, I reject the null hypothesis that the time effects were insignificant. Thus, the Fixed Effects model with both individual and Time fixed effects is more accountable for more unobservable effects.

The brewery variable is still significantly significant at the 1% level in the Fixed Effects model with individual and time fixed effects but real income is the only other significant variable. Interpreting these estimators, an increase of one brewery in a county in a year again leads to about six more alcohol-related accidents. The estimator for real income also barely changed, although the variable is only statistically significant at the 5% level in this model. A possible reason that the variables for percentage male and percentage non-white no longer being statistically significant lies in the nature of time fixed effects. Because of the nature of demographics, these variables change marginally from year to year. Adding time fixed effects accounts for these minute changes and any effect that the demographic variables had on the drunk driving rate is picked up in the time dummy variables. *Table 3* shows the time dummy variables representing the time effects in the last model. They were all statistically significant at the 1% level with the exception of the 2012, which is insignificant, and the 2007, 2009, and 2011 dummy variables that is significant at the 5% level.

Conclusion

This study examines the effects of the craft brewing industry on drinking and driving in North Carolina. My results provide evidence that the opening of breweries around the state have led to a rise in accidents where alcohol was involved. The theory behind this is that the increase in breweries has given individuals an incentive to drink, leading to higher chances that the individual will get behind the wheel while under the influence. Craft beer is also generally higher in alcohol by volume than most macro produced beers. Someone who is not fully aware of this may be more likely to get in the car thinking they are more sober than they are in reality. There may also be cultural factors relating to the amount of beer being consumed. Excessive intake of spirits and wine is more associated with alcoholism, and individuals might attempt to avoid this association by moderating their intake. On the other hand, excessive beer intake is more related to partying, or "having a good", time and drinkers may be more comfortable being intoxicated on beer in public and then having to drive home.

In the Fixed Effects model, the percentage non-white and unemployment rate variables both had decreased the number of estimated drunk driving crashes while the percentage male variable slightly increased the estimate. The variable for male population falls in line with the suggestion in the literature that men are on the road while drunk more than women (Berger & Snortum, 1985). Both the unemployment rate and the non-white population's effects on crashes may be explained by the same theory that drunk driving is tied to disposable income. Minority populations are still facing a disparity between what they make and what their white counterparts make (Western & Pettit, 2005). It would follow that the minority population, on average, has less disposable income to spend on alcohol.

The income variable is significant in both Fixed Effects models. The income variable having the effect it does also gives more evidence to the theory that those with more disposable income are more likely to be drinking and, thus, more likely to drink and drive (Berger and Snortum,1985). This falls in line with basic demand and utility theory.

There are several policy implications that one can expound from this. If lawmakers decide that the craft brewing industry is leading to dangerous effects, a tax on brewing sales could lead to decreased rates. Zelikman (n.d.) found evidence that both federal and state alcohol taxes lead to decreases in drunk driving rates. A similar tax on consumption of craft beer could potentially reduce the rates seen in this study.

Another effect that has been studied in the field of alcohol is beer advertising. Anderson et. al. (2009) found that increased exposure to alcohol advertising leads to higher rates of adolescent alcohol consumption and higher rates of alcoholism across ages. Policies have already been implemented to restrict advertising and curb consumption of products like tobacco. This policy could be implemented as an indirect way to reduce drunk driving by reducing alcohol advertising and, thus, reducing consumption altogether.

As the craft beer industry continues to grow, data will also become more readily available in terms of sales and consumption. This study could benefit from a replication with this new data as it will more accurately reflect the effect in counties where no breweries have yet opened but are still seeing sale and consumption of craft beer. It would also be interesting to see this study expanded to the national level. If this were done, the preventative variables mentioned in the literature review could potentially be added as independent variables to see if the effect is still significant. This study could also be used to justify more research into the health effects that the rise in craft beer has on the population.

Graph 1~Number of breweries per year statewide

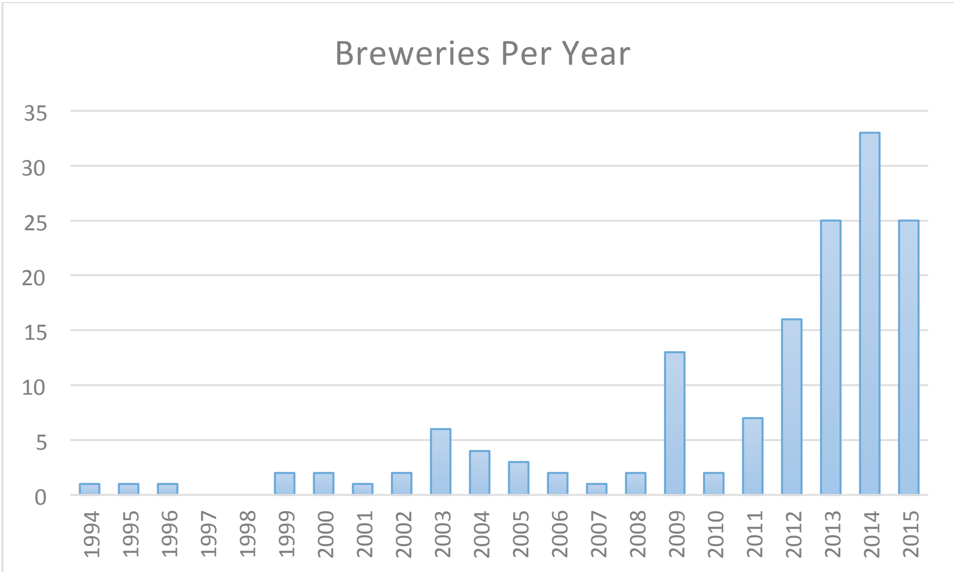

Figure 1~ Total Number of Breweries, 1994-2016

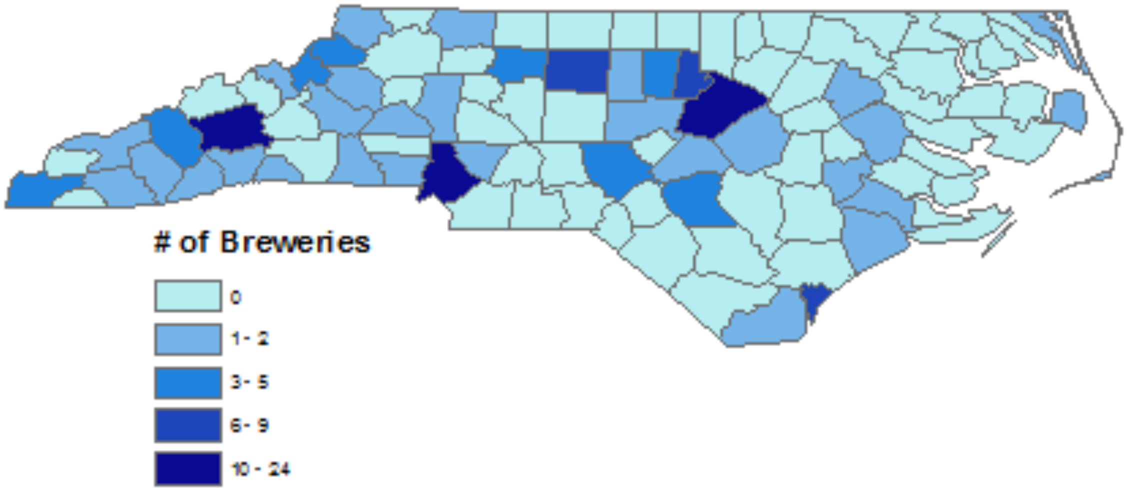

Table 1~ Descriptive Statistics

Variable	Definition	Mean	S.D.
Crashes	number of alcohol-related accidents	115.10	4.31
Breweries	number of breweries opened	0.08	0.01
Population	population/1,000	91.21	3.56
Percent Male	percentage of the population that is male	47.36	0.15
Percent Non-White	percentage of the population that is non-white	25.27	0.47
Median Age	median age of the population	39.83	0.12
Unemployment	unemployment rate	7.80	0.08
Income	real income	30508	158.55

Table 2~Regression Results

Variable	Pooled OLS	Random Effects	Fixed Effects	fixed effects with Time Effects
Breweries	-16.51***	-16.36***	5.61***	6.27***
	(2.54)	**(2.37)**	**(2.06)**	**(2.01)**
Population	1.22***	1.14***	-0.02	-0.02
	(0.02)	**(0.02)**	**(0.06)**	**(0.05)**
Percent Male	0.22	0.004**	0.33**	0.61
	(18.60)	**(17.06)**	**(13.63)**	**(0.21)**
Percent Non-White	0.04	-0.12	-5.44***	-5.28
	(6.19)	**(13.17)**	**(89.80)**	**(0.88)**
Median Age	-1.70***	-2.45***	-0.16	1.30
	(0.26)	**(0.51)**	**(0.86)**	**(1.27)**
Unemployment	-1.37***	-1.30***	-0.65*	-1.13
	(0.38)	**(0.40)**	**(0.34)**	**(0.78)**
Income	-0.002***	-0.003***	0.001***	-0.001**
	(0.00)	**(0.00)**	**(0.00)**	**(0.01)**
Adj. R^2	0.95	0.78	0.09	0.17
F	$4089.60_{7,1392}$	$709.32_{7,1392}$	$20.36_{7,1293}$	$14.11_{20, 1280}$
	(0.00)	**(0.0)**	**(0.00)**	**(0.00)**

*The Regressions in Table 2 are all run on alcohol-related car crashes. Standard Errors in parentheses. *p <0.10, * * p <0.05, * * * p < 0.01*

Figure 2~ Percentage Estimate of Alcohol-Related Crashes as it Relates to 2014 Totals

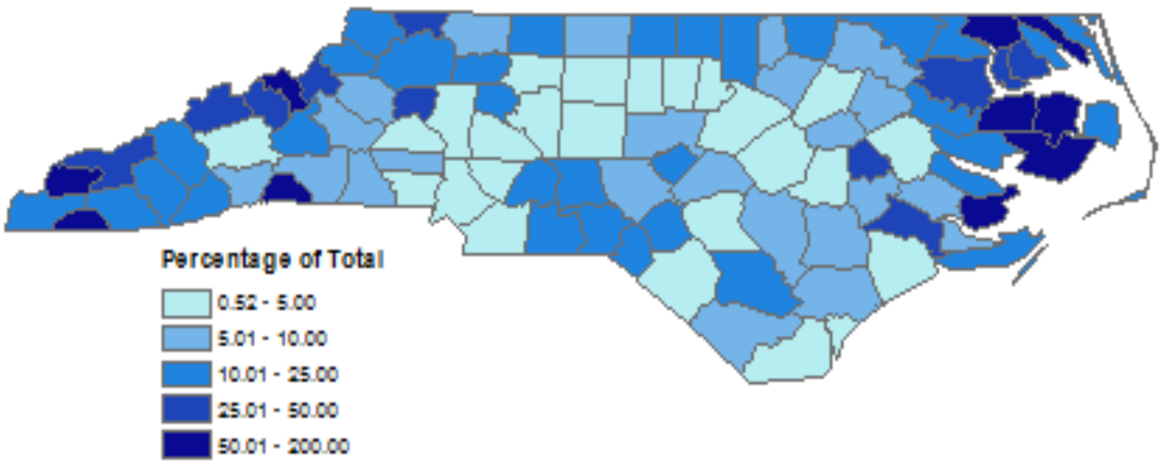

Table 3~Time Dummy Variables

Variable	Time Dummy Coefficients
FE2002	-17.28***
	(3.38)
FE2003	-31.18***
	(3.48)
FE2004	-25.40***
	(-3.75)
FE2005	-26.40***
	(4.15)
FE2006	-18.44***
	(5.34)
FE2007	-12.45**
	(5.87)
FE2008	-14.78***
	(5.72)
FE2009	-16.13**
	(7.22)
FE2010	-20.73***
	(7.90)
FE2011	-20.65**
	(8.06)
FE2012	-15.74
	(8.10)
FE2013	-21.90***
	(8.12)
FE2014	-23.32***
	(8.35)

Works Cited

Anderson, P., Bruijn, A., Angus, K., Gordon, R., & Hastings, G. (2009). Impact of Alcohol Advertising and Media Exposure on Adolescent Alcohol Use: A Systematic Review of Longitudinal Studies. *Alcohol and Alcoholism*, 229-243. doi: http://dx.doi.org/10.1093/alcalc/agn115

Berger, D. E., & Snortum, J. R. (1985). Alcoholic Beverage Preferences of Drinking-Driving Violators. *Journal of Studies on Alcohol*, *46*(3), 232-239.

Breusch, T. S., & Pagan, A. R. (1980). The Lagrange Multiplier and its Applications to Model Specification in Econometrics. *Review of Economic Studies*, *47*(1), 239-253.

Bureau of Labor Statistics, United States Department of Labor (2016). *Local Area Unemployment and Income Statistics, All North Carolina Counties 2001-2014*. [Data File]. Available from http://www.bls.gov/home.htm

Catalano, R., Dooley, D., Wilson, G., & Hough, R. (1993, September). Job Loss and Alcohol Abuse: A Test Using Data from the Epidemiologic Catchment AreaProject. *Journal of Health and Social Behavior*, *34*(3), 215-225.

Chi, G., Zhou, X., McClure, T. E., Gilbert, P. A., Cosby, A. G., Zhang, L., Robertson, A. A., & Levinson, D. (2011). Gasoline prices and their relationship to drunk-driving crashes. *Accident Analysis and Prevention*, *43*, 194-203.

Chung, J., Joo, H. H., & Moon, S. (2014, October). Designated Driver Service Availability and Its Effects on Drunk Driving Behaviors. *The B.E. Journal of Economic Analysis & Policy*, *14*(4), 1543-1567.

Dang, J. N. (2008, May). Statistical Analysis of Alcohol-Related Driving Trends, 1982-2005. *National Highway Traffic Safety Administration*.

Dee, T. S. (2001). Alcohol Abuse and Economic Conditions: Evidence From Repeated Cross-Sections of Individual-Level Data [Electronic version]. *Health Economics*, *10*, 257-270. doi:10.1002:hec.588

Douglas, R. L., Filkins, L. D., & Clark, F. A. (1974, June). The Effect of Lower Legal Drinking Ages on Youth Crash Involvement. *National Highway Traffic Safety Administration*.

Elder, R. W., Shults, R. A., Sleet, D. A., Nichols, J. L., Zaza, S., & Thompson, R. S. (2002). Effectiveness of Sobriety Checkpoints for Reducing Alcohol-Involved Crashes. *Traffic Injury Prevention*, *3*(4), 266-274. doi:10.1080/15389580214623

Facts and Figures, North Carolina Office of Budget and Management (2014). *County Estimates, All North Carolina Counties 2001-2014*. [Data File]. Available from https://www.osbm.nc.gov/

Hausman, J. A. (1978, November). Specification Tests in Econometrics. *Econometrica*, *46*(6), 1251-1271.

Fell, J. C., Waerhrer, G., Voas, R. B., Auld-Owens, A., Carr, K., & Pell, K. (2015). Relationship of Impaired-Driving Enforcement Intensity to Drinking and Driving on the Roads. *Alcoholism: Clinical and Experimental Research*, *39*(1), 84-92.

Klein, T. M. (1989, July). Changes in Alcohol-Involved Fatal Crashes Associated With Tougher State Alcohol Legislation.*National Highway Traffic Safety Administration*.

North Carolina Crash Data, N.C. Governor's Highway Safety Program (2014). *County-wide Alcohol-related Crash Totals, All North Carolina Counties 2001-2014*. [Data File]. Available from http://nccrashdata.hsrc.unc.edu/

Purvis, K. (2015, August 8). N.C. Craft Beer Industry Now Tops in the South. In *The*

Charlotte Observer. Retrieved April 12, 2016, from http://www.charlotteobserver.com/living/food-drink/article30505149.html

RateBeer. N.p., n.d. Web. 19 Apr. 2016. <http://www.ratebeer.com/breweries/north-carolina/33/213/>.

Saffer, H. (1994, April). Alcohol Advertising and Motor Vehicle Fatalities. *National Bureau of Economic Research*.

The Effects Following the Implementation of an 0.08 BAC Limit and an Administrative Per Se Law in California. (1991, August). *National Highway Traffic Safety Administration*.

Voas, R. B., & Tippetts, A. S. (1998, October). Impact of Ohio Administrative License Suspension. *Annual Proceedings of the Association for the Advancement of Automotive Medicine*, *42*, 401-415.

Voas, R. B., & Tippetts, A. S. (1999, April 15). The Relationship of Alcohol Safety Laws to Drinking Drivers in Fatal Crashes.*National Highway Traffic Safety Administration*.

Western, B., & Pettit, B. (2005). Black-White Wage Inequality, Employment Rates, and Incarceration. *American Journal of Sociology*, *111*(2), 553-578.

Zador, P. L., Lund, A. K., Fields, M., & Weinberg, K. (1989). Fatal Crash Involvement and Laws against Alcohol-Impaired Driving. *Journal of Public Health Policy*, *10*(4), 467-485.

Zelikman, Yekaterina V. "The Effect of Alcohol Tax on Alcohol Consumption, Drunk Driving and Binge Drinking." Working Paper. Print.

2014 Craft Beer Data Infographic. (2015, March 16). In *Brewers Association*. Retrieved April 12, 2016, from https://www.brewersassociation.org/industry-updates/2014-

craft-beer-data-infographic/