# Research Article
## The Effect Factors on Alcohol Consumption by Men in China

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**Abstract:** This study estimated the consumption of wine, spirits and beer by men in China, using data from the China Health and Nutrition Survey, 2006. The empirical relationship between alcohol land effect factors such as age, income, education and smoke is investigated. For wine and spirits, to bit censored model is used and for beer, Poisson regression model is explored. Findings suggest that income and urban show significant impact on all three of the alcohols demand, while smoke positively effects spirits consumption especially.

**Keywords:** Type your keywords here, separate by coma,

## INTRODUCTION

Alcohol is considered an important aspect of the Chinese culture (Hao and Young, 2000). Since 1980s, along with the economic development and growing western influence, patterns of alcohol consumption have changed rapidly (Demers et al., 2001).

There are several interesting characteristics about alcohol consumption in China. First, the Chinese consume more spirits but less wine and beer compared with some western countries. Second, people living in northern part of China consume more alcohol than the southern part (Cochrane et al., 2003; Gallet, 2007).

Previous studies in alcohol consumption in Western countries mainly focused on the estimation of price and income elasticity, based primarily on time-series data (Leung and Phelps, 1993).

This study attempts to investigate the determinants of alcohol consumption of men in China, using a cross section data.

The paper starts with a description of the data, followed by an explanation of the model specification. Then, the empirical relationships are explored using Possion regression model and censored regression model, respectively.

## DATA

Data are drawn from the China Health and Nutritional Survey (CHNS), 2006. The total observations are 1834. A multistage, random cluster procedure was used to draw the sample. The 2006 CHNS is used for this study because it is the most recent available.

Descriptive statistics are shown in Table 1.

Dependent variables are quantities of beer, measured in bottles, the quantities of wine and spirits, measured in kilogram. The three kinds of alcohols are consumed by 59.8, 6 and 79% of the sample, respectively. The average amounts of consumption are 2.358 bottles of beer, 0.032 kg of wine and 0.512 kg of spirits per week.

The independent variables include continuous explanatory variables such as age, household income, education years, as well as binary variables such as smoke, health diet, physical activity and urban. Dummy variables equal to 1 if the answer is yes. The measure of income used is the log of gross household income per capita, with the unit yuan (1 dollar = 6.48 yuan).

In particular, smoke is categorized into three levels, people who never smoke, ever smoked and who is still smoking. Two dummies, current smoker and former smoker are used in the regression, while the non-smoker is taken as a reference. The healthy diet and physical activity variables are ranked in a similar way.

Each observation with missing value is assigned a value equivalent to the mean of the values of all other observations.

## ESTIMATION RESULTS

First, since beer is measured in bottles, which is not a continuous unit, possion model regression is explored. In particular, quasi passion MLE is used in order to solve the over-dispersion problem Secondly, for wine

Table 1: Descriptive statistics

| Variable | Definition | Mean |
|---|---|---|
| Dependent variables | | |
| Beer | Per week(bottle) consuming% = 59.8 | 2.3580 |
| Wine | Per week(kg) consuming% = 6.0 | 0.0320 |
| Spirits | Per week(kg) consuming% = 79 | 0.5120 |
| Continuous explanatory variables | | |
| Age | Age in years | 48.044 |
| HH Income | Annual household income in log | 9.7930 |
| Education Year | Completed Years of Education in School | 8.7260 |
| Binary explanatory variables (1 = yes; 0 = no) | | |
| Current Smoker | Current Smoker | 0.6500 |
| Former Smoker | Former Smoker | 0.0760 |
| Non smoker | Non Smoker (reference) | 0.2730 |
| Good Diet | Diet is good | 0.3120 |
| Fair Diet | Diet is fair | 0.6440 |
| Bad Diet | Diet is bad (reference) | 0.0440 |
| Good phy. Activity | phy. activity is good | 0.2800 |
| Fair phy. Activity | phy. activity is fair | 0.6210 |
| Bad phy. Activity | phy. activity is bad (reference) | 0.0990 |
| Urban | Resides in central city | 0.3380 |

China Health and Nutrition Survey, 2006

Table 2: Estimation results for beer, wine and spirits, respectively

| Variable | Beer | t-value | Wine | t-value | Spirits | t-value |
|---|---|---|---|---|---|---|
| Constant | -2.0710*** | -8.05 | -87.607*** | -3.35 | -20.929*** | -3.39 |
| Age/10 | 0.53200*** | 6.72 | -6.5190 | -0.90 | 13.071*** | 6.940 |
| Age2/1000 | -0.7860*** | -9.02 | 10.470* | 1.440 | -10.776*** | -5.64 |
| HH Income | 0.16600*** | 9.36 | 3.3620* | 1.920 | -0.3140 | -0.75 |
| Education year | 0.02100*** | 7.57 | 0.1840 | 0.740 | -0.146* | -2.37 |
| Current smoker | 0.00000 | -0.01 | -1.072 | -0.29 | 5.3970*** | 5.87 |
| Former smoker | -0.0690 | -1.00 | -5.630 | -0.83 | -0.878 | -0.53 |
| Good Diet | -0.0830 | -0.81 | 6.192 | 0.60 | -2.282 | -0.90 |
| Fair Diet | 0.01200 | 0.13 | 1.446 | 0.16 | -2.904 | -1.33 |
| Good phy. activity | 0.21000** | 2.72 | -8.152 | -1.05 | -0.778 | -0.39 |
| Fair phy. activity | 0.05000 | 0.82 | -6.926 | -1.15 | -0.397 | -0.26 |
| Urban | 0.20900*** | 6.50 | 16.264*** | 4.54 | -3.993*** | -4.61 |
| % of censored | | | 94.000% | | 20.9% | |
| Log likelihood | -5309.9035 | | -787.52298 | | -6418.0579 | |

China Health and Nutrition Survey, 2006; *: Significant at 10%; **: Significant at 5%; ***: Significant at 1%

and spirits, since there are large proportions of non-consuming men in the sample, censored regression model is used.

**Findings of beer consumption using a poisson MLE:**
We find that age has a positive effect on beer demand, with a 10 year increase increasing the consumption by 53% (Table 2). This result differs from finding for Malaysia (Tan *et al*., 2009), that age is not an important factor in alcohol consumption. Education year and urban factors are positive and highly significant at the 1% level, although the magnitudes are generally small.

Furthermore, lifestyle is also a factor in beer consumption. The physically active men are more likely to consume more beer, with a probability as high as 21% than men who rarely doing sports Table 2.

However, since the non-consumption data are not considered separately as in the censored model, this may cause a biased estimation.

**Findings of wine and spirits consumption using a censored model:** For the coefficients of most of the variables, in both wine and spirits, the magnitude and direction are consistent to our expectations. Urban is indeed found to be an important determinant on wine consumption. This result can be explained by the following two reasons. First is the indirect effect of

high income, since the average economic level is higher in urban areas. Secondly, people in the city are much easier to get influence from the western lifestyle, while wine is more popular in western world.

Current smoke has a positive impact on spirits consumption. However, smoke may suffer an endogenous problem. Previous research indicates that co-occurrence rates of alcohol and cigarette addiction are very high (Batel *et al*., 1995), which may be partly because of genetic factors (Madden *et al*., 2000). In a study of light smokers, King and Epstein (2005) find that alcohol dose-dependency increases the urge to smoke.

Finally, opposite to beer and wine, people living in the rural areas tend to drink more spirits than urban areas. Also, education year shows a positive effect. One possible explanation for this result is that, in rural China, higher education is often associated with more social activities where spirits are available and consumption is encouraged.

## CONCLUSION AND POLICY SUGGESTIONS

Different alcohols have different consumer groups. High income, well-educated and people in urban areas with a good physical activity are found to consume

more beer. People in urban areas with high income tend to prefer drinking wine. Rural people with relatively high income and current smokers drink more spirits.

This finding suggests that different policies should be made for each type of alcohols, either when the government tries to reduce the consumption of alcohols, or when the companies attempt to extend the sailing market.

## LIMITATIONS

First, in the poisson regression model for beer, the non-consumption is not considered separately, which may cause a sample selection bias. In the further study, a censored model will be considered if continuous data of beer consumption quantities are available.

Secondly, in the to bit model, a single censored equation is used, based on the normal distribution assumption of the error term, which may also produce inconsistent empirical estimates when the normality assumption is violated. This specification issue may be solved by estimating a censored equation system, using quasi-maximum likelihood and copula methods.

Thirdly, not just smoke, both health diet and physical activity are suffering an endogenous problem. Without use of IV (Instrumental Variables), the estimation results may be biased. However, finding an IV is not an easy thing, since both the inclusion and exclusion conditions should be satisfied.

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