

Mirzobobo Yormirzoev* and Gnel Gabrielyan

Factors Associated with Alcoholic Beverages Consumption in Russia: A Discrete Choice Model

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Abstract: Alcohol consumption in Russia remains a topic of extensive debate and investigation. In this article we attempt to explore and analyze some factors affecting vodka, beer, dry wine and champagne consumption in the country by utilizing the most recent household level dataset. We made use of logistical regression approach as a key empirical tool. Our findings highlight that there exist different trends and patterns in contemporary alcohol drinking behavior among respondents. This paper rejects the common stereotype that only vodka is a popular variety of alcohol beverage in Russia. In a model with dry wine and champagne most of explanatory variables remain statistically significant.

Keywords: vodka, beer, wine, champagne, Russian longitudinal monitoring survey (RLMS), Russia

1 Introduction

Russia is said to be a nation having a distinctive drinking culture. Historically, such perception was based upon travelers' observations of the drinking habits of the high class families at royal celebrations in Moscow taverns (Keenan et al. 2014). According to the World Health Organization in 2011 (WHO 2011) the average annual alcohol consumption in Russia that accounts for 15.7 liters of ethanol per an adult individual exceeds a similar indicator for Europeans of 12.2 liters. Therefore, it remains a topic of intensive debate and research by several authors (discussed below).

Previous literature on Russia's alcohol consumption is diverse as it focuses both on economic and non-economic consequences of heavy drinking. In a relatively earlier study Bobak et al. (1999) point out that alcohol consumption is more prevalent among males and it is not connected with sizable socio-economic differences as well as changes in Russian society during a transition period.

*Corresponding author: Mirzobobo Yormirzoev, Department of Economics and Finance, National Research University Higher School of Economics, 38 Studencheskaya Street, Perm, 614070, Russia, E-mail: mmermirzoev@hse.ru

Gnel Gabrielyan, Food and Brand Lab, 114 Warren Hall, Cornell University, Ithaca, NY 14853, E-mail: gg352@cornell.edu

Tekin (2004) explored the relationship between alcohol consumption and labor market productivity in Russia. His empirical findings suggest that the relationship appears to follow an inverse U-shape. Moderate drinking facilitates employment in cross sectional models. After individual fixed effects are controlled for, the positive impact of alcohol consumption on employment disappears in the case of both men and women accordingly.

Baltagi and Geishecker (2006) estimated a rational addiction model for alcohol consumption by utilizing a panel data setting on a wave-by-wave basis. Their findings partially reveal some implications of the RA model in the case of male drinkers. However, they did not come up with any feasible outcome in the case of Russian women who belonged to their sample.

Tapilina (2007) provides a concise description of the scale and dynamics of alcohol consumption for the period between 1994 and 2002. She focuses mainly on the social and demographic aspects of immoderate drinking in Russian society. She argues that this is an indicator of health with respect to individuals and society as a whole. Reduction of alcohol consumption depends significantly upon relevant public policy which is aimed at improvement of people's welfare through better living conditions, more access to education, etc.

Perlman (2010) analyzed drinking patterns in Russia during a country's transition period. In his descriptive paper he argues that economic decline in late 1990s was associated with a sharp and gradual decline in heavy drinking. However, homemade distilled spirit consumption increased that put some concern in public fears to combat counterfeit vodka poisoning.

In most recent paper Keenan et al. (2014) demonstrate empirically that there exists certain correlation between alcohol consumption and cohabitation, and marriage. Their findings are in line with previous studies in Western countries implying that heavy drinking is connected with the early consumption of adult roles, including union formation. Herzfeld, Huffman, and Rizov (2014) came up with a similar empirical outcome implying that males demonstrate a persistence propensity to heavy drinking and that relevant policy measures need to address men as the most vulnerable group in Russian society.

As we have noticed earlier studies focused primarily on heavy drinking and relevant analysis on other kinds of alcohol consumption in Russia is missing. Therefore, in this paper we attempt to identify and examine factors that potentially affect not only vodka, but also beer, dry wine, and champagne consumption in the country. Alternatively, our study will investigate presence of any differential and compare alcohol consumption patterns in the context of three types of drinks. The rest of the article is organized as follows: a description of data used in this study is then given. In section three we describe methodology of the study. Section four summarizes empirical findings. Key findings of the article are outlined in the final section.

2 Data

Our empirical analysis is based upon data drawn from the Russian Longitudinal Monitoring Survey (RLMS) (Popkin, Kozyreva, and Kosolapov 2015). It represents a series of nationally representative surveys that are regularly conducted in Russia to monitor and track the effects of government reforms on the welfare of individuals and households in the country. This survey includes two kinds of sample: representative sample and complete sample. The former contains observations on households and individuals representing Russia's population in each phase of survey. The latter comprises observations on all households and individuals who are interviewed in the framework of current wave. The dataset is run by National Research University Higher School of Economics and Russian Academy of Sciences in cooperation with Carolina Population's Center at the University of North Carolina.

For the present article we utilize variables of interest from 2013 representative sample that may better fit our research. It includes more than sixteen thousand cross sectional observations. Like any surveys, RLMS has missing values on several variables. In order to address this issue we conducted list-wise deletion. For some missing data, in particular information on income which is a sensitive question for many respondents we substituted mean of that variable from those regions in which sample participants were residing at the time of interview. Consequently, our final sample includes 4,582 observations.

Our predicted variables imply whether respondents consumed vodka, beer and dry wine, and champagne during the last 30 days. Socio-demographic and economic indicators as well as dummies for Russia's federal

districts represent explanatory variables in the article. Table 1 reflects definitions and summary statistics.

Women represent more than half of respondents in the sample. The average age is 48 years and those individuals who belong to the second and third cohorts in the table constitute the majority of survey participants. Sixty-seven (67%) of respondents indicate that they have full time employment. The distribution of education level shows that about 50% have special secondary education followed by individuals with college and university degrees.

Most of respondents are married and nearly 81% live in households with an average of two and five members. In terms of monthly income we take real wage that respondent received in the past thirty days. 31% of respondents indicate that their monthly real wage varies within a range of 5,001 and 15,000 rubles (158 USD to 471 USD), 38% earn from 15,001 to 25,000 rubles (471 USD to 785 USD), 14% make from 25,001 to 35,000 rubles (785 USD to 1,100 USD). Only 2.5% of survey participants are referred to high income individuals whose monthly salary exceeds 55,000 rubles (1,727 USD).

Sixty (60%) of respondents reported that they are not smokers while Russia remains one of the top smoking nations in Eastern Europe. Russia represents a multinational society where except for Russians people with different ethnicity background were born and reside in the country. More than 12% identified themselves as non-Russians.

Interesting information stems from the fact that how survey participants remain satisfied with their life in general at the time of interview. Forty four (44%) are rather satisfied and 24% have reported both yes and no answers. Only 5.5% were not all satisfied with their life.

The last line and column of the table displays how respondents are distributed among country's federal districts. It shows that sample was not evenly allocated across regions implying that Central Federal as well as Volga Federal Districts account for more than half of respondents. Ural Federal District has the smallest number of sample participants, while Far Eastern and North Caucasian Federal Districts account for 5.24% and 4.3% accordingly.

3 Methodology

Our dependent variables have two possible qualitative outcomes. Unlike previous studies in which response variable comprises and aggregates all types of alcohol

Table 1: Definitions and summary statistics of the explanatory variables.

Variable description		Frequency (percent)	Mean	Standard Deviation
Gender		0.505		0.500
1	If female	50.48		
0	If male	49.52		
Age		48.340		14.120
1	If 18–30	10.56		
2	If 31–43	30.93		
3	If 44–56	29.03		
4	If 57–69	21.03		
5	If 70 and above	8.45		
Employment			0.666	0.472
1	If respondent has full time employment	66.56		
0	Otherwise	33.44		
Education			12.202	3.137
1	If elementary education	5.91		
2	If incomplete secondary education	9.95		
3	If complete secondary education	8.82		
4	If secondary special education (vocational training)	47.29		
5	College/university education	26.56		
6	Graduate and higher education	1.46		
Marital status			0.662	0.473
1	If married	66.15		
0	otherwise	33.85		
Number of household members			3.379	0.945
1	If only a couple in household	17.63		
2	If from two and five people in household	80.75		
3	If six and eight people in household	1.58		
4	If nine and more people in household	0.04		
How much real wage respondent received in the past 30 days from his/her full time employment^a			21,913.46	15,114.36
1	If less than 5,000 rubles	3.12		
2	If 5,001–15,000 rubles	31.41		
3	If 15,001–25,000 rubles	38.05		
4	If 25,001–35,000 rubles	14.21		
5	If 35,001–45,000	8.75		
6	If 45,00–55,000	1.98		
7	If 55,001 and above	2.48		
Smoking			0.410	0.492
1	If respondent smokes	40.96		
0	Otherwise	59.04		
Nationality/Ethnicity			0.123	0.328
1	If non-Russian	12.29		
0	If Russian	87.71		
Life satisfaction			2.667	1.043
1	Fully satisfied	9.06		
2	Rather satisfied	43.87		
3	Both yes and no	23.90		
4	Less than satisfied	17.70		
5	Not at all satisfied	5.48		

(continued)

Table 1: (continued)

Variable description		Frequency (percent)	Mean	Standard Deviation
Federal Districts			0.125	0.303
1	Central Federal District	27.08		
2	Southern Federal District	8.60		
3	Northwest. Federal District	10.26		
4	Far Eastern Federal District	5.24		
5	Siberian Federal District	15.69		
6	Ural Federal District	2.86		
7	Volga Federal District	25.97		
8	North Caucasian Federal District	4.30		
<i>Number of Observations</i>		4,582		

Note: ^aRuble is Russian currency. The 2013 official exchange rate was 31.84 rubles per U.S. dollar.

consumption in a single indicator, in this article we seek to relate and analyze each variety of alcoholic beverage to a set of possible predictors. Let the binary variable y_i to be defined as follows:

$y_i = 1$ if a respondent i consumed any type of alcohol for the past thirty days with probability p ,
 $y_i = 0$ if a respondent i did not consume any type of alcohol for the past thirty day with probability $1-p$.

Hence, the logit or logistic regression model indicates that

$$p = \varphi(x'\beta) = \frac{e^{x'\beta}}{1 + e^{x'\beta}} \quad (1)$$

where $\varphi(\cdot)$ refers to the logistic cumulative distribution function, with $\varphi(g) = e^g / (1 + e^g) = 1 / (1 + e^{-g})$ accordingly.

In models with dichotomous outcomes ordinary least squares approach is not an acceptable empirical tool since normality of errors and homoscedasticity of error variances are not valid. In this case, the maximum likelihood method is used to estimate the parameters of a model under consideration. The first order conditions for logit maximum likelihood estimation (MLE) yields to

$$\sum_{i=1}^N (y_i - \varphi(x_i'\beta)) x_i = 0 \quad (2)$$

$$\text{with } \varphi'(g) = \varphi(g)[1 - \varphi(g)] \quad (3)$$

The empirical expression of the model is thus represented as:

$$y_i = \beta_0 + x_i'\beta + \varepsilon_i \quad (4)$$

y_i is whether a survey participant i provided an affirmative response in the form *yes* or *no* and x_i and ε_i refer to observed

and unobserved characteristics. When estimating this model empirically, one needs to assume that a standard logistic distribution will have zero mean and standard deviation $\sigma = \pi / \sqrt{3}$ (Holmquist, McCluskey, and Ross 2012).

4 Empirical Results

The results of three logit models are reported in Table 2. Each column represents the results of different model where we capture the impact of various socio-economic characteristics on the consumption of vodka, beer, and dry wine and champagne, respectively. In all models we utilize age of respondents and their received real wage in squared form as well to see whether each variety of alcoholic beverage consumption demonstrates a diminishing marginal effect.

Not surprisingly, being a female decreases the probability of consuming vodka and beer (significant at 1% level). These results are similar to earlier findings in literature (Bobak et al. 1999; Baltagi and Geishecker 2006; Keenan et al. 2014). However, we find that women have a positive and a significant (at 1% level) impact on the probability of dry wine and champagne consumption. Interestingly, being a full-time worker has a positive and a significant (at 1% level) impact consuming a dry wine or champagne. This result might signal different drinking attitudes in Russian society. One of the possible explanations is that preference and consumption of dry wines and champagnes might signal social status that is expressed by full-time employment. Another possible explanation is that dry wines and champagnes are more expensive, therefore, only consumers with constant income can afford to purchase. This hypothesis is further verified by impact of wages on the probability of dry wine and champagne

Table 2. Estimation results for vodka, beer, and dry wine and champagne consumption models.

Parameter	Coefficient estimates		
	Vodka consumption	Beer consumption	Dry Wine and Champagne consumption
Constant	−3.536 (0.437)***	2.693 (0.454)***	−3.622 (0.555)***
Gender	−1.194 (0.074)***	−1.015 (0.774)***	1.887 (0.010)***
Nationality	0.082 (0.101)	−0.497 (0.107)***	0.041 (0.127)
Employment	−0.032 (0.830)	0.444 (0.082)	0.012 (0.100)***
Life satisfaction	0.023 (0.322)	0.086 (0.333)***	−0.069 (0.039)*
Age	0.169 (0.016)***	−0.088 (0.166)***	−0.074 (0.018)***
Age squared	−0.001 (0.000)	0.000 (0.000)**	0.001 (0.000)***
Education	−0.059 (0.109)***	−0.030 (0.114)***	0.118 (0.014)***
Marital status	−0.084 (0.088)	−0.235 (0.091)***	0.335 (0.108)***
Smoking	0.332 (0.735)***	0.340 (0.074)	−0.427 (0.094)***
Household	0.013 (0.043)	0.031 (0.044)	−0.057 (0.055)
Wage	−2.180 (4.120)	4.030 (4.220)	0.000 (4.440)***
Wage squared	−1.050 (3.030)	−3.570 (3.170)	−6.160 (2.760)**
Central Federal Dist.	0.093 (0.173)	0.842 (0.187)***	1.221 (0.304)***
South Federal Dist.	0.024 (0.192)	1.125 (0.205)***	0.942 (0.324)***
Northwest Federal Dist.	0.047 (0.190)	0.442 (0.206)**	1.582 (0.315)***
Far East Federal Dist.	0.098 (0.211)	1.121 (0.224)***	0.878 (0.344)**
Siberian Federal Dist.	−0.041 (0.178)	1.209 (0.191)***	0.720 (0.312)**
Ural Federal Dist.	0.129 (0.246)	1.127 (0.258)***	0.431 (0.403)
Volga Federal Dist.	0.236 (0.168)	1.153 (0.183)***	0.952 (0.304)***
<i>Log likelihood</i>	−2817.670	−2692.848	−2052.859
<i>Pseudo R²</i>	0.11	0.15	0.19
<i>Number of Observations</i>	4582	4582	4582

consumption. Even though the coefficient is very small, it is positive and significant at 1% level. Consumers who have higher life satisfaction also prefer.

We observe similar results for education variable. The education that represents years of schooling is negatively correlated with the probability of vodka and beer

consumption (significant at 1% level). Yet, it positively impacts the probability of dry wine and champagne consumption, further confirming our hypothesis about the lifestyle and its impact on consumption of dry wine and champagne. We observe similar results for marital status. The results show that if a person is married than there is

a higher probability of consuming dry wines and champagne and lower probability of consuming beer (significant at 1% level) and vodka. While the coefficients are significant at 1% level in beer and dry wine and champagne models it is not significant in vodka model at 10% significance level.

We also find that smoking significantly (at 1% level) increases the probability of vodka consumption and decreases the probability of dry wine and champagne consumption (at 1% significance level). The coefficient for smoking does not have any significant impact on the probability of beer consumption.

Surprisingly, consumers that are not Russian do not consumer beer as much. If the person has other nationality than Russian, than there is lower probability that they consume beer. It is possible that consumers of other nationality consume alcoholic beverages that are famous in their own countries or regions of origin.

The results show that older consumers prefer vodka but not beer or dry wine and champagne. As age group of consumers goes up there is higher probability that these consumers consume vodka and lower probability that they consumer beer and wine and champagne. All the respective coefficients are significant at 1% significance level. Having age squared in the model allows us to capture the non-linearity of these relationships. E.g., if consumers' age groups goes up the probability of vodka consumption goes up as well but with decreasing rate. The estimated coefficients for the most of Russia's Federal Districts except for Volga region are statistically significant in the beer model and nearly all fitted coefficients for country's federal districts yield a similar qualitative pattern in the wine model.

Some of the findings in the analysis are quite persistent towards suggesting that there is a pattern for consumption of different alcoholic beverages. We notice that female consumers and consumers who have constant employment with higher wages, have higher education level, and are married have a higher probability of consuming dry wine and champagne and lower probability of consuming vodka. One of the suggestions to decrease vodka consumption in Russia is that the government can support consumers by providing full-time employment and/or increasing the salaries. At the same time, the companies producing and/or selling dry wines and champagne can increase their sales by targeting female consumers. The government can also promote the "good" lifestyle of moderate drinking of wine and champagne, at the same time educating its citizens about health issues of heavy drinking.

5 Conclusions

This article explored and analyzed factors affecting consumption of some varieties of alcoholic beverage in Russia. A recent dataset from the Russian Longitudinal Monitoring Survey has been utilized as a key source of information. Logistic regression was chosen to be an empirical tool of this study.

We investigated and estimated three models. In particular, we looked at recent trends and patterns of each type of alcohol consumption by respondents separately. In the first scenario we noticed that regions and income level are not influential and significant. Consistent with previous findings, men are likely to drink more. The second model relates beer consumption with a number of predictors. We see and discover empirically that non-Russians do not opt for this alcoholic beverage and a degree of life satisfaction remains significant. Nearly all country's federal districts are statistically influential. In the last model most of explanatory variables remained significant. This suggests that dry wine as well as champagne seem to be the most popular alcoholic drink in the country.

The findings of the paper suggest some implications both for public policy and companies that operate at Russia's alcohol market. Raising tax rates and time constraints for selling vodka and strict age limitations could be some options for this policy. This may prevent and reduce socially and medically negative consequences of vodka consumption and decrease further individuals' physical and moral degradation.

Beer and wine could substitute vodka as an alternative variety of alcoholic beverage. However, consumption of the former should not be addictive and overused. Its consumption with reasonable and acceptable amount should benefit people in terms of relaxing, relieving tension, reducing stresses and improving one's mood.

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