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Article

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Determinants of fortified wine consumption in Russia: Evidence from a national sample of the Russian Population

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Abstract

In this article we examine factors affecting fortified wine consumption in Russia by utilizing micro-level data from the Russian Longitudinal Monitoring Survey (RLMS). A model with limited dependent variables has been applied to the study. Our analysis shows that Russian males demonstrate a persistent propensity to fortified wine consumption due to its higher alcohol content. Our finding reflects the presence of diminishing marginal effect by age, while the estimated coefficient for marital status is negatively significant. Respondents from southern regions do not opt for fortified wine. One explanation of this might be that Krasnodar Province located in the South federal district is known as one of Russia's major wine producers.

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Keywords: Fortified wine consumption; National Survey; Alcohol; Logistic regression; Russia

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1. Introduction

The favorable conditions on the world energy market in the first decade of the twenty-first century enabled Russia to gain significant revenues from the sale of oil and natural gas. As a result, Russia enjoyed steady economic growth of 6.8% yearly

in the period of 1999 through 2008 (World Bank, 2010). The Russian consumer price index dropped from 86% in 1999 to 11.4% in 2013 (Rosstat, 2015). Relatively stable patterns of the country's growth path created a sizable middle class that constituted more than one-third of the Russian population (Ceccia et al., 2013). The emergence of a Russian middle class with rising disposable income had a positive impact on imports of food and consumer goods to the country, which rose from 7.4 billion dollars in 2000 to 39.7 billion dollars in 2014

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(Rosstat, 2015). One of these goods is wine products whose import increased by 16% between 2012 and 2013 (Tang et al., 2015). In this context, the wine sector in Russia has the potential to grow in the future.

In Russia wine is considered to be the third choice of alcoholic beverage, following vodka and beer (Ceccia et al., 2013). According to the Wine Institute in 2012, 5.1% of the world wine consumption is attributed to this country.

Therefore, investigating consumption patterns of wine products and their determinants may provide some knowledge and insights about a relatively new and fast growing market in a country that is located in both Europe and Asia. The purpose of this study is to explore and examine factors affecting fortified wine consumption from a national sample of the Russian population. In 2013 more than 7% of the Russian wine market consisted of fortified wine; this figure exceeds an analogous indicator from several major markets such as United States – 1.8%, Great Britain – 5%, Germany – 1.6%, China – 2% and India – 2.2% (Market Line).

Most of previous studies were conducted in Western and emerging wine markets. Russian wine consumption patterns have received insignificant attention in research literature except for a recent paper written by Ceccia et al. (2013). In that study, the authors investigated the prospects for the export for wine products to the Russian market. Based on their experimental approach they concluded that there are three well-defined segments in this market. Price, region of origin and presence of product certificate are important among Russian consumers. However, this study does not include socio-demographic, economic and regional factors that may potentially affect wine consumption in Russia. Furthermore, their analysis is based on three cities with limited coverage of survey information. A more detailed analysis of this topic at a national level is important.

The remainder of the article is organized as follows: in the next section we discuss previous studies on alcoholic beverages consumption in Russia. Section three provides a detailed description of data and variables used in the analysis. In section four we discuss methodology applied to the topic. Section five touches on estimation results and the last section highlights some concluding remarks.

2. Past studies

As mentioned above there is only a single paper on wine consumption in Russia. Other studies are focused on multi-disciplinary approaches to heavy drinking. In an earlier study, Bobak et al. (1999) point out that alcohol consumption is more prevalent among males and it is not connected either with sizable socio-economic differences with changes in Russian society during a transition period.

Tekin (2004) investigated the presence of a relationship between alcohol consumption and labor market productivity in Russia. His empirical findings indicate that such a correlation between variables of interest follows an inverse U-shape. Moderate drinking habits appear to have a positive impact on employment in cross sectional models. However, such an

impact seems to disappear once individual fixed effects are taken into account.

Baltagi and Geishecker (2006) estimated a rational addiction model for alcohol consumption by utilizing a panel data setting on a wave-by-wave basis. They emphasized that this model may partially explain patterns and behavior of Russian male drinkers. This model did not have significant effects for women.

Taplina (2007) provides a concise description of the scale and dynamics of alcohol consumption for the period between 1994 and 2002. Her analysis primarily refers to the social and demographic aspects of immoderate drinking in the Russian society. In her paper she points out that alcohol consumption is an indicator of societal health. Public policy aimed at improving people's welfare should encourage reduction of excess alcohol consumption in this society.

In a study by Perman (2010) he presents an analysis of drinking patterns in Russia at the time of country's transition period. Despite the fact that during the 1990s economic hardship was associated with a gradual decline in the purchase of alcoholic beverages, homemade ethanol consumption increased significantly which raised public concerns over this problem as drinking counterfeit ethanol may seriously deteriorate Russian's health conditions.

Herzfeld et al. (2014) demonstrate that Russian males show a persistent propensity to heavy drinking. They point out that relevant policy measures need to be undertaken in order to address men as the most vulnerable demographic cohort in the Russian society.

Keenan et al. (2014) investigated alcohol consumption in Russian society from sociological perspectives. Drinking patterns may affect relationship among people. They argue that individuals who are not drinkers are more likely to convert their relationship from cohabitation into marriage as compared with frequent drinkers that suffer from instable and irregular relationship.

To our best knowledge the present study is the first examination of determinants of fortified wine consumption in Russia. We believe that findings of the present study may represent the attitudes and preferences of the general Russian population regarding this product. Certainly, this study will be useful for companies working or intending to act in marketing of fortified wine in one of the largest markets in the world.

3. Data

The data utilized for the present article is taken from the Russian Longitudinal Monitoring Survey (RLMS). The RLMS is the most comprehensive and nationally representative micro-level survey that is regularly conducted in all of Russia's federal districts. This survey is jointly coordinated and maintained by National Research University Higher School of Economics and Russian Academy of Sciences together with Carolina Population's Center at the University of North Carolina.

Information collected as a result of these surveys is designed to monitor and track the impact of state reforms on the welfare

of country's population. Therefore, data collected for RLMS comprises a wide range of information on household and individual characteristics such as demographic composition, income, expenditure, employment, politics, health status and consumption of a wide range of food and non-food products, including alcoholic beverages.

For our analysis we make use of the recent individual data from the 2013 representative sample. The complete survey contains more than sixteen thousand observations. Generally speaking, national level surveys have missing values on certain questions that are not answered by respondents. This information may touch on various questions which may have both economic and non-economic characteristics. In our analysis we are faced with missing information on variables of our interest as well. In the RLMS the majority of survey participants did not respond to the question about consumption of fortified wine. This category of respondents was removed from our analysis. Hence, a list wise deletion technique was applied that effectively tackles this issue. In the case of a sensitive question such as income we substituted the mean value of that variable from a country's federal district under study. For instance, the average income from Central Federal District was used to fill the missing value of income of respondents who were from this particular district. Our final sample that covers all related information on variables of interest comprises 3083 individual cross sectional observations.

It is important to emphasize that the list-wise deletion technique may affect the statistical power of tests that rely upon large sample sizes. Even though we include only about twenty percent of Russia's nationally representative survey our sample still remains large. Absence of responses on the dependent variable is not contingent on survey questions and therefore, it may be considered as missing completely at random.

The survey asks respondents whether they consumed an alcohol containing beverage, in the case of fortified wine, during the last thirty days. Then we collected and used relevant covariates for our empirical analysis from those participants who provided affirmative answers. Most of these independent and control variables are ordinarily used in similar studies. In our analysis we also included other predictors such as life satisfaction, economic conditions, health status, smoking habits and Russia's regions to see whether country specific information has any impact on the variable of interest. Definitions and summary statistics are presented in [Table 1](#).

The mean age of respondents is 43.7 years which is above the average for the Russian population. The distribution of gender remains almost equal, while women slightly exceed males, also in line with Russian population. The age composition is divided into five cohorts and we may notice that those respondents who belong to the second and third groups represent the majority of sample participants. Ninety seven percent of respondents confirmed that they have full time employment. In terms of education level those who completed secondary education rank first. Almost one third have incomplete high school degree and one fourth reported that they hold college and university education. This generally reflects the

educational level of Russian society where roughly one-quarter of the population graduates from colleges and universities.

More than sixty eight percent of respondents say that they are married. Nearly 40% live in households without any children. This situation of the Russian population reflects current family status in major Western nations as well. Forty three percent of sample participants said that they come from households that include members ranging from two and five people.

Information on how much real wage respondents received in the past thirty days is taken as a proxy for income. In 2013 the reported average real wage accounted for 20,669.08 rubles (650 US dollars in 2013), which lags a behind a similar indicator from all G7 industrialized nations. Almost one fourth reported that their post-tax salaries range within 5001 rubles (157 US dollars) and 15,000 rubles (471 US dollars). More than thirty percent of respondents confirmed that their real wage was between 15,001 rubles (471 US dollars) and 25,000 rubles (785 US dollars) accordingly. Only 2.5% of sample participants had income exceeding 55,000 rubles (1774 US dollars).

Russia is said to be one of the top smoking nations worldwide, which is also seen with this table. More specifically, more than 40% identify themselves as regular smokers. An interesting link between smoking and health status can be noticed as well. Half of the respondents said that their health status is neither good nor bad.

It is worth mentioning about life satisfaction and economic conditions. Despite the fact that more than one-third of respondents said they are less than satisfied with their economic conditions, almost half of them seem to be rather satisfied with their lives. Despite Russia being a multinational country, the vast majority of the sample (87.9%) identified themselves as Russians.

In terms of the distribution of survey across federal districts, residents of the Center and Volga districts, which correspond to a historical "Russian heartland", constitute almost half of the sample, while Far East and North Caucasus represent 4.8% and 3.7% of survey areas respectively.

4. Methodology

We utilize logistic regression analysis to proceed further with our estimations. Logistic regression has become the key empirical tool to estimate models when the response variable of interest has only two possible outcomes: zero or one. Compared to the standard regression technique, the classical assumptions are not valid any more. More specifically, non-normality of error terms as well as homoscedasticity of error variance is violated leading to bias and inconsistency of fitted coefficients. Therefore, in this case ordinary least squares is not the optimal empirical tool.

The alternative method of estimation that is generally applied when the dependent variable is dichotomous is called maximum likelihood. The method of maximum likelihood is designed to find values of unknown parameters that maximize the probability of getting the observed set of data ([Hosmer](#)

Table 1
Definitions and summary statistics of the independent variables.

Variable description	Frequency (percent)	Mean	Standard deviation
Gender		0.505	0.50
1 If female	50.44		
0 If male	49.56		
Age		43.691	11.101
1 If 20–30	12.93		
2 If 31–41	32.46		
3 If 42–52	30.27		
4 If 53–63	20.75		
5 If 64–87	3.59		
Employment		0.974	0.159
1 If respondent has full time employment	97.41		
0 Otherwise	2.59		
Education		12.202	3.137
1 If incomplete secondary education	28.7		
2 If complete secondary education	37.07		
3 If secondary special education (vocational training)	4.24		
4 College/university education	26.30		
5 Graduate and higher education	3.69		
Marital status		0.686	0.464
1 If married	68.63		
0 otherwise	31.37		
Number of household members		2.476	1.022
1 If a single person in household	15.70		
2 If only a couple in household	40.71		
3 If from two and five people in household	43.18		
4 If six and eight people in household	0.42		
How much real wage respondent received in the past 30 days from his/her full time employment ^a		20669.08	15676.03
1 If less than 5000 rubles	4.56	Coding for	estimation
2 If 5001– 5000 rubles	39.83	log(income)	
3 If 15,001–25,000 rubles	31.65	mean=7.090	Std. dev.=12.612
4 If 25,001–35,000 rubles	13.30		
5 If 35,001–45,000	5.74		
6 If 45,001–55,000	2.39		
7 If 55,001 and above	2.53		
Smoking		0.427	0.495
1 If respondent smokes	42.69		
0 Otherwise	57.31		
Nationality/Ethnicity		0.123	0.328
1 If Russian	87.90		
0 If non-Russian	12.10		
Life satisfaction		2.550	0.981
1 Fully satisfied	9.96	Coding for estimation:	

Table 1 (continued)

Variable description	Frequency (percent)	Mean	Standard deviation
2	Rather satisfied	47.23	1 if fully or
3	Both yes and no	24.23	0 if otherwise
4	Less than satisfied	14.99	
5	Not at all satisfied	3.6	
	Economic Conditions		3.499
1	Fully satisfied	3.02	Coding for estimation:
2	Rather satisfied	19.43	1 if fully or
3	Both yes and no	22.35	0 if otherwise
4	Less than satisfied	35.03	
5	Not at all satisfied	20.18	
	Health Status		2.639
1	Very good	1.30	Coding for estimation:
2	Good	37.79	1 if very good
3	Neither good nor bad	56.76	0 if otherwise
4	Bad	3.99	
5	Very bad	0.16	
	Federal Districts		0.125
1	Central Federal District	24.59	
2	Southern Federal District	14.11	
3	Northwest. Federal District	7.75	
4	Far East Federal District	4.80	
5	Siberian Federal District	15.86	
6	Ural Federal District	7.01	
7	Volga Federal District	22.15	
8	North Caucasus Federal District	3.73	
	<i>Number of observations</i>	3083	

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

et al., 2013). The model is expressed in the following linear form:

$$Y_i = \beta_0 + \beta X_i + \varepsilon_i \tag{1}$$

where: $Y_i=1$ if the i th respondent consumed fortified wine in the past thirty days. $Y_i=0$ if the i th respondent did not consume fortified wine in the past thirty days. X_i represents a set of potential socio-demographic, economic and health indicators as well as dummies for Russia's regions affecting the variable of interest. ε_i depends on the Bernoulli distribution of the Y_i that follows a cumulative logistic distribution with mean zero and variance σ^2 .

$$\text{Prob}(Y_i = 1) = F(\beta' X_i) \text{Prob}(Y_i = 0) = 1 - F(\beta' X_i)$$

The log-likelihood function for logistic regression can be thus expressed in the following way:

$$\log_{\text{exp}} L(\beta) = \sum_{i=1}^n Y_i (X_i' \beta) - \sum_{i=1}^n \log_{\text{exp}} [1 + \exp(X_i' \beta)] \tag{2}$$

The values for β_0 and other β s are coefficients that maximize $\log_e L(\beta)$. X_i' refers to explanatory variables in matrix form. Estimates for maximum likelihood can be written as b_0, b_1, \dots, b_{p-1} . Let b denote the vector of the ML estimates:

$$b_{p \times 1} = \begin{bmatrix} b_0 \\ b_1 \\ \vdots \\ b_{p-1} \end{bmatrix} \tag{3}$$

The fitted values for logistic regression can then be expressed as follows:

$$\pi^0 = \frac{\exp(X'b)}{1 + \exp(X'b)} = [1 + \exp(-X'b)]^{-1} \tag{4}$$

$$\pi^{\circ_i} = \frac{\exp(X'_i b)}{1 + \exp(X'_i b)} = [1 + \exp(-X'_i b)]^{-1} \tag{5}$$

where

$$X'b = b_0 + b_1 X_1 + \dots + b_{p-1} X_{p-1} \tag{6}$$

$$X'_i b = b_0 + b_1 X_{i1} + \dots + b_{p-1} X_{i,p-1} \tag{7}$$

The empirical representation of the model is thus defined as:

$$\begin{aligned} FWC_i = & \beta_0 + \beta_1 \text{Gender} + \beta_2 \text{Age} + \beta_3 \text{Age}^2 + \beta_4 \text{Employment} \\ & + \beta_5 \text{Marital_Status} + \beta_6 \text{Household} + \beta_7 \text{Income} \\ & + \beta_8 \text{Smoking} + \beta_9 \text{Nationality} + \beta_{10} \text{Life_Satisfaction} \\ & + \beta_{11} \text{Economic_Conditions} + \beta_{12} \text{Health_Status} \\ & + \beta_{13} \text{Federal Districts} + \varepsilon_i. \end{aligned} \tag{8}$$

where FWC_i refers to fortified wine consumption by i th respondent in the sample.

5. Results and discussion

This section presents fitted coefficients from our logistic regression analysis and marginal effects of explanatory variables with confidence intervals (see Table 2). Prior to

estimating our model of interest, we conducted correlations among covariates and discovered that they are not highly correlated with each other. The highest is the correlation between education and income at 0.25. Because of low correlations, the correlation matrix is not presented here.

As we may notice from Table 2 the effect of gender on the odds of drinking fortified wine are negative and significant at the one percent level. This implies that women are less likely to prefer fortified wine than men as a variety of alcoholic beverages. Fortified wine generally has a higher content of ethanol as compared with beer and red wine. Consequently, this alcohol drink seems to be more popular among Russian men than among women. This finding confirms earlier studies in literature in which males in Russian society opt for stronger drinks (Baltagi and Geishecker, 2006; Keenan et al., 2014).

The relationship between fortified wine consumption and age and its squared form reflects a diminishing marginal effect of this particular variable on Y_i . More specifically, age is positively and significantly connected with fortified wine consumption, but the negative sign of age in squared form, also statistically significant, may indicate that as people get mature the odds of consuming this alcohol drink will tend to decline. For each additional year of age the logit of fortified wine consumption increases by 0.119, and is afterwards diminished by -0.001 , on average after controlling for all other variables in the model. More specifically, the finding reflects the presence of diminishing marginal effect implying that the fortified wine consumption that is attributed to age increases at a decreasing rate over time.

The estimated coefficient for marital status of respondents is statistically significant at the 10 percent level. Compared with their single counterparts, married individuals are less likely to drink fortified wine. In other words, their odds for consuming this product are less than singles' by a factor of 0.696 ($\exp[-0.3629]$), after all other variables remain constant.

Out of all Russia's federal districts the estimated coefficient for South remains statistically significant at the 10 percent level. The negative sign means that respondents in the South federal district are less likely to consume fortified wine than respondents from other districts. One explanation of this might be that Krasnodar Province located in the South federal district is known as one of Russia's major wine producers. This province supplies about 40% of the domestically produced wine products to Russian market (Rosstat, 2015). Therefore, for consumers from this particular region local wine seems to be more preferable.

Other predictors included in the models did not yield statistically significant results. Hence, they seem not to influence the likelihood of consumption of this particular wine product in Russian society.

6. Limitations and future research

The present study explored some factors associated with fortified wine consumption in Russia, based on a surveyed sample of the Russian population. A logistic regression model was used as a primary empirical tool.

Table 2
Coefficient estimates and marginal effects of the explanatory variables on the odds of fortified wine consumption.

Variable	Coefficient estimates	Standard error	Z-statistic	Marginal effect estimates	Standard error	Z-statistic	95% Confidence Interval	
							Lower bound	Upper bound
Intercept	−5.799***	1.682	−3.45					
Gender	−1.344***	0.185	−7.25	−0.951***	0.014	−6.98	−9.061	−2.503
Age	0.119**	0.051	2.33	0.008**	0.004	2.32	−1.708	−0.981
Age squared	−0.001*	0.000	−2.03	−0.000*	0.000	−2.03	−0.002	−0.000
Employment	−0.073	0.457	−0.16	−0.005	0.032	−0.16	−0.969	−0.823
Education	0.001	0.027	0.01	0.000	0.002	0.01	−0.050	0.051
Married Status	−0.363*	0.188	−1.94	−0.026	0.014	−1.93	−0.731	0.005
Household	0.093	0.107	0.87	0.007	0.008	0.87	−0.116	0.302
Log(income)	0.136	0.135	1.01	0.010	0.001	1.01	−0.129	0.401
Smoke	−0.178	0.164	−1.08	−0.126	0.012	−1.08	0.499	0.143
Nationality	−0.129	0.216	−0.59	−0.009	0.015	−0.59	−0.553	0.296
Life Satisfaction	−0.226	0.152	−1.49	0.004	−0.016	−1.48	−0.524	0.072
Economic Conditions	0.277	0.179	1.54	0.020	0.013	1.54	−0.076	0.629
Health Status <i>Federal Districts</i>	−0.147	0.156	−0.94	−0.010	0.011	−0.94	−0.453	0.159
Center	0.095	0.312	0.30	0.007	0.023	0.30	−0.532	0.722
South	−0.467*	0.269	−1.68	−0.023	−0.330	0.02	−0.996	0.006
Northwest	−0.217	0.413	−0.40	−0.015	0.029	−0.53	−1.027	0.592
Far East	−0.521	0.491	−0.97	−0.037	0.035	−1.18	−1.484	0.441
Siberia	−0.033	0.361	−0.08	−0.002	0.025	−0.08	−0.739	0.672
Ural	−0.085	0.403	−0.12	−0.06	0.832	−0.12	−0.876	0.705
Volga	−0.058	0.351	−0.14	−0.004	0.869	−0.14	−0.746	0.630
North Caucasus	−0.829	0.606	−1.37	−0.059	0.172	−1.98	−2.017	−0.358
Log likelihood	−790.944							
Pseudo R ²	0.08							

*** Significant at the 1% level.

** Significant at the 5% level.

* Significant at the 10% level.

This paper has a few limitations and further studies in the context of the Russian wine market should be pursued. Data taken from the Russian Longitudinal Monitoring Survey reflect overall changes and trends in this country via regular surveying, and includes analysis of people's health status, dietary intakes, household and community level and region-specific indicators. This survey is widely used in numerous studies about Russian economy and society. It does not reflect particular information on the consumption of alcoholic beverages that would better fit our model.

A second important point would be to get information on sensory attributes and consumer perceptions for wine products that would precisely explain Russians' preferences and demand for this type of alcoholic beverage. Further studies might also focus on product origin, price, label, and brand as they play a crucial role at the time of consumer purchases and decision-making processes. For this purpose a product specific survey should be organized, for it would provide more opportunities for researchers to fit models of their interest and come up with clear empirical findings.

Some final words can be expressed in terms of applying more comprehensive empirical tools. The hedonic price model initially proposed by Rosen (1974) is frequently used in wine product studies; Oczkowski (2011) and Ashenfelter (2008) pioneered in this field. Furthermore, the contingent valuation method designed to identify consumer preferences for a chosen product is also applied in the wine consumption literature. For instance, Yang et al. (2009) utilized this methodology to investigate the Washington State red wines market.

The prospect for wine products in Russia is promising and we believe that future research will contribute to existing literature with new and interesting findings. Companies and businesses may benefit from these studies as well. They will be well informed on Russians' attitudes and preferences and this valuable information will enable them to successfully promote

and target their wine products to the Russian alcoholic beverages market.

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