Research Article

Addiction & Research

Impact of macroeconomic parameters on alcohol consumption in Russia

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Received: 23-APR-2021; **Published:** 29-APR-2021;

Citation: Dr. Yury Evgeny Razvodovsky, Impact of macroeconomic parameters on alcohol consumption in Russia

Abstract

Background: *A high level of alcohol consumption, a significant share in the structure of unrecorded alcohol consumption, as well as changing economic cycles, make Russia a convenient object for studying the influence of the level of income of the population on the level of alcohol consumption.*

Aims*: to study the relationship between macroeconomic parameters and alcohol consumption in Russia at the population level.*

Methods: *A comparative analysis of the dynamics of the main macroeconomic indicators (gross domestic product (GDP), Gini coefficient) and the level of alcohol sales, the level of alcohol consumption, the level of consumption of unrecorded alcohol in Russia in the period from 1990 to 2015 has been carried out.*

Results: *GDP is positively correlated with alcohol sales ($r = 0.45$; $p < 0.021$), negatively correlated with the general level of alcohol consumption ($r = -0.68$; $p < 0.000$), as well as with the consumption of unrecorded alcohol ($r = -0.79$; $p < 0.000$). The Gini coefficient is positively correlated with the level of alcohol sales, although this relationship is not statistically significant ($r = 0.4$; $p < 0.063$). No relationship was found between the Gini coefficient and the overall level of alcohol consumption ($r = 0.04$; $p < 0.871$), as well as the consumption of unrecorded alcohol ($r = -0.13$; $p < 0.576$).*

Conclusions: *a positive relationship was found between income and the sale of alcohol, as well as a negative relationship between income and consumption of unrecorded alcohol at the population level. The data obtained substantiate the need for synchronous indexation of excise taxes on alcohol as incomes of the population grow in order to reduce the economic availability of alcohol.*

Key words: GDP, alcohol, sales, consumption, Russia.

The level of alcohol consumption is a key indicator, since it's largely determines the level of alcohol-related problems [1,12]. The overall level of alcohol consumption is determined by a number of factors, one of which is the level of income [14]. A number of studies have shown the influence of the state of macroeconomics and economic cycles on the level of alcohol consumption [2-6].

The study of the relationship between the level of alcohol consumption and GDP, based on data from 189 countries of the world, showed that the overall level of consumption increases linearly with the growth of GDP to 15 thousand dollars [19]. However, further GDP growth has no effect on the overall level of alcohol consumption. It was also found that in countries with a GDP level below 15 thousand dollars, the level of alcohol sales grows in proportion to GDP growth [19]. In countries where GDP exceeds 30 thousand per capita, there is no relationship between the level of alcohol sales and GDP. In addition, an inverse relationship was shown between the level of consumption of unrecorded alcohol and GDP [19].

The available evidence predicts a decrease in the level of alcohol consumption during the economic crisis [17]. The fall in income is forcing the population to switch to a mode of economy with a decrease in spending on the purchase of alcohol. A number of studies have shown a decrease in the level of alcohol consumption, as well as the prevalence of alcohol abuse in European countries during the global economic crisis of 2008 [7,8,10,13]. In one such study, it was demonstrated that in European countries in the period from 2006 to 2013 the level of alcohol consumption among men and women aged 50-64 has decreased [4].

It should be noted that an important variable that determines the level of alcohol consumption during the economic crisis is the stress caused by unemployment and uncertainty about the future [2]. According to the theory of self-medication, alcohol can be used as a stress-reducing agent, which leads to an increase in the level of alcohol consumption during an economic crisis [17]. According to some researchers, stress was the reason for the increase in the level of alcohol morbidity and mortality in a number of European countries during the 2008 global economic crisis [2].

The research evidence suggests that the level of alcohol consumption is influenced not only by the level of income, but also by the uniformity of their distribution [7]. It seems that income inequality is positively associated with both the frequency of alcohol consumption and the volume of alcohol consumption [8]. However, information on the relationship between the evenness of income distribution and the level of alcohol consumption is rather contradictory [8].

The high level of alcohol consumption [16], and significant share in the structure of unrecorded alcohol consumption [14], as well as changing economic cycles [9], makes Russia a convenient object for studying the influence of the population's income on the level of alcohol consumption. Previous studies conducted in Russia showed a positive correlation between income and alcohol consumption at the population level [1]. In particular, it was found that income growth is accompanied by an increase in the overall level of alcohol consumption, both due to an increase in the frequency of drinking and due to the dose of alcohol consumed [1]. Another work demonstrated a direct relationship between the level of income and the level of vodka consumption [11]. In addition, a direct relationship was shown between income and consumption of moonshine [11].

The aim of this study was to study the relationship between macroeconomic parameters and alcohol consumption in Russia at the population level.

Materials and methods

A comparative analysis of the dynamics of the main macroeconomic indicators (GDP, Gini coefficient) and the level of alcohol sales, the level of alcohol consumption, the level of consumption of unrecorded alcohol in Russia in the period from 1990 to 2015 has been carried out. Data on the level of GDP (an integral indicator of economic activity and living standards), as well as the Gini coefficient (an indicator of of income inequality) are taken from the World Bank database. The overall level of alcohol consumption was estimated using an indirect method using the level of alcohol-related mortality from acute alcohol poisoning as an indirect indicator [16].

Statistical analysis was carried out using the STATISTICA 10 package. To check the normal distribution of the time series, the Kolmogorov-Smirnov test was used. Since the distribution of the values of the studied time series differs from the normal one, the statistical analysis was carried out using the nonparametric method (Spearman correlation analysis).

Results

The dynamics of the studied indicators in Russia is shown in Figure 1. Graphical evidence suggests that GDP gradually decreased until 1998, then grew exponentially until 2008, then sharply increased in subsequent years, reaching a peak in 2013, after which dropped sharply. Alcohol sales after a sharp rise in the first half of the 1990s slightly decreased in 1996, then grew linearly until 2007, after which it began to decline. The overall level of alcohol consumption increased significantly in the first half of the 1990s, decreased significantly between 1994 and 1998, then increased again between 1998 and 2003, after which it began to decline. The level of unrecorded alcohol consumption increased significantly in the first half of the 1990s, decreased significantly between 1995 and 1998, increased between 1998 and 2002, decreased between 2002 and 2013, after which it began to grow.

According to the results of the correlation analysis, GDP is positively correlated with alcohol sales ($r = 0.45$; $p < 0.021$), negatively correlated with the general level of alcohol consumption ($r = -0.68$; $p < 0.000$), as well as with the consumption of unrecorded alcohol ($r = -0.79$; $p < 0.000$).

The Gini coefficient is positively correlated with the level of alcohol sales, although this relationship is not statistically significant ($r = 0.4$; $p < 0.063$). No relationship was found between the Gini coefficient and the overall level of alcohol consumption ($r = 0.04$; $p < 0.871$), as well as the consumption of unrecorded alcohol ($r = -0.13$; $p < 0.576$).

Discussion

The results of the time series analysis carried out in the framework of this study reproduce previously obtained data indicating the existence of a positive relationship between income and the sale of alcohol, as well as a negative relationship between income and consumption of unrecorded alcohol at the population level [19]. At the same time, the data obtained do not support the results of international studies, which showed a positive relationship between income and alcohol consumption at

the population level [19].

The lack of relationship between income and alcohol consumption contradicts the results of studies conducted in Russia at the individual level, which demonstrated a positive relationship between these variables [1,11]. The present study found no statistically significant relationship between the Gini coefficient and the level of alcohol sales / consumption, as well as the level of consumption of unrecorded alcohol. Apparently, it is methodologically more correct to search for such a connection in studies conducted at the individual level.

The inconsistency in the data on the relationship between income and alcohol consumption, obtained in studies based on population and individual data may be due to methodological limitations of the studies. One of the limitations is the use of the overall level of alcohol consumption, which is an average indicator and, therefore, does not reflect the differences in the level of alcohol consumption by different social groups [14]. In addition, representatives of different social groups may react differently to changes in the level of income [1].

In particular, the level of alcohol consumption by heavy drinkers is more correlated with the level of GDP than the level of alcohol consumption by moderate drinkers [4]. It has also been shown that as GDP rises, women increase their alcohol consumption more than men [7]. To a certain extent, the decline in the gender gradient in the level of alcohol-related problems that has been observed in many countries over the past decades can be explained by an increase in income levels [7]. On the other hand, due to the difference in gender roles, men's drinking behavior may be more dependent on economic cycles than women's drinking behavior [1].

It should also be taken into account that the effects of economic cycles can be layered on long-term trends in the level of alcohol consumption, formed under the influence of some unaccounted for factors. For example, the decline in the overall level of alcohol consumption, which began in 2003, is largely attributed to the adoption of a set of measures aimed at improving control over the alcohol market and reducing the availability of alcohol [15, 18]. Growth in alcohol consumption against the backdrop of a decline in GDP in the first half of the 1990s explained by the combined effect of increasing the availability of alcohol, due to the abolition of the state alcohol monopoly and psychosocial stress caused by the collapse of the Soviet Union [14]. The lack of state control over the alcohol market caused a sharp increase in the level of consumption of unrecorded alcohol during this period.

A significant drop in GDP in 2009, caused by the global financial and economic crisis in 2008, was accompanied by a slight decrease in the level of alcohol sales. In the last years of the period under review, against the background of the economic recession, there was a decrease in the level of alcohol sales and an increase in the level of consumption of unrecorded alcohol.

In conclusion, the results of this study found a positive relationship between income and the sale of alcohol, as well as a negative relationship between income and consumption of unrecorded alcohol at the population level. This evidence substantiates the need for synchronous indexation of excise taxes on alcohol as incomes of the population grow in order to reduce the economic availability of alcohol. During the economic crisis, the task of carrying out measures to combat the shadow alcohol market becomes more urgent. In the framework of a comprehensive alcohol policy, economic measures should be combined with a set of other measures that have proven effective.

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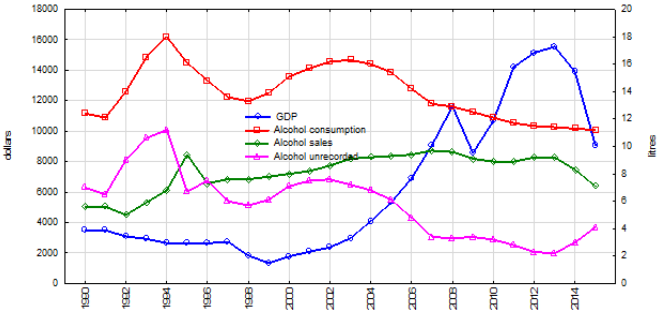

Figure 1. Trends in GDP, alcohol sales, alcohol consumption and recorded alcohol consumption in Russia in 1990-2015.