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Research Article

Effect of affordability of alcohol on the level of alcohol consumption in Russia

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Abstract

Objective: To study the relationship between the affordability of alcohol and the level of its sale, the total level of consumption, as well as the consumption of unrecorded alcohol in Russia in the post-Soviet period.

Methods: A comparative analysis of the dynamics of the affordability of alcohol, the level of its sale, the total level of consumption, as well as the consumption of unrecorded alcohol in Russia in the period from 1991 to 2015 was carried out. Statistical analysis (Spearman's correlation, linear regression) was carried out using the STATISTICA 10 package.

Results: The affordability of alcohol is positively correlated with the sale of alcohol ($r=0,64$; $p<0,000$) and negatively correlated with the total level of alcohol consumption ($r=-0,4$; $p<0,000$), as well as the level of unrecorded alcohol consumption ($r=-0,77$; $p<0,000$).

Conclusions: This study revealed the positive relationship between affordability of alcohol and the level of alcohol sales, as well as negative relationship between affordability of alcohol and unregistered alcohol consumption in Russia.

Despite the decrease in the level of alcohol-related morbidity and mortality observed in recent years, Russia continues to suffer from a heavy burden of alcohol-related problems [1-8]. International experience in the field of alcohol policy indicates that one of the most effective measures is to limit the physical and economic availability (affordability) of alcohol [9-13].

Unfortunately, this experience is not fully applicable to Russia. Previous attempts to reduce the level of alcohol consumption by reducing its affordability did not achieve their goal due to the existence of an extensive shadow alcohol market [1,2,4]. In previous studies it was shown that in Russia the rise in prices for vodka reduces its consumption, but increases the consumption of moonshine [14-16].

Nevertheless, in the history of the state alcohol policy in Russia there are examples of the successful use of excise policy in order to reduce alcohol consumption. In particular, during the last three decades of the 19th century, the level of alcohol sales in the Russian Empire decreased by almost two times, which,

most likely, was a consequence of the increase in the excise tax on vodka [17]. Analysis of the data for this period showed that an increase in the excise tax rate by 1% was accompanied by a decrease in the level of alcohol sales by 0.5%. Moreover, the decline in sales during this period was not accompanied by an increase in the consumption of unregistered alcohol [17].

Over the past decades, the level of affordability of alcohol in Russia has been subject to significant fluctuations [10,12,15]. Dramatic changes in the affordability of alcohol can be viewed as a natural experiment that allows one to study the effect of the availability of alcohol on the level of alcohol consumption. Therefore, the purpose of this work was to study the effect of the affordability of alcohol on the level of its sale, the total level of consumption, as well as the consumption of unrecorded alcohol in Russia in the post-Soviet period.

Materials and methods

A comparative analysis of the dynamics of the affordability of alcohol, the level of its sale, the total level of consumption,



as well as the consumption of unrecorded alcohol in Russia in the period from 1991 to 2015 was carried out. Statistical data are obtained from the annual reports of Rosstat for the corresponding period. The overall level of alcohol consumption was estimated using an indirect method [18].

The affordability of alcohol was defined as the number of litres of vodka that can be purchased for an average monthly salary. It should be noted that a more adequate indicator for assessing the affordability of alcohol is the level of real disposable income of the population. In the present study, the average monthly salary was used as its surrogate, which may be one of the methodological limitations of this work.

Statistical analysis (Spearman's correlations, linear regression) was carried out using the STATISTICA 10 package. The elasticity coefficient was derived from the following equation: $e = y'x (x/y)$, where y – the sale/consumption of alcohol and x – the price of alcohol. Elasticity represents the percentage change in a dependent variable associated with a 1% increase in an independent variable.

Results

In Russia in the period from 1991 to 2015 affordability of alcohol increased 2.5 times (from 24.2 to 60.9 litres), alcohol sale increased by 26.8% (from 5.6 to 7.1 liters), alcohol consumption decreased by 7.4% (from 12.1 to 11.2 liters), the consumption of unrecorded alcohol decreased by 36.7% (from 6.5 to 4.1 liters). The dynamics of the studied indicators in Russia is shown in Figure 1. Graphical evidence indicates that the affordability of alcohol grew linearly during the first decade of the 2000s, after which it began to decline. Alcohol sale after a sharp rise in the first half of the 1990s decreased slightly 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, dropped significantly from 1995 to 1998, increased from 1998 to 2002, decreased from 2002 to 2013, and then began to grow.

A visual analysis of the graphical data suggests that in the period under review, the trends in the level of affordability of alcohol and the total level of its consumption differed significantly. For example, in the period from 2003 to 2011 the overall level of alcohol consumption declined amid a sharp rise in the affordability of alcohol. Trends in the affordability of alcohol and the level of its sale were quite similar throughout most of the period under review. As for the affordability of alcohol and the consumption of unrecorded alcohol, the trends of these indicators in the 2000s were oppositely directed.

According to the results of the correlation analysis the affordability of alcohol is positively correlated with the sale of alcohol ($r = 0.64$; $p < 0.000$), negatively correlated with the total level of alcohol consumption ($r = -0.4$; $p < 0.000$), as well as with consumption of unrecorded alcohol ($r = -0.77$; $p < 0.000$). In addition, the overall level of alcohol consumption is closely correlated with the consumption of unrecorded alcohol ($r = 0.85$; $p < 0.000$). It was also found that the level of alcohol sale is negatively correlated with the consumption of unrecorded alcohol ($r = -0.52$; $p < 0.007$).

The results of Spearman's correlation analysis suggest a strong positive relationship between the affordability of alcohol and alcohol sale. Therefore, a linear regression model was applied in further analysis. The relationship between the affordability of alcohol and alcohol sale can be described by the linear regression equation: $y = 6,5 + 0,03*x$. The results of statistical analysis suggest that a 1% increase in the affordability of alcohol is associated with a 0.18% increase in alcohol sale.

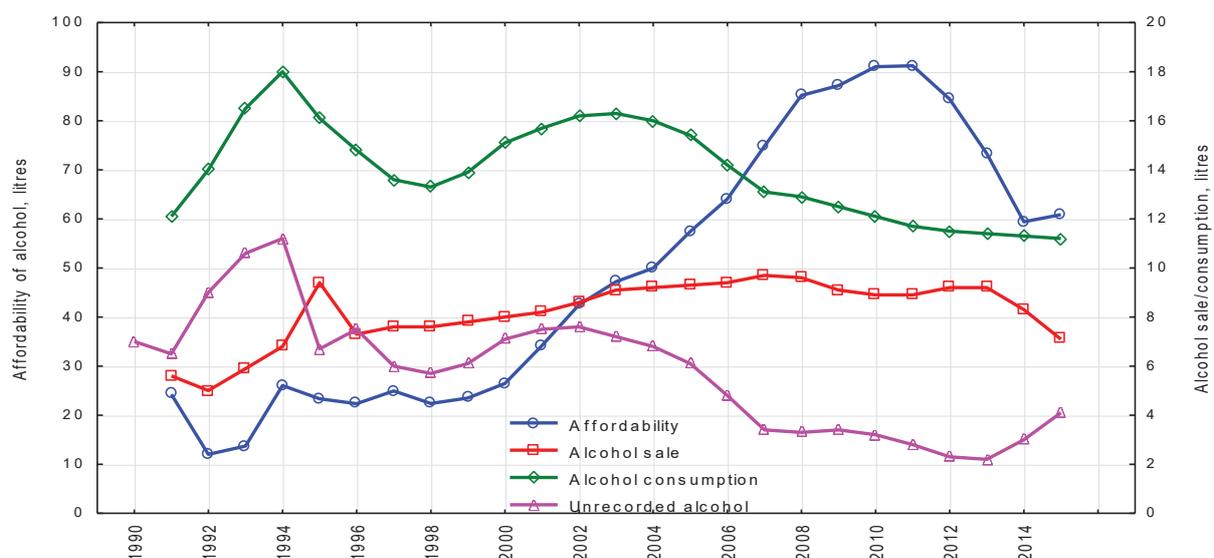


Figure 1: Dynamics of affordability of alcohol, alcohol sales, total level of consumption, consumption of unrecorded alcohol in Russia in the period from 1991 to 2015.



Discussion

The results of the analysis indicate that in Russia the affordability of alcohol is positively correlated with its sale and negatively correlated with the consumption of unrecorded alcohol. In addition, there is a weak negative relationship between the affordability of alcohol and the overall level of alcohol consumption. In general, this research evidence confirms the idea that the affordability of alcohol is one of the factors that determine the level of its sale [13]. These findings reproduce the results of previous studies using Russian data, which showed that an increase in vodka prices leads to an increase in the consumption of moonshine [14].

The relationship between the affordability of alcohol and the overall level of alcohol consumption is not so straightforward, given the changing nature of the relationship between these indicators over different periods of time. It is clear that the main variable affecting the relationship between the affordability of alcohol and the level of its consumption is unrecorded alcohol.

The influence of the affordability of alcohol on the level of consumption of unrecorded alcohol can be traced during periods of sharp changes in the availability of alcohol. A significant decrease in the consumption of unrecorded alcohol was noted during the first decade of the 2000s against the background of a sharp increase in the economic availability of alcohol. In subsequent years, the opposite situation was observed: an increase in the consumption of unregistered alcohol against the background of a decrease in the affordability of alcohol.

In the 2000s the effect of affordability of alcohol on its sale and unrecorded consumption can be described as follows: an increase in affordability is accompanied by an increase in the sale of alcohol and a decrease in unrecorded consumption. The relationship between the sale of alcohol and its unrecorded consumption is reversed when the affordability of alcohol decreases.

It should be noted, however, that the consumption of unrecorded alcohol, in addition to the affordability of alcohol, is determined by a number of other factors. In particular, a sharp increase in the consumption of unrecorded alcohol in the first half of the 1990s could be due to an increase in its physical availability due to the abolition of the state alcohol monopoly [1,14]. In addition, the decrease in the consumption of unrecorded alcohol in the 2000s, to a certain extent, could be due to an increase in the level of income of the population, since it is known that as well-being grows, consumers prefer higher quality and more expensive alcohol [1,16].

The decline in the level of consumption of unrecorded alcohol, which began in 2003, took place against the background of the phased introduction of legislative measures against the illegal production and sale of alcohol [19,20]. The growth in the level of consumption of unrecorded alcohol in the last years could be triggered by the economic crisis, which reduced the income of the population and a decrease in the affordability of licensed alcohol due to the increase in excise taxes [2,8,19].

Conclusion

This study revealed a direct relationship between the affordability of alcohol and the level of its sale, as well as an inverse relationship between the affordability of alcohol and the consumption of unrecorded alcohol in Russia. In general, the obtained data confirm the existing idea that reducing the affordability of alcohol is an effective measure to reduce the level of its sale. However, the existence of a shadow alcohol market does not allow full use of price regulation as an effective means of alcohol policy. Therefore, an important task in the framework of the implementation of the comprehensive alcohol policy is to minimize the shadow alcohol market.

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