Structural model of the shadow market of addictive products in urban and rural settlements of Russian Federation

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Abstract. The problem of shady activity in the markets of addictive goods is in the focus of public attention and authorities, especially in rural areas, where the most used are home-made alcohol and counterfeit alcoholic and alcohol-containing products, the abuse of which causes significant damage to the social and economic development of territories. The specifics of the content and structure of shadow activity in the markets of addictive goods are determined. It is established that the shadow sector is initiated from the supply and demand side, for the assessment of which a methodology has been developed and implemented that includes groups of indicators of unrecorded, informal, hidden economic activity of supply entities and hidden demand for "dual-use" goods. It is shown that the digitization of state regulation of the alcohol market did not reduce the shadow sector, but led to a change in its structure. To reduce consumption of goods "dual use" is recommended to control the movement of raw materials for the production of alcohol-containing liquids, turn to potentially addictive goods components, precluding their use for destructive purpose, pharmacies alcohol-containing medications in prescription and limit vacation "in one hand", enter the time limit sales, to introduce excise duties on alcohol-containing products of medical appointment at the level of the vodka excise taxes. International and domestic standards for measuring the informal economy need to expand the scope of economic transactions related to the consumption of goods for other purposes.

1. Introduction

Based on the legal prohibitions of addictive goods in Russia, energy drinks are allowed for production, turnover, sale and mass consumption, and the production, turnover and sale of alcoholic and alcohol-containing products, tobacco products, electronic cigarettes, and narcotic drugs are restricted and controlled.

In the markets of addictive goods [1-2], numerous forms of "failures" of the market system are particularly clearly manifested, the reproduction of which is carried out in the shadow sector.

Therefore, the problem of shadow activity in the markets of addictive goods is under constant
attention of the public and lawmakers [3-6]. This issue is particularly relevant for rural areas, where moonshine and counterfeit alcoholic and alcohol-containing products are the most used, and their abuse causes significant damage to the social and economic development of the territories [7-9]. The content and structure of the shadow market for addictive goods are specific in urban and rural areas.

2. Materials and methods
The research methodology includes the following stages:

- determining the specifics of the content and structure of shadow activities in the markets of addictive goods;
- formation of indicators for evaluating segments of the shadow market of addictive goods;
- development of an approach for assessing shadow activity in the industrial alcohol production sector;
- assessment of the impact of digitalization of state regulation on the functioning, structure and level of the shadow market of alcoholic beverages;
- development of measures to reduce the shadow sector.

The assessment of the level of shadow activity in the industrial alcohol production sector was carried out by calculating the effective excise rate for strong alcohol products (EERab) [10]:

\[ EER_{ab} = \frac{GIF}{RS} \times C_{aa} \] (1)

where GIF gross receipt of excise taxes from strong alcoholic beverages, RS retail sale of alcoholic beverages, C\textsubscript{aa} for the conversion rate to absolute alcohol.

Information and the empirical base of the research includes the official data and estimates of the Ministry of Finance, Ministry of internal Affairs of the Russian Federation, the Ministry of health of Russia, Federal state statistics service, Federal tax service, Federal service for alcohol market regulation, the All-Russian centre of studying of public opinion, Research holding «ROMIR», experts and author's calculations.

3. Results
The approaches presented in economics to the study of the formation, structure, and causes of shadow forms of economic activity are based on the fact that the shadow economy is initiated from the supply side of goods. Definitions and analysis of various forms of the shadow economy are usually focused on the economic system and organized crime [11-13]. At the same time, in the markets of addictive goods, the shadow sector is formed both on the supply side and on the demand side. A significant portion of consumers of addictive goods satisfy their destructive needs with legal "dual-use" goods or surrogates. Their range includes: pharmacy tinctures and medical alcohol-containing liquids, perfumes and cosmetics (lotions, colognes, bath products and concentrates, etc.), confectionery alcohol-containing products (food additives, flavorings, etc.), technical and household alcohol-containing products (solvents, disinfectants, detergents, fresheners, non-freezers, etc.) and other alcohol-containing food and non-food liquids.

Four types of transactions occur in the course of interaction between supply and demand entities. For example, the subject of the offer sells an alcohol-containing food additive, an antiseptic to meet the design needs to improve the taste characteristics of prepared dishes, and to treat wounds. The subject of demand can use them for the main constructive purpose – in confectionery production, medicine (type I – constructive-constructive transaction), and can consume them for an additional destructive purpose – to satisfy the addictive need for intoxication (type II – destructive-constructive transaction). But there may be a different situation. For example, the subject of the offer sells vodka to
satisfy a destructive need for intoxication. The subject of demand can use it for the main destructive purpose – purposefully satisfy an addictive need (type III-destructive-destructive transaction), and can use it for an additional constructive purpose – rubbing at high temperature, ear treatment, etc. (type IV – constructive-destructive transaction).

Unintentionally substituting and hiding the purpose of consumption of "dual-use" goods (II, IV type of transactions), the subjects of demand form an unobservable segment of the shadow economy. For example, according to Rosstat, the sale of alcoholic beverages in absolute alcohol per adult population in 2015 was 6.8 liters [14]. This grossly underestimated estimate of alcohol consumption is the subject of social manipulation and self-promotion by various government agencies. At the same time, according to expert estimates, the consumption of addictive "dual-use" goods to meet destructive needs when evaluating the effectiveness of government regulation reduces the relevance of conclusions, since the total destructive consumption is underestimated. In this regard, there are institutional pitfalls: assessment and forecasting and monitoring.

The unobservable economy includes part of the legal informal economy, which for various reasons is not subject to systematic registration by official statistical agencies, hidden consumption of "dual-use" goods, and all shadow economic activity.

The unobservable economy in the markets for addictive goods includes:
1. Indicators of unrecorded economic activity due to imperfect statistical observation (production of beer by mini-Breweries for restaurant purposes, distribution of tobacco mixtures of their own manufacture for hookahs).

2. Indicators of informal activities:
   - activities of unincorporated enterprises working for their own needs (production of natural fruit or grape wine from their own raw materials, etc.);
   - activities of unincorporated enterprises with informal employment (secondary employment);
   - household activities (moonshine making, preparation of "home-made" wine, beer, tinctures, tobacco growing, etc., both for their own consumption and exchange, use as in-kind payment for labor).

3. Indicators of hidden economic activity of the subjects of the offer:
   - activities concealed by official producers or distributors of addictive goods for the purpose of tax evasion (hidden or second economy), when performing foreign trade operations in order to recover indirect taxes (fictitious economy);
   - illegal production of alcoholic and alcohol-containing products (also turnover, storage, retail sale, etc.), medicinal drugs (underground economy);
   - production, turnover, storage and retail sale of alcoholic and alcohol-containing products without marking, marked with fake Federal special and excise stamps, according to fictitious documents confirming the legality of product turnover, with fake seals and stamps, etc. (underground, fictitious economy);
   - production of addictive goods using a fake trademark;
   - violation of the accounting procedure, conditions stipulated by a special permit( license), deadlines for submitting a Declaration and distortion of data on the volume of production and turnover of ethyl alcohol, alcoholic and alcohol-containing products;
   - production and distribution of drugs (black, criminal economy).

4. Indicators of latent demand for the goods of "dual use":
production, turnover and retail sale of legal "dual-use" goods (intended primarily for constructive purposes) actually purchased to meet destructive needs (alcohol-containing food and non-food liquids, medicinal drugs, etc.).

Traditionally, in rural areas, the shadow segment of alcoholic beverages is formed by households that produce moonshine for their own consumption and barter. Cities have developed consumption of alcohol-containing "dual-use" products and industrially produced alcohol without paying excise duty.

A reflection of the existence of an unaccounted market for strong alcohol products is the statistics of offenses related to the turnover of alcohol products unmarked or marked with counterfeit special or excise stamps.

| Table 1. Results of inspections of alcohol and alcohol industry organizations. |
|---------------------------------|-----------------|-----------------|-----------------|
| Offences                        | 2010-2014 on average | 2015-2019 on average | 2015-2019 in % to 2010-2014 |
| Total                           | 7971,2           | 7614,4           | 96              |
| including:                      |                  |                  |                 |
| no license                      | 79               | 103,4            | 131             |
| non-compliance with minimum prices | 231,2           | 314,8            | 136             |
| violation of trading rules      | 158              | 258,2            | 163             |
| violation of accounting procedures | 227,6           | 1412             | 620             |
| violations of license conditions | 1362             | 637,6            | 47              |
| violation of terms of provision | 3714,8           | 2520,2           | 68              |
| the production and turnover of products | 34,8           | 319,4            | 918             |
| the turnover of products        | 516              | 553,8            | 107             |
| other                           | 1647,8           | 1495             | 91              |

In 2015-2019, compared to 2010-2014, the number of offenses related to conducting activities without licenses increased by 31%, with the production and turnover of products with counterfeit brands by 7% and without stamps by 9 times.

Legal activities without a license by households for their own consumption that do not pay taxes (the informal sector of the economy) are also unaccounted for. According to some estimates, the volume of home brew is 25-30 million DCL per year [14].

The hidden demand for "dual-use" goods or alcohol surrogates is growing steadily by almost 20% per year, according to Rosalokolregulirovaniya estimates [14]. Their consumption according to various estimates made in 2013-2015 was 20-25 million DCL per year. According to the Center for research of Federal and regional alcohol markets, in 2016, 55-67 million DCL of pharmacy tinctures and alcohol-containing dual-use liquids were sold [14].

The digital revolution has provided new methods and tools for regulating the markets of addictive goods (EGAIS, Declaration, registration of licenses, movement of motor vehicles, electronic passports of organizations, etc.). The Introduction of information technologies in the regulation of alcohol markets actively began in 2006. These measures are aimed at regulating the supply of alcohol products and reducing shadow activity. From the point of view of business, there is a positive dynamics of the following indicators: the profitability of alcohol production increased from 12% on average in 2002-2006 to 17 % in 2012-2016; the share of profitable organizations increased from 49 % to 69 %; the number of offenses in the sphere of legality of production and turnover of ethyl alcohol and alcoholic
products decreased from 299,712 units to 115,239 units. The level of utilization of production
capacities for vodka production decreased from 32% on average in 2002-2006 to 26 % in 2012-2016.

**Table 2.** Indicators of the socio-economic state and development of the Russian alcohol market.

| Indicators                                                                 | On average 2002-2006 | On average 2012-2016 | 2012-2016 in % to 2002-2006 |
|---------------------------------------------------------------------------|----------------------|----------------------|-----------------------------|
| **From a business perspective**                                           |                      |                      |                             |
| Return on sales, %                                                        | 12                   | 17                   | 136                         |
| Share of profitable enterprises, %                                        | 49                   | 69                   | 139                         |
| Capacity utilization, %                                                   | 32                   | 26                   | 83                          |
| Violations in the sphere of production and turnover of ethyl alcohol and alcoholic products, units | 299,712              | 115,239              | 38                          |
| **From the consumer's point of view**                                    |                      |                      |                             |
| The proper quality of domestic vodka and distillery products has been established, % | 92                   | 97                   | 105                         |
| **From the position of the state**                                        |                      |                      |                             |
| The retail sale of strong alcoholic beverages, million decaliters         | 216                  | 130                  | 60                          |
| Legal activity (based on excise taxes paid), million dkl                  | 94                   | 81                   | 87                          |
| Crime under the influence of alcohol, units                               | 311,228              | 370,067              | 119                         |
| Deaths from accidental alcohol poisoning, thousand people                | 41                   | 15                   | 36                          |
| Deaths from alcohol-related causes, people                               | 97,280               | 56,149               | 58                          |
| Incidence of alcoholism and alcohol psychosis with the first established diagnosis, people: |
| in total (thousands)                                                     | 214                  | 109                  | 51                          |
| on 100 thousands populations                                             | 149                  | 75                   | 50                          |
| The number of patients with alcoholism and alcohol psychosis registered in medical institutions: |
| in total (thousands)                                                     | 2,192                | 1,653                | 75                          |
| on 100 thousands populations                                             | 1,533                | 1,139                | 74                          |

The quality of domestic vodka and distillery products improved by 5 % from 92 % on average in 2002-2006 to 97 % in 2012-2016.
Registered retail sales of alcoholic beverages decreased by 40% from 216 million dkl per year on average in 2002-2006 to 130 million DCL in 2012-2016. This trend deserves a positive assessment. However, in the sphere of accounting for the capacity of the alcohol market, the influence of institutional traps (estimated, forecast and monitoring) is great. The decline in retail sales of strong alcoholic beverages is largely due to the tightening of the mapping data provided by manufacturers, distributors and retailers the subjects in the reports: the first stage inclusion in USAIS the production of alcoholic beverages (2006); at the second stage – exhaustive statistics of retail sales (2007), the third – a single procedure for the Declaration of retail sale throughout the territory of the Russian Federation (2012), the fourth – inclusion in USAIS the wholesale and retail segment (2015-2016). The convergence of the volumes declared by all participants in production and circulation occurs by displacing” excise-exempt alcoholic products into the unaccounted retail sector of home-made products, medical, food and non-food alcohol-containing liquids of "dual-use", the consumption of which is not recorded to meet destructive needs.

Legal activity, based on excise taxes paid, decreased by 13%, respectively, from 94 million DCL to 81 million DCL, which is negative from the point of view of the budget. At the same time, from 1998 to 2019 in Russia, the effective excise tax rate that the consumer is able to pay is more than 2 times lower than the current rate, so the level of shadow activity only in the industrial production of alcoholic beverages is over 50%.

On the background of reducing the consumption of industrial alcohol produced marked improvement in social indicators since decreased: mortality from accidental alcohol poisoning at 64% and from causes related to alcohol consumption by 42%; the morbidity of population with alcoholism and alcoholic psychoses, taken under the supervision diagnosed in 2 times; the number of patients with alcoholism and alcoholic psychoses, consisting on the account in medical institutions by 25%. However, the number of crimes committed by persons under the influence of alcohol increased by 19%. Digitalization of state regulation did not ensure the reduction of the shadow sector in the alcohol market.

4. Conclusion
The structural model and assessment of the shadow sector adapted to the markets of addictive goods should include groups of indicators: unrecorded; informal; hidden economic activity of supply entities; hidden demand for "dual-use" goods. Only a comprehensive accounting of all segments will allow you to get a correct assessment of the level of shadow activity and consumption of addictive goods, since there is a constant change in the structure of the shadow market under the influence of institutional conditions. Practical measures to transform the demand-side shadow market of addictive goods into socially and economically acceptable forms may include: control over raw materials for the production of "dual-use" liquids; adding components to potentially addictive goods that exclude their use for destructive purposes; selling them by prescription; restrictions on "one-hand" sales; limiting the time of sale; introducing excise taxes on alcohol-containing medical products at the level of vodka excise taxes, etc. International and domestic standards for measuring the informal economy need to expand the scope of economic transactions related to the consumption of goods for other purposes. Digitalization of the state regulation of the alcohol market did not ensure the reduction of the shadow sector, but led to a change in the structure of the shadow market itself by replacing "excise-exempt" alcohol products in the unaccounted retail sector of home-made products, medical, food and non-food alcohol-containing liquids "dual-use".

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