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Changes in Out-of-Home Food and Alcohol Expenditure during the COVID-19 Pandemic[1]

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This study investigates changes in the expenditure on out-of-home food and alcohol during the COVID-19 pandemic. Our research specifically explores intergroup variations among households, taking into account the dissimilarity of Russian regions in light of the degree of quarantine restrictions enforced. To test the research hypotheses, we use microdata from the Household Budget Survey conducted by the Federal State Statistics Service. To compare the expenditures on out-of-home food and alcohol in regions with soft, medium, and hard restrictive measures, we employ t-test for comparing means and the Kolmogorov – Smirnov test for comparing distributions. The Tobit model is applied to compare different social groups' household spending habits. The joint analysis of out-of-home food and alcohol expenditure enables the separation of involuntary savings from coping strategies using models for censored data, thereby facilitating an in-depth assessment of household well-being in the face of shocks. Our findings show a reduction in out-of-home food expenditure across all social groups and all levels of quarantine restrictions. The share of alcohol expenditure decreased in almost all social groups in regions with soft measures but significantly increased in those with medium and hard restrictions.

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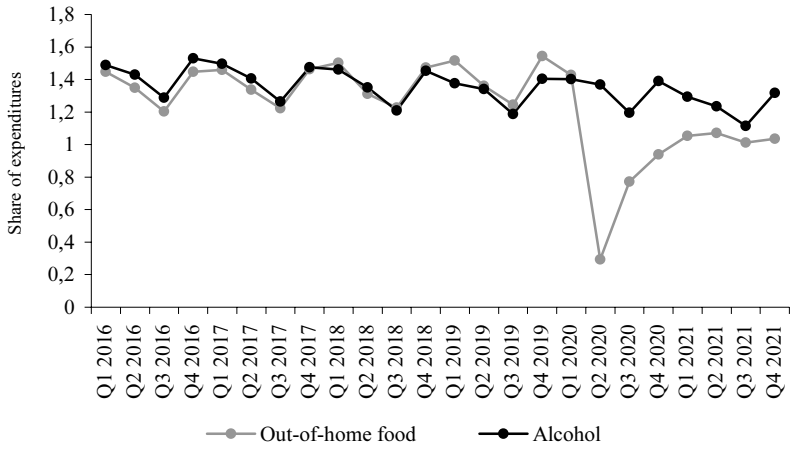
1. Introduction

Households are the economic agents most sensitive to external shocks. Numerous studies have estimated the effect of crises on households' living standards, inequality, and aggregate consumption [Alonso, Rodríguez, Rojo, 2015; Blundell et al., 2022]. The natural response to economic uncertainty and political crises is a decline in aggregate consumption, which has been the subject of numerous papers [Gautier, Ulgazi, Vertier, 2020; Grigoryev et al., 2021]. Concurrently, household responses may vary across categories of expenditures and their socio-economic characteristics.

[Barigozzi et al., 2012] note that the distribution of household expenditure is stable over time but varies across expenditure categories. In this study, we investigate the impact of the COVID-19 pandemic on two of the most elastic categories of household expenditure[2]: out-of-home food and alcohol. The study of these expenditure categories is of particular interest in the context of the COVID-19 pandemic for several reasons. *First*, before the pandemic crisis, the shares of these expenditure categories in the structure of household consumption were relatively equal, whereas during the pandemic, the dynamics of expenditure on these categories changed significantly. Figure 1 displays the proportion (in %) of out-of-home food and alcohol spending in overall household expenditures. Changes in the spending patterns on out-of-home food and alcohol expenditures, precipitated by quarantine restrictions, appear to serve as an indicator of social well-being and long-term shifts in lifestyle patterns, rather than an indicator of household welfare. The observed changes in out-of-home food expenditure may be indicative of shifts in daily practices, such as transitioning to remote work arrangements, modifying dietary habits, or avoiding public places. The increase in alcohol expenditures, on the other hand, may be a consequence of heightened stress levels and maladaptation. Despite their relatively modest contribution to the overall consumption structure, these changes offer insight into the mechanisms by which households adapt to extreme conditions. *Second*, in the context of the impact of the COVID-19 pandemic on alcohol consumption, two opposing trends can be observed: an increase in alcohol consumption due to stress and a decrease in alcohol consumption due to freeing up time for sport (see Section 2.2). This study is of particular significance in the context of Russia, where the proportion of heavy drinkers is high. In 2020, the prevalence of heavy drinking in Russia was 20% of the total number of people who consume alcohol [Antonov, 2024]. *Third*, the nature of the pandemic had a direct impact on out-of-home food expenditures due to the imposition of restrictions on movement. In this context, the response of households to such restrictions

[2] Federal State Statistics Service methodology defines the household consumption structure as comprising five groups of expenditures: food at home, food outside the home, alcohol, non-food items, and services. It should be noted that statistics on smaller expenditure groups, such as tobacco, are not kept.

is particularly worthy of examination, as compliance with the restrictions was predetermined by attitudes towards the pandemic [Sobol, Blachnio, Przepiorka, 2020]. Furthermore, it is crucial to examine the evolution of consumption patterns across diverse household groups. The estimation of the effects on different social groups has the potential to improve crisis planning and strengthen regional support measures (both financial and psychological), especially in household groups where alcohol expenditure increases *Fourthly,* despite its modest share in the structure of household consumption, expenditures on out-of-home food and alcohol have a decisive role in catering and trade. In February 2020[3], approximately 20 per cent of all small and medium-sized enterprises (SMEs) were engaged in retail and restaurant activities. Consequently, even minor reductions in household expenditure on the categories under study have the potential to adversely affect the revenues and employment of small firms, thereby hindering economic development and the recovery after COVID-19.



Note: Graph compiled from household level data from a sample household survey conducted by [Federal State Statistics Service, 2022].

Fig 1. Percentage of consumer spending on food outside the home and alcohol

We observe similar dynamics in the share of consumer spending on out-of-home food and alcohol, which fluctuate between 1.2% and 1.6% and follow seasonal patterns. The dynamics diverge during the COVID-19 pandemic's acute phase when the share of expenditure on eating out dramatically drops in the second quarter of 2020 compared to the first quarter of 2020 due to restrictive measures. Conversely, the share of expenditure on alcohol slightly declines from 1.40% in the first quarter of 2020, to 1.37% in the second quarter of 2020. This finding contradicts previous empirical research which suggests a rise in alcohol consumption during COVID-19 lockdowns [Jacob et al., 2021; Schmits, Glowacz, 2022].

The motivation for this paper is fourfold. *First*, the reaction to external shocks varies across diverse social and demographic groups [Abebe, Charlebois, Music, 2022]. During the pandemic, this may be attributed to households' diverse adaptability levels: younger households appear

[3] Unified register of small and medium-sized enterprises. (https://rmsp.nalog.ru/statistics.html)

to be more receptive towards delivery services and online buying as compared to their older counterparts. According to [Abebe, Charlebois, Music, 2022], an increase in educational attainment results in a greater willingness by households to use delivery services. Low-income households tend to consume their meals at home, while wealthy households often indulge in dining out. To address the varied responses of households to external shocks, we categorise them into groups based on their income, education level, and number of children.

Second, the delineation of social groups is unclear in the literature, creating ambiguity in identifying wealthy or impoverished households, high- or low-educated households, and those with few or many children. Nevertheless, household typification is a crucial element in accurately assessing the impact of external shocks on a specific group of households [Rausch, Metcalf, Reilly, 2011]. The present paper categorizes various studies and methodologies used to define household groups. Our approach to dividing households within Russian regions is modified on the basis of these frameworks (see Section 4).

Third, the COVID-19 pandemic distinguishes itself from the global financial crisis and local economic crisis of 2014 (sanction crisis) in its impact on crisis-affected regions and the economy [Kolomak, 2020]. Therefore, quantifying the impact of these crises using dummy variables requires improvement.

Fourth, one of the defining characteristics of the COVID-19 pandemic is the implementation of varying degrees of quarantine regulations. The impact of quarantine measures on household consumption has been found to vary depending on the severity of the quarantine measures [Chen, Li, Li, 2024; Yukseltan et al., 2022]. Similarly, [Baker et al., 2020] indicate that the greatest decline in consumer spending was observed among households with children and low-income groups. The frequency of the emergence of new viruses[4] and the evolution of existing ones also provide further motivation to explore the potential consequences of quarantine restrictions. Given the potential for the re-imposition of quarantine restrictions, we conduct a detailed examination of the response of households to the quarantine measures introduced during the COVD-19 pandemic. To analyse the impact of COVID-19, we utilise a measure of the strictness of quarantine restrictions, which distinguishes between regions with soft, medium, and hard restrictions. A distinctive feature of this paper is the examination of quarantine restrictions over time. Our methodology considers changes in pandemic policies across regions over time, as regions may shift between levels of restrictions. Therefore, the *purpose* of the study is to examine the impact of the COVID-19 pandemic on share of expenditures on out-of-home food and alcohol across different social groups of households in Russian regions.

This paper addresses gaps in the current literature as follows. *First*, it distinguishes various types of regions according to the level of quarantine restrictions imposed, categorising them as soft, medium, or hard. We adopt a dynamic methodology to classify each region under the specified quarantine levels. *Second*, we consider inter-group differentiation of households by identifying social groups based on income level, education level, and the number of children in the household. This paper differs from previous studies in that it employs a number of modifications of existing approaches to categorise households, taking into account the specifics of the Russian households. *Third*, we compare changes in the shares of expenditure on out-of-home food and alcohol, which have been the focus of a small body of literature.

[4] To illustrate, in the autumn of 2024, the World Health Organisation (WHO) declared a lethal outbreak of the Marburg virus in Rwanda. (https://www.who.int/emergencies/disease-outbreak-news/item/2024-DON537)

The paper is organised as follows: Section 2 analyses the literature on the impact of the pandemic on out-of-home food and alcohol expenditures. This section is also devoted to theoretical background and hypotheses. Section 3 describes the data and the empirical estimation framework. Section 4 is devoted to describing the approach used to divide Russian households according to education, income, and number of children, which are described and justified. This section also outlines the household profile contingent on the group. Section 5 provides empirical results on the impact of the COVID-19 pandemic on out-of-home food and alcohol for different household groups. Finally, Section 6 provides the hypothesis testing results and the conclusions of the study.

2. Literature Review

2.1. The impact of COVID-19 on household expenditures

There is extensive literature exploring the effects of the pandemic on household expenditures on out-of-home food worldwide. According to [Grigoryev et al., 2021], consumer services, which encompass cafés and restaurants, were most affected by the extensive quarantine restrictions implemented globally. [Chen, Qian, Wen, 2021] show that quarantine restrictions significantly changed the consumption basket of Chinese households. For instance, expenditure on restaurants decreased by 64–72% in 2020 compared to 2019, resulting in an overall consumption decline of 14–69% depending on the city. Similarly, [Gautier, Ulgazi, Vertier, 2020] report a 70–90% decrease during the acute phase of pandemic, compared to the previous year in expenditure on transport and out-of-home food in France. An important limitation of these studies is the concentration on national-level analyses. These papers consider households as a homogenous unit, whereas their composition is highly heterogeneous. A limited number of studies have examined intergroup disparities in response to the pandemic. For instance, research conducted in the United States suggests that there has been a decline in out-of-home food expenditure, ranging from 19.5% to 33.7%, depending on the household group [Dhakal, Acharya, Wang, 2022]. In this context, the present study addresses the literature gap by evaluating how the COVID-19 pandemic affected expenditures on out-of-home food and alcohol in Russia for different household types.

There is a large body of medical research related to alcohol consumption during the COVID-19 pandemic [Jacob et al., 2021; Marano et al.; 2022; Schmits, Glowacz, 2022]. According to the literature, two contrasting views have emerged about the effect of the pandemic regarding alcohol consumption. The first view suggests that individuals employ alcohol as a coping mechanism during these challenging times [Avery et al., 2020; Rahman et al., 2020]. The authors note that continuously staying at home and sudden changes in habits led to heightened stress levels, resulting in increased alcohol consumption. As demonstrated by [Anderson et al., 2022], a considerable escalation in alcohol expenditure was observed during periods of pub closures, notably among the most deprived households. In this context, it can be anticipated that a reduction in the stringency of quarantine restrictions may result in a decline in both alcohol consumption and alcohol expenditure. A contrasting viewpoint suggests that increased time for sports and physical activity at home has led to a reduction in alcohol consumption [Ammar et al., 2020; Pišot et al., 2020]. The authors document that individuals who exercise periodically commenced the activity due to the increased free time resulting from the elimination of commuting to work. As posited by [Acharya, Dhakal, 2022] the repercussions of the pandemic have been shown to vary across

different socioeconomic demographics. The research utilised data pertaining to American households and showed that low-income households exhibited a decrease in expenditure on alcohol, whilst high-income households demonstrated an increase in this category. The ambiguity inherent in these empirical findings serves as an impetus for the employment of theoretical models and the formulation of our hypotheses.

2.2. Theoretical background and hypotheses statement

The theoretical framework of this study is predicated on several fundamental theories and concepts, including the theory of the allocation of time [Becker, 1965], mental accounting [Thaler, 1985], human capital theory [Becker, 2009], and stress and coping [Lazarus, 1984]. The consumer choice theory [Becker, 1965; Thaler, 1985], sheds light on the response of the most elastic categories of goods and services in response to external shocks. [Becker, 1965] underscores the significance of incorporating the time spent on consumption (indirect cost) in addition to the price (direct cost). Consequently, the decline in out-of-home food expenditure can be explained in terms of increased opportunity costs, as during lockdowns, additional time was required to visit a public establishment. In this context, the consumption behaviour of household groups with reduced mobility (e.g. families with children) is of particular interest. [Thaler, 1985] concept of mental accounting involves the categorisation of consumer expenditure into specific groups ("food", "entertainment", etc.). In such circumstances, households may opt to reduce expenditure categories they deem less pressing, particularly in the face of external shocks. In essence, the theory propounded by [Thaler, 1985], posits that households subjected to the pandemic may choose to spend less on "luxury" categories, such as out-of-home food and alcohol, from their consumption.

It is evident that quarantine restrictions engender considerable stress due to the disruption of routines, the curtailing of social interactions, and the limitation of personal autonomy. In response to such challenges, [Lazarus, 1984] delineated two coping strategies: emotion-focused, which entails the assessment of emotional responses, and problem-focused, which involves the identification of stressors. Given the ineffectiveness of an individual's influence on the trajectory of the pandemic, it is plausible that individuals have resorted to alcohol consumption as a coping mechanism. The use of alcohol as a coping mechanism in response to uncertainty has been demonstrated to reduce anxiety [Avery et al., 2020; Rahman et al., 2020]. However, empirical evidence suggests heterogeneity in the response of households to stress, with variations observed across different income groups [Acharya, Dhakal, 2022; Anderson et al., 2022].

The theory of human capital [Becker, 2009] underscores the pivotal function of education in shaping consumer spending patterns. The fundamental premise of this theory posits that education enhances rational decision-making by fostering heightened awareness of the long-term implications of consumption decisions. This notion finds particular relevance in the context of alcohol, given its inherent addictive nature. Empirical evidence indicates that households with higher levels of education exhibit a reduced propensity for alcohol consumption, attributable to heightened awareness of its adverse health implications [Cutler, Lleras-Muney, 2010; Yen, Jensen, 1996]. In light of the empirical and theoretical background, the present study aims to test the following hypotheses.

Hypothesis 1: In regions with severe and medium quarantine restrictions, the decrease in the share of expenditure on out-of-home food is higher among households with children compared to households without children.

Hypothesis 2: The increase in the share of expenditure on alcohol in regions influenced by strict and medium quarantine restrictions is inherent only to low-income groups of households.

Hypothesis 3. Regardless of the severity of quarantine restrictions, households with higher levels of education have a lower share of alcohol expenditure compared to less educated households.

3. Data and Empirical Setup

3.1. Data

To examine changes in consumer spending on out-of-home food and alcohol during the pandemic, we use data from the household budget survey (HBS) conducted by [Federal State Statistics Service, 2022]. The data include social and financial data on households, including the income level, educational attainment, and the number of children. The dataset comprises 576,200 observations recorded from Q1 2019 to Q4 2021, cleaned from statistical outliers[5]. The number of households surveyed is subject to change annually and within the year. As a replacement for a dropped-out household, a new one is introduced with the same identification number. Basically, this is a cross-sectional sample with rotating households, the frequency of measurement is one quarter. Hence, it is unfeasible to classify households utilising singular identification codes, and neither is it possible to ascertain the overall number of households partaking in the survey, segregated by quarter[6].

A distinctive attribute of HBS is the integration of in-person interviews and diary (and logbooks) monitoring by households. Information pertaining to a range of social characteristics (e.g., household size, place of residence, housing area) is obtained through both methods. Data on household income and expenditure is collected via the diary (and logbooks) records. Expenditure on specific categories (e.g., out-of-home food[7], alcohol) is documented in the designated sections of the household diary. It is important to note that food purchased by delivery from catering establishments is not included in the expenditure on out-of-home food. Cash income received, financial assets, and savings are also entered into the household diary. Household diaries are kept for a quarter and a household survey is conducted at the end of the quarterly cycle. After completing one cycle, a household can either drop out of the survey or remain in the survey. Thus, variable generation occurs both through the survey and through diary entries. Table 1 provides a detailed description of the variables used in the survey analysis.

The Federal State Statistics Service methodology delineates five groups of expenditures within the consumption pattern: food at home, out-of-home food, alcohol, non-food items, and services. This paper focuses on food outside the home and alcohol for several reasons. *First*, despite the evident distinction between these expenditure categories (alcohol is an addictive good, while eating out can be regarded as a luxury item), studying them reveals the heterogeneity of household responses to external shocks. Consequently, fluctuations in alcohol expenditure may signify the utilisation of coping mechanisms in response to stress, while changes in out-of-home food expenditure may denote a pragmatic reallocation of resources. The joint analysis of these

[5] Specifically, households with per capita household income below 1,000 rubles and above 400,000 rubles.

[6] According to Rosstat, between 48,000 and 49,000 households are surveyed annually.

[7] Only expenses in restaurants, cafes, canteens are included in this category.

two expenditure categories enables the distinction between the effects of enforced savings and the employment of coping strategies, thereby providing a comprehensive assessment of the economic and social well-being of households. *Second*, the response of all categories of household expenditures has been studied [Voytenkov, Demidova, 2023], indicating the need for separate analyses of expenditures on out-of-home food and alcohol with the application of improved methodological tools. *Third*, given the large number of zero values in the expenditures on out-of-home food and alcohol, an approach involving the use of a model that takes into account censored data is applied. Consequently, in contrast to the other expenditure categories (food at home, non-food items, services), a methodological rationale exists for the combination of expenditure on out-of-home food and alcohol.

Table 1.

Variables description

Variable	Description	Unit of measurement/interpretation
	Dependent variables	
Food out of home	Out-of-home food expenditure in total consumer spending	%
Alcohol	Alcoholic beverages expenditures in total consumer spending	%
	Independent variables	
City (X_1)	Type of locality	0 – rural, 1 – urban
Children 4-16 (X_2)	Number of children aged 4 to 16	Persons
Children under 3 (X_3)	Number of children under 3	Persons
Income (X_4)	Real income per household member, adjusted to 2016 prices and fixed set of consumer goods and services as a percentage of the national average cost[8]	Ruble
Assets (X_5)	Growth of financial assets as a percentage of income	%
Savings (X_6)	Savings as a percentage of income	%
Average age (X_7)	Average age of household members	Years
Education level (edu_k)	Maximal value of education level of household members	Scores: 1 – no basic general education 2 – basic general education 3 – secondary general education 4 – secondary vocational education 5 – higher vocational education
Housing area (X_8)	Housing area per household member	Square metres

[8] Real incomes are calculated as nominal incomes deflated by chained consumer price indices (CPI) for the period 2016–2021. Regional differences in the cost of living are then adjusted by calculating the ratio to the cost of a fixed set of consumer goods and services as a percentage of the national average cost. This indicator is calculated for each Russian region. Data on CPI and the cost of the basket are obtained from the Statistical publications titled "Regions of Russia" issued by the Russian Federal State Statistics Service (Rosstat).

Continuation

Variable	Description	Unit of measurement/interpretation
Variables, capturing the impact of COVID-19 crisis		
Dummy 2020	Dummy variable for the 2020 year	1 – values for the 2020 0 – otherwise
Isolation hard	Dummy variable reflecting the introduction of severe restrictive measures	1 – strict quarantine restrictions are introduced 0 – otherwise
Isolation hard	Dummy variable reflecting the introduction of soft restrictive measures	1 – soft quarantine restrictions are introduced 0 – otherwise

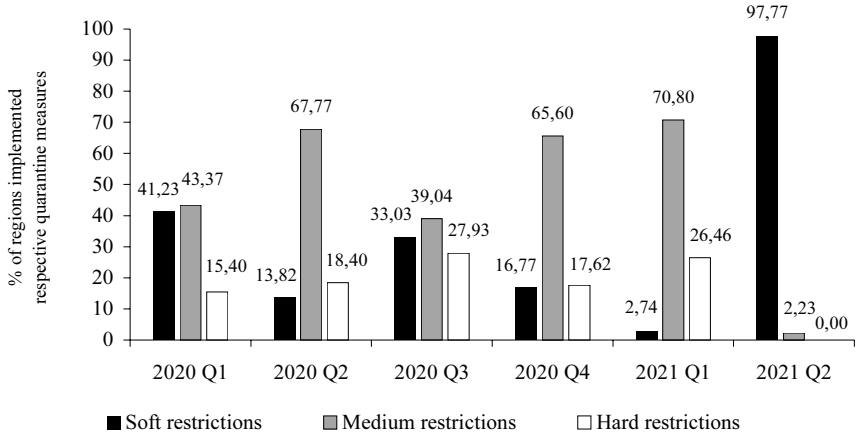
Note: Econometric modelling uses household income per capita in 2016 prices, in rubles. All variables denoted as independent are included in the regression models.

To control for household heterogeneity during the COVID-19 pandemic, we use a broad set of social and financial household characteristics. For example, as [Janssen et al., 2021] indicate, differences in consumption were also associated with socio-demographic factors, including income level and household composition. Similarly, [Xiong et al., 2021] documents the importance of family composition, as well as the age of household members, in determining consumption patterns. To illustrate, families with children have particular requirements for non-food items (toys, clothing, educational materials). Similarly, the level of education is identified as a predictor of consumer spending in the literature, as evidenced by [Maniriho et al., 2021; Soberon-Ferrer, Dardis, 1991; Varlamova, Larionova, 2015; Yen, Jensen, 1996]. In the context of consumption, education appears to serve as a proxy variable for preferences that are not directly observable. For instance, individuals with a higher level of education may exercise greater caution in their selection of goods and may also endeavour to gain insight into other cultures, which is also reflected in their consumption patterns. Furthermore, the social connections of those with higher levels of education may also be reflected in expenditure on alcohol (based on recommendations from social circles) and dining out (spending time in cafés and restaurants). In examining the financial characteristics of the household, we consider income, and savings characteristics. Income is widely regarded as the most significant predictor of consumer expenditure [Edelstein, Kilian, 2009]. [Verter, Osakwe, 2014] highlight the pivotal role of savings characteristics in shaping household consumption patterns.

To examine the effects of the pandemic, we apply a range of dummy variables, ensuring a comprehensive coverage of its impact. The St. Petersburg Policy Foundation's methodology is employed to distinguish among regions with varying degrees of quarantine restrictions [Petersburg Policy Foundation St., 2020]. This methodology for assessing the stringency of quarantine restrictions has been employed in a number of studies [Lukashina, 2020; Seliverstov et al., 2021; Voytenkov, Demidova, 2023]. As the most severe levels of quarantine measures, restrictions were imposed on visiting tourist attractions, prohibiting the operation of entertainment establishments at night, and restricting mass events. In terms of vaccination, it was mandatory for some categories of citizens. In regions with medium restrictions, vaccination was not mandatory. However, some measures were in place at the level of regions with severe restrictions. These included restrictions on the operation of catering establishments at night, as well as on

groups of the population for whom self-isolation was mandatory, and a prohibition on mass events. In regions with soft quarantine restrictions, there were no mandatory vaccination requirements, restrictions on movement, or the operation of public catering enterprises.

We adopt a flexible system for determining regional quarantine restrictions, in which regions could shift from one category to another over time. Our approach involves adjusting restrictions in response to the decisions made by regional authorities. Monthly evaluations of each region's level of quarantine measures were conducted by the Petersburg Policy Foundation identifying three groups of regions: those with soft, medium, and hard restrictions. To quantify these levels of restrictions, we assigned numerical values: soft quarantine measures are denoted by 1, medium by 2, and hard by 3. We then used a simple average to aggregate the data at the regional level and quarterly dynamics. We obtained balanced panel data consisting of 510 observations across 83 Russian regions for the period from Q1 2020 to Q2 2021. Figure 2 presents the percentage of regions that have implemented the respective quarantine restrictions.



Note: Graph compiled from regional level data following methodology of [Petersburg Policy Foundation St., 2020].

Fig 2. Percentage of regions imposed different quarantine restrictions

As demonstrated in Fig. 2, the data indicates the dynamism of quarantine restrictions in Russia. It is evident that quarantine measures fluctuated throughout 2020, moving from a high proportion of regions with soft quarantine measures (approximately 41% in Q1 2020) to a predominance of medium quarantine measures (65–67% in Q2 and Q4 2020). This phenomenon can be attributed to the emergence of new strains of the virus, which led to a transition in the nature of restrictions imposed by regions. By the second quarter of 2021, the majority of quarantine restrictions had been relaxed, with soft restrictions being implemented in nearly all regions. The data accounts for quarantine restrictions in 2020, while vaccination-related restrictions (introduced in late 2021) are not considered in this paper.

The restrictions on alcohol purchase in Russia warrant particular attention. At the outset of the pandemic (Q1 2020), only a few Russian regions (Khakassia, Bashkiria, Yakutia, and Karelia) announced a ban on alcohol purchases at specific times (typically before 15:00 or 18:00 local

time). This indicates that there is no correlation between the severity of quarantine measures and institutional restrictions on alcohol purchase. In contrast, there were significant institutional constraints on eating out. For example, at the beginning of the pandemic, most businesses operated takeaways, and as the Russian vaccine developed, a QR code was required to enter a restaurant.

3.2. Empirical setup

To test hypotheses 1–3 we employ the Tobit model with robust standard errors, t-test (to compare the average expenditure on alcohol and out-of-home food), and the Kolmogorov – Smirnov test (to compare the distributions of expenditures). We use Tobit models to analyse censored data. In essence, a considerable proportion of households exhibit a dependent variable value of zero, while the remainder displays positive values. The fundamental Tobit model [Tobin, 1958] takes the form (Equations 1–3):

$$Y_i^* = x_i'\beta + \varepsilon_i, \quad i = 1,2,\ldots N, \tag{1}$$

$$Y_i = Y_i^* \text{ if } Y_i^* > 0, \tag{2}$$

$$Y_i = 0 \text{ if } Y_i^* \le 0, \tag{3}$$

where $\varepsilon_i \sim NID\left(0,\sigma^2\right)$ and independent of x_i. Since out-of-home food and alcohol expenditures cannot be negative, the constraint on the dependent variable can be rewritten in general terms as follows (Equations 4–5):

$$Y_i = Y_i^* \text{ if } Y_i^* > 0, \tag{4}$$

$$Y_i = 0 \text{ if } Y_i^* = 0. \tag{5}$$

To model the impact of COVID-19 on out-of-home food and alcohol expenditures, we employ the Engel function. Specifically, the Engel curve corresponds to the connection between household income and out-of-home food and alcohol expenditure. [Leser, 1963] suggests the incorporation of income as the main predictor of household expenditure. Several empirical studies demonstrate the influence of household socioeconomic features on household consumption trends [Edelstein, Kilian, 2009; Varlamova, Larionova, 2015]. Given this evidence, we extend the basic model by including household social characteristics (e.g., age, number of children, education level) and household financial characteristics (e.g., income). The theoretical work of [Blundell, Chen, Kristensen, 2007] highlights the significance of incorporation of demographic characteristics in Engel curve estimates. Similarly, [Hausman, Newey, Powell, 1995] indicates that one of the most effective forms of the Engel curve is the form with an income on the right-hand-side and the control of household socio-economic characteristics. The Lesser model specification differs from a number of microeconomic models, including the Almost Ideal Demand System and its modifications, in that it does not require the inclusion of prices for related goods and services. Given the peculiarity of the Rosstat sample and the impossibility of extracting the price vector (due to the unavailability of individual purchase prices), we apply this specification (Equation 6):

$$Y^*_{itjr} = \beta_{0j} + \beta_{1j}X_1 + \ldots + \beta_{8j}X_8 + \sum_{k=2}^{5}\delta_{kj}edu_k + \sum_{t=2}^{4}\boldsymbol{\gamma}_{tj}q_t + \\ + \sum_{r=2}^{83}\boldsymbol{\alpha}_{rj}d_r + \varphi_{softj}d_{softj} + \varphi_{hardj}d_{hardj} + \varepsilon_{ij} \quad (6)$$

where $j = 1,2$ corresponds to the expenditures on out-of-home food and alcohol respectively (dependent variables), $i = 1,\ldots,N$ is the number of households, $r = 1,\ldots,83$ is the number of the region. $X_1 - X_8$ are explanatory variables, which are explicitly stated in Table 1, $edu_k (k = 2,\ldots,5)$ is the set of dummy variables indicating the maximal level of education in household (baseline category is no basic general education, which was excluded from models). We denote dummy variables for quarters as $q_t (t = 2,\ldots,4)$, the base category is determined as the first quarter. Regional dummy variables (regional fixed effects) are denoted as $d_r (r = 2,\ldots,83)$, the base category is Altay region. In order to avoid the potential issues posed by the dummy trap, the dummy for the first quarter and dummy for Altay region were excluded from the model. To capture the impact of the COVID-19 pandemic we use d_{softj} which indicates soft measures, d_{hardj} corresponds to hard measures. Thus, as a base category, medium quarantine measures are chosen, due to the fact that this is the largest group of restrictions.

The Tobit model estimation procedure employed in this analysis adheres to established methodologies outlined in the econometric literature (see Chapter 19 from [Greene, 2012]). Models (4)–(6) were estimated using the STATA 14 statistical software, incorporating robust standard error estimators (Huber-White/sandwich estimator) to mitigate potential heteroskedasticity. Notably, the conventional White estimator assumes independence across all observations – a premise that may be excessively restrictive for datasets aggregated at the regional level, where intra-regional dependencies could plausibly exist. To address this concern, we further implemented clustered standard errors, which relax the assumption of independence within regions while maintaining independence between regions. The empirical results exhibited robustness across both estimation frameworks: key coefficients retained their statistical significance, with no substantive deviations observed.

4. Typification and Profiles of Russian Households

To conduct an intergroup analysis of Russian households, three factors are identified as the basis for the division[9]: household income level, education level, and the number of children. The selection of criteria for household typology is founded upon their theoretical (see Section 2.2 for further details) and empirical relevance in our context. Consequently, income level is a pivotal determinant of expenditure, as outlined in the Leser model, and directly influences the financial capacity of households. The level of education has been found to be related to health awareness

[9] It would appear reasonable to divide households by employment sector. However, this is not feasible, as the Rosstat questionnaires do not provide information on the employment sector of individuals, nor do they indicate who is the head of the household.

and the rationality of consumer choice [Becker, 2009], and the number of children has been found to affect expenditure patterns due to specific needs and the reduced mobility of households.

To categorise households by income we use the results of the study by [Nartikoev, Peresetsky, 2021]. In contrast to classical approaches that use the exogenous income categorization of households, Nartikoev and Peresetsky adopt an endogenous approach, which utilises log-normal distributions to identify household groups for the eight federal districts of Russia. This approach takes into account the substantial income disparity among households in Russia by segmenting into federal districts [Murashov, Ratnikova, 2017; Potapenko, Shirov, 2021]. Nartikoyev and Peresetsky's approach assumes the identification of three groups of households, whereas the current study identifies four. The upper group has been divided by income according to the median level of the upper group. The bottom 50% are categorised as "Medium high" and the top 50% as "High". The rationale for singling out the "Medium high" group is that the Household Budget Survey tends to focus on low-income groups of households. Consequently, the allocation of this group represents an attempt to identify the "middle class" of Russian society.

In contrast to income, there is no empirical evidence suggesting significant variation in the education level, and the number of children among Russian regions. Therefore, we do not consider specific regional factors for household typification. To categorise households by education level, we follow the Federal State Statistics Service classification. The first group ("Low") comprises households with basic general education. The second group ("Middle") includes households with general secondary education or secondary vocational education. The third group ("High") consists of households with tertiary education. The estimate for the educational attainment level of a household is the calculated average of the educational attainment levels of each member within the household, excluding children's levels of education from the calculation[10].

To categorise households based on the number of children, the commonly used criteria consist of childless, small (one or two children), and large families. However, there is no definition for identifying large families in Russia; instead, regional by-laws usually establish a threshold of three. The proposed criteria for household categorisation are presented in Table 2.

Table 2.

Criteria for classification of households by income, educational attainment, number of children

Variable	Household group	Description
Income	Low	Interval boundaries are calculated based on the study of Nartikoev and Peresetsky (2021), income differences by territorial districts are taken into account
	Medium low	
	Medium high	
	High	
Educational attainment	Low	Households with prevalent general education
	Middle	Households with prevalent secondary and secondary vocational education
	High	Households with prevalent higher education

[10] The incorporation of the education level of children tends to result in a biased estimation of the average – consequently, the mean educational level in households with a high number of children, is substantially understated.

Continuation

Variable	Household group	Description
Number of children	No children	Households without children
	1 to 2 children	Households with 1 or 2 children
	3 or more children	Households with many children (more than 3 children)

The primary household characteristics are determined by the ratio of spending on out-of-home food, alcohol, the number of children, average household age, income, and educational level. Together, these attributes outline the household's profile. Table 3 illustrates the detailed attributes of each household group.

Table 3.

Profile of households by group

Variable	Household group	Out-of-home food, %	Alcohol, %	Children 4–16 (per 1000)	Children under 3 (per 1000)	Age, years	Income (per household member), rubles
Income	Low	1.14	1.211	78.088	744.30	38.92	10642.79
	Medium low	0.994	1.387	168.715	13.439	52.44	27159.713
	Medium high	1.177	1.372	20.648	1.680	57.41	62240.426
	High	1.57	1.588	6.021	0.441	55.30	85190.06
Educational attainment	Low	0.48	1.116	322.030	31.506	54.39	20628.52
	Middle	0.84	1.312	348.438	32.032	48.85	21032.94
	High	1.66	1.358	499.606	55.292	42.71	22204.49
Number of children	No children	0.880	1.333	0.000	0.000	56.08	29313.106
	1 to 2 children	1.688	1.264	1238.790	112.136	26.77	10831.545
	Over 3 children	1.182	0.792	2818.909	433.716	19.63	4510.503

Notes: For all variables average values are represented. The average values for the entire sample from 2019 to 2021 are presented herein. Incomes are presented per household member in 2016 prices, in rubles. The number of children is presented per 1,000 households.

Table 3 demonstrates several interesting patterns. *First*, there is an upsurge in the proportion of spending on alcohol and eating out when moving from the low-income to the high-income group. Similarly, household spending on these categories increases alongside their educational levels. *Second*, the per capita household income across education groups shows little variation, from 20,600 rubles at the "Low" education level to 22,200 rubles at the "High" education level. *Third*, the highest number of children is found in groups with low income or high education.

This section examines the typification characteristics of Russian households and delineates the attributes of each household group. Against this background, we expect households from different groups to react differently to the COVID-19 pandemic. Section 5 presents the Kolmogorov – Smirnov test and t-test results, along with Tobit model estimates for each household group.

5. Empirical Results

This section is composed of two parts, which are the statistical and econometric analyses. The statistical analysis uses t-test and Kolmogorov – Smirnov test to reveal the quantitative changes in out-of-home food and alcohol expenditures depending on the level of quarantine measures in the region. Tobit models enable us to estimate the impact of the crisis depending on individual household characteristics. Both the statistical and regression analyses investigate changes within each household group based on income, education level, and the number of children. Table 4 gives the results of the Kolmogorov-Smirnov test and t-test.

Table 4.

Kolmogorov – Smirnov test and t-test for out-of-home food and alcohol expenditure

	Income				Educational attainment			Number of children		
	Low	Medium low	Medium high	High	Low	Middle	High	No children	1 to 2 children	Over 3 children
Expenditure on food outside the home. Comparison of regions with strict quarantine measures and other regions										
t-test	–0.379***	–0.163***	–0.245***	–0.134**	–0.116***	–0.242***	–0.354***	–0.199***	–0.445***	–0.514***
	(0.0234)	(0.0289)	(0.0425)	(0.0633)	(0.0310)	(0.0213)	(0.0322)	(0.0188)	(0.0356)	(0.0888)
K-S test	0.000	0.000	0.000	0.000	0.030	0.000	0.000	0.000	0.000	0.000
Expenditure on food outside the home. Comparison of regions with medium quarantine measures and other regions (excluding severe measures)										
t-test	–0.403***	–0.308***	–0.299***	–0.418***	–0.161***	–0.283***	–0.559***	–0.295***	–0.548***	–0.254***
	(0.0155)	(0.0202)	(0.0297)	(0.0426)	(0.0214)	(0.0145)	(0.0216)	(0.0127)	(0.0243)	(0.0651)
K-S test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Expenditure on food outside the home. Comparison of regions with soft quarantine measures and other regions (excluding severe and medium measures)										
t-test	–0.221***	–0.260***	–0.197***	–0.259***	–0.110***	–0.180***	–0.343***	–0.181***	–0.363***	0.111
	(0.0189)	(0.0250)	(0.0380)	(0.0523)	(0.0257)	(0.0179)	(0.0266)	(0.0158)	(0.0298)	(0.0722)
K-S test	0.000	0.000	0.001	0.000	0.003	0.000	0.000	0.000	0.000	0.095
Expenditure on alcohol. Comparison of regions with strict quarantine measures and other regions										
t-test	0.011	0.055**	0.024	0.126***	–0.026	0.018	0.105***	0.044***	0.059***	–0.080
	(0.0155)	(0.0216)	(0.0323)	(0.0384)	(0.0298)	(0.0169)	(0.0179)	(0.0142)	(0.0193)	(0.0498)
K-S test	0.459	0.022	0.844	0.006	0.233	0.496	0.000	0.036	0.051	0.568

Continuation

	Income				Educational attainment			Number of children		
	Low	Medium low	Medium high	High	Low	Middle	High	No children	1 to 2 children	Over 3 children
Expenditure on alcohol. Comparison of regions with medium quarantine measures and other regions (excluding severe measures)										
t-test	0.077*** (0.0101)	0.049*** (0.0150)	–0.006 (0.0222)	0.033 (0.0258)	0.057*** (0.0207)	0.037*** (0.0114)	0.066*** (0.0119)	0.032*** (0.0095)	0.092*** (0.0130)	0.164*** (0.0363)
K-S test	0.000	0.016	0.048	0.057	0.028	0.001	0.000	0.000	0.000	0.000
Expenditure on alcohol. Comparison of regions with soft quarantine measures and other regions (excluding severe and medium measures)										
t-test	–0.005 (0.0117)	–0.034* (0.0176)	–0.030 (0.0267)	–0.057 (0.0306)	–0.019 (0.0237)	–0.032** (0.0134)	–0.013 (0.0139)	–0.028** (0.0112)	0.002 (0.0151)	–0.092** (0.0380)
K-S test	0.802	0.027	0.679	0.784	0.931	0.213	0.358	0.135	0.195	0.379

Note: standard errors are given in parentheses (), *** – 1% significance level, ** – 5% significance level, * – 10% significance level for t-test. For the Kolmogorov – Smirnov test, p-values are presented.

We observe a reduction in the proportion of out-of-home food, irrespective of the imposed restrictions and household characteristics. Areas under medium quarantine measures exhibit the most significant decline in spending. Conversely, regions with soft restrictions show the smallest decrease and, in some instances, no statistically significant impact on expenditure distribution.

Intergroup analysis indicates a significant decline in the proportion of spending on out-of-home food among low, medium-low-income groups, and highly educated households. In the hard quarantine regions, families with 3 or more children significantly reduced the share of their expenditure on out-of-home food compared to households with fewer children. In contrast, households with 3 or more children exhibit the smallest decline in the percentage of their expenditure on restaurants in regions with medium quarantine measures.

The proportion of spending on alcohol rose in areas with hard and medium quarantine measures, while it fell (or remained unchanged) in areas with soft quarantine measures, suggesting that the severity of restrictive measures reduced alcohol expenditure. The intergroup analysis reveals that quarantine restrictions did not affect the alcohol spending habits of those with medium-high incomes. On the other hand, in regions with hard quarantine restrictions, a considerable increase in the share of alcohol expenditures is observed among high income, highly educated households, and those with up to 3 children. In areas with medium quarantine restrictions, there is an observable rise in alcohol spending, particularly among low-income and low-educated households, and those with 3 or more children. The rationale for this is increased stress level due to the severity of restrictions, which is in line with findings of [Avery et al., 2020; Lee, 2020; Rahman et al., 2020]. In regions with soft quarantine restrictions, we find the largest decreases in the share of alcohol expenditure among middle-income, middle-educated households, and households without children. Table 5 shows the Tobit model estimations for out-of-home food and alcohol expenditures across household income groups.

Table 5.

Econometric modelling for income differentiation

	Dependent variable: the share of out-of-home food					Dependent variable: the share of alcohol				
	Low	Medium low	Medium high	High	Whole sample	Low	Medium low	Medium high	High	Whole sample
Children 4–16	0.439***	0.150	−1.558***	1.371*	0.422***	0.036**	−0.877***	−2.156***	−0.463*	−0.461***
	(0.051)	(0.113)	(0.340)	(0.766)	(0.045)	(0.018)	(0.039)	(0.120)	(0.236)	(0.015)
Children under 3	−2.543***	−3.918***	−6.129***	−11.714***	−3.036***	−0.142***	−0.856***	−2.475***	−2.877***	−0.705***
	(0.113)	(0.308)	(1.004)	(3.040)	(0.109)	(0.037)	(0.106)	(0.353)	(1.066)	(0.036)
Age	−0.205***	−0.284***	−0.336***	−0.291***	−0.271***	−0.015***	−0.043***	−0.089***	−0.057***	−0.042***
	(0.003)	(0.004)	(0.008)	(0.006)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)
Log of income	3.304***	4.119***	1.566***	8.802***	4.057***	1.328***	0.351***	−0.430**	2.115***	0.870***
	(0.087)	(0.223)	(0.562)	(0.306)	(0.053)	(0.028)	(0.068)	(0.174)	(0.086)	(0.015)
Education level: basic general education	5.241	0.261	−0.497	−2.119	−0.161	0.332	0.351	−0.290	1.692***	0.872***
	(4.471)	(1.873)	(2.039)	(1.898)	(0.984)	(1.051)	(0.348)	(0.359)	(0.444)	(0.201)
Education level: secondary general education	6.827	0.853	0.540	−3.355*	0.753	0.427	1.001***	−0.069	1.307***	1.225***
	(4.463)	(1.830)	(1.974)	(1.838)	(0.966)	(1.048)	(0.336)	(0.341)	(0.426)	(0.196)
Education level: secondary vocational education	7.986*	3.170*	1.865	−2.074	2.334**	0.467	1.461***	0.543	1.507***	1.547***
	(4.462)	(1.819)	(1.956)	(1.813)	(0.961)	(1.048)	(0.333)	(0.333)	(0.419)	(0.194)
Education level: higher vocational education	10.024**	6.227***	5.918***	1.073	5.017***	0.361	1.568***	0.893***	1.072**	1.552***
	(4.462)	(1.820)	(1.959)	(1.815)	(0.962)	(1.047)	(0.333)	(0.336)	(0.420)	(0.194)
Isolation hard	−1.152***	−1.229***	−1.800***	−0.884***	−1.264***	−0.018	−0.087	−0.044	0.076	−0.027
	(0.135)	(0.186)	(0.361)	(0.325)	(0.102)	(0.040)	(0.055)	(0.105)	(0.096)	(0.030)
Isolation soft	0.570***	0.108	0.549**	0.494**	0.464***	−0.047	−0.140***	−0.022	−0.093	−0.066***
	(0.093)	(0.149)	(0.273)	(0.244)	(0.074)	(0.029)	(0.044)	(0.081)	(0.075)	(0.023)
Dummy 2020	−2.539***	−2.202***	−2.261***	−2.498***	−2.454***	0.126***	0.112***	0.087	0.132**	0.114***
	(0.073)	(0.110)	(0.204)	(0.181)	(0.057)	(0.022)	(0.033)	(0.061)	(0.055)	(0.017)
Constant	−39.192***	−43.254***	−14.929**	−96.381***	−42.113***	−12.205***	−2.291***	8.697***	−22.437***	−7.986***
	(4.552)	(2.873)	(6.282)	(4.071)	(1.124)	(1.088)	(0.746)	(1.872)	(1.104)	(0.252)
Sigma constant	10.401***	11.409***	12.657***	13.708***	11.475***	4.264***	4.916***	5.634***	5.489***	4.789***
	(0.052)	(0.096)	(0.217)	(0.185)	(0.052)	(0.018)	(0.026)	(0.049)	(0.040)	(0.014)
Observation	269914	164927	70087	70132	575060	269915	164928	70087	70132	575062

Note: *** indicates 1% significance level, ** indicates 5% significance level, * indicates 10% significance level. Robust standard errors are given in parentheses (). Each model incorporates dummy variables for quarters, with the base category assigned as the first quarter, and dummy variables for Russian regions, with the base category designated as the Altay region. I test the model specification with clustered standard errors at the regional level, which yield the same significance levels for the variables. The estimated coefficients cannot be interpreted as marginal effects, but marginal effects in case of the Tobit model have the same sign and significance. The set of estimated coefficients (control variables) also includes (but not stated in the table) type of locality, average age of household members, savings in household income, changes

in financial assets in household income, housing area. Additionally, the model was tested with the inclusion of a self-isolation index from Yandex (higher index = higher restrictions) in place of the conventional restrictions. This variable enables the monitoring of actual compliance with quarantine measures, as it accounts for the actual number of individuals present in public spaces. The modelling results indicate that the obtained estimates are robust to the proxy variable used for quarantine restrictions.

We assessed the effects of the pandemic by incorporating dummy variables reflecting the extent of quarantine restrictions. The baseline category corresponds to periods when a given region implemented medium restrictions. The coefficients (*Isolation hard*, *Isolation soft*) capture how changes in restriction levels within the same region affect expenditures on out-of-home food and alcohol. The findings suggest a decline in the proportion of out-of-home food expenditures when restrictions are tightened from medium to severe within the region. However, the extent of the reduction varies between income groups, with the richest households (group "High") demonstrating a less pronounced reduction in out-of-home food expenditures compared to less affluent households. Conversely, when constraints in the region are relaxed from medium to soft, households increase the share of out-of-home expenditure, suggesting a rebound in consumption.

Expenditure on out-of-home food increases with income in all income groups. Notably, the most affluent households (group "High") demonstrate the highest growth in the proportion of expenditure on out-of-home food as income increases, while the group "Medium high" exhibits the lowest growth in the dependent variable. This phenomenon could be attributed to the fact that low and middle-low-income households receive social assistance and have a low base effect, enabling them to allocate their expenses towards eating out. Conversely, medium-high-income households do not benefit from such support programmes as found by [Mareeva, 2020], thus making it challenging to reallocate their income for out-of-home food expenditure. These results contradict studies for the US and the UK, which indicate a significant reduction in out-of-home food expenditure in the most affluent households [Hacıoğlu-Hoke, Känzig, Surico, 2021; Leone et al., 2020].

In the context of consumption, an individual's education level is a significant determinant of unobserved preferences. Similar to the effect of the income variable, it was found that the proportion of out-of-home food expenditure is elevated in households whose members have attained a higher vocational education level in comparison to households whose members have not attained basic education, in the "Low", "Medium low" and "Medium high" income groups. The effect is most pronounced among the low-income group (group "Low"), indicating the significance of higher education in shaping preferences and interests in learning about other cultures (e.g. through world cuisines). Conversely, as the income level ascends from the poorest to the wealthiest groups, the effect's magnitude and statistical significance diminish.

Statistically significant differences were not identified when strengthening quarantine measures from medium to severe within a region in terms of the share of alcohol expenditures. A decrease in the share of alcohol expenditures was found in regions with soft quarantine measures compared to regions with medium quarantine restrictions among the "Medium low" group. Given the absence of statistically significant effects in other household groups, it can be posited that alcohol habits remain relatively consistent regardless of the level of quarantine measures imposed.

As households move from poorer to richer groups, our findings demonstrate that the impact of income growth on the proportion of alcohol expenditure follows a U-shaped pattern. Therefore, the Low group households, being the poorest, spend more on alcohol as income increases

than the Medium low and Medium high group households, but less than the High group households. A corresponding impact is noted by [Pu et al., 2008], where poor households spend most of their expenditure on tobacco and alcohol.

The overall impact of education level is inconsistent. The findings reveal a statistically insignificant impact of educational attainment in the 'Low' group. However, as the economic status of the households increases, a positive difference in the share of alcohol expenditure is observed between households with no basic general education and the rest of the households. We can assert that an increase in income favours a rise in alcohol expenditure. This demonstrates the significant role that education plays in influencing consumer preferences. As educational opportunities expand, low-income groups are not likely to change their expenditure on alcohol. A contrasting effect is evident among the most affluent group of households (group "High"), where heightened levels of education augment the proportion of alcohol expenditure. This phenomenon may be attributed to the notion that enhanced educational attainment fosters the establishment of social interactions, thereby contributing to an increase in the share of alcohol expenditure. Modelling results for selected expenditure groups according to household education groups are presented in Table 6.

Table 6.

Econometric modelling for education differentiation

	Dependent variable: the share of out-of-home food				Dependent variable: the share of alcohol			
	Low	Middle	High	Whole sample	Low	Middle	High	Whole sample
Children 4–16	0.310* (0.162)	0.376*** (0.071)	0.577*** (0.063)	0.422*** (0.045)	−0.754*** (0.054)	−0.498*** (0.023)	−0.280*** (0.021)	−0.461*** (0.015)
Children under 3	−3.509*** (0.444)	−3.667*** (0.192)	−2.390*** (0.138)	−3.036*** (0.109)	−0.849*** (0.132)	−0.661*** (0.059)	−0.562*** (0.046)	−0.705*** (0.036)
Age	−0.360*** (0.009)	−0.293*** (0.004)	−0.235*** (0.003)	−0.271*** (0.002)	−0.066*** (0.002)	−0.044*** (0.001)	−0.030*** (0.001)	−0.042*** (0.001)
Log of income	4.612*** (0.227)	3.883*** (0.088)	4.217*** (0.070)	4.057*** (0.053)	0.900*** (0.050)	0.943*** (0.022)	0.830*** (0.021)	0.870*** (0.015)
Education level: basic general education	−0.821 (1.173)	–	–	−0.161 (0.984)	0.596** (0.233)	–	–	0.872*** (0.201)
Education level: secondary general education	−0.152 (1.153)	–	−4.283 (4.048)	0.753 (0.966)	0.945*** (0.229)	–	−0.552 (1.676)	1.225*** (0.196)
Education level: secondary vocational education	2.011* (1.177)	–	−6.179 (6.075)	2.334** (0.961)	1.491*** (0.237)	–	1.567 (2.016)	1.547*** (0.194)
Education level: higher vocational education	8.257*** (1.334)	2.544*** (0.111)	−1.058 (2.554)	5.017*** (0.962)	2.014*** (0.328)	0.090*** (0.035)	3.802*** (1.126)	1.552*** (0.194)

Continuation

	Dependent variable: the share of out-of-home food				Dependent variable: the share of alcohol			
	Low	Middle	High	Whole sample	Low	Middle	High	Whole sample
Isolation hard	−1.858***	−1.406***	−1.103***	−1.264***	−0.063	−0.042	−0.003	−0.027
	(0.397)	(0.164)	(0.138)	(0.102)	(0.102)	(0.045)	(0.042)	(0.030)
Isolation soft	−0.281	0.445***	0.570***	0.464***	0.047	−0.088***	−0.072**	−0.066***
	(0.296)	(0.119)	(0.100)	(0.074)	(0.077)	(0.034)	(0.032)	(0.023)
Dummy 2020	−2.178***	−2.303***	−2.627***	−2.454***	0.102*	0.081***	0.152***	0.114***
	(0.228)	(0.090)	(0.077)	(0.057)	(0.059)	(0.026)	(0.024)	(0.017)
Constant	−44.675***	−37.388***	−38.840***	−42.113***	−7.449***	−6.808***	−10.680***	−7.986***
	(2.730)	(0.899)	(2.666)	(1.124)	(0.587)	(0.227)	(1.148)	(0.252)
Sigma constant	13.387***	11.743***	11.019***	11.475***	5.858***	4.924***	4.311***	4.789***
	(0.285)	(0.088)	(0.061)	(0.052)	(0.050)	(0.020)	(0.018)	(0.014)
Observation	84809	269259	220992	575060	84809	269261	220992	575062

Note: *** indicates 1% significance level, ** indicates 5% significance level, * indicates 10% significance level. Robust standard errors are given in parentheses (). Each model specification incorporates dummy variables for quarters, with the base category assigned as the first quarter, and dummy variables for Russian regions, with the base category designated as the Altay region. I test the model specification with clustered standard errors at the regional level, which yield the same significance levels for the variables. The estimated coefficients cannot be interpreted as marginal effects, but marginal effects in case of the Tobit model have the same sign and significance. The set of estimated coefficients (control variables) also includes (but not stated in the table) type of locality, average age of household members, savings in household income, changes in financial assets in household income, housing area. Additionally, the model was tested with the inclusion of a self-isolation index from Yandex (higher index = higher restrictions) in place of the conventional restrictions. This variable enables the monitoring of actual compliance with quarantine measures, as it accounts for the actual number of individuals present in public spaces. The modelling results indicate that the obtained estimates are robust to the proxy variable used for quarantine restrictions.

As with the income-based household classification, a decrease in the share of expenditure on out-of-home food is observed with the tightening of restrictions from the average and strict level within the region. The degree of decrease in the share of food expenditures is lower among the most educated households (group 'High') compared to the other groups. An increase in the share of expenditure on food outside the home is seen when restrictions within the region are loosened from medium to soft in groups with medium and high levels of education. This can be explained by the fact that within the region, where restrictions on cafes and restaurants were relaxed, the likelihood of repeated severe restrictions was much lower. Furthermore, the absence of lockdowns meant that household purchasing power remained stable.

As income increases, the impact on expenditures on out-of-home food is positive for all groups of households. Households belonging to the "Low" education group exhibit a more substantial increase in out-of-home food expenditure. This phenomenon can be attributed to the propensity of this demographic to allocate a significant portion of their expenditure on dining out at cafes and restaurants. Furthermore, the low base effect contributes to this finding, as household expenditure profiles reveal that the "Low" education group allocates the smallest proportion of their budget to out-of-home food.

Households with higher vocational education level appear to have a higher out-of-home food expenditures compared to households with no basic education in the "Low" and " Middle " groups. At the same time, we find no statistical differences in the share of expenditure on out-of-home food between households with no education and those with higher vocational education level. These findings suggest a shift in consumer preferences during the pandemic, as well as a heightened awareness of the health risks associated with dining in cafes and restaurants during the acute phase of the pandemic.

The influence of hard quarantine measures on the proportion of spending on alcohol in all groups is statistically insignificant. In the context of the relaxation of quarantine restrictions within a region, a decline in the proportion of alcohol expenditure is observed among households with a middle or high level of education. Conversely, households with a low level of education exhibited no change in the proportion of alcohol expenditure following the relaxation of quarantine restrictions within the region. This implies that despite the leniency of restrictions, particular demographic groups chose to not to change their alcohol spending, contrary to the typical consumption pattern where more relaxed quarantine regulations tend to lead to a reduction in alcohol expenses, as indicated by the t-test findings.

The share of alcohol expenditure is positively affected by household income, irrespective of the household group. Our examination of the impact of income on household groups' expenditure highlights differences that imply contrasting consumption behaviour between education and income groups [Padel, Foster, 2005].

A positive difference is observed between households with higher vocational education levels and those with no basic education in all household groups. This indicates a higher share of alcohol expenditure as education level increases, regardless of household group. These results contradict with [Monden et al., 2003], who document that household members with low education heighten health hazards associated with excessive alcohol consumption, while those with high education mitigate such risks. The extant evidence indicates a rejection of Hypothesis 3, which posits a decrease in the proportion of alcohol expenditure with increasing educational attainment. In the context of the pandemic, alcohol has been employed as a coping mechanism by households, irrespective of their educational level (and consequently their awareness of the harms of alcohol), a phenomenon that is consistent with the findings of [Lazarus, 1984]. Table 7 shows the estimates for expenditure on alcohol and out-of-home food, corresponding to the number of children in the household.

In the context of studying the consumption structure of households, the division of families with children is of particular interest for the following reasons. Firstly, the composition of families with children differs from that of families without children, indicating potential shifts in the consumption structure. *Secondly*, children require goods and services (children's food, toys, educational services) that are not necessary for adults, contributing to consumer spending. *Thirdly*, children can influence their parents through the emotional channel of purchases, which can also cause changes in consumer spending.

In the event of a shift in quarantine restrictions from medium to severe measures within the region, a decline in the proportion of expenditure on out-of-home food is observed across all household demographics. Conversely, a transition towards milder quarantine restrictions within the region is associated with an increase in the share of out-of-home food expenditure among households without children and with one to two children. In families with three or more children, the proportion of expenditure on out-of-home food remains consistent as quarantine restrictions

are relaxed. This phenomenon is consistent with Hypothesis 1, which suggests that large families may face significant mobility constraints, especially during the COVID-19 pandemic.

Table 7.

Econometric modelling for number of children differentiation

	Dependent variable: the share of out-of-home food				Dependent variable: the share of alcohol			
	No children	1 to 2 children	Over 3 children	Whole sample	No children	1 to 2 children	Over 3 children	Whole sample
Children 4–16	–	2.489*** (0.090)	0.506*** (0.025)	0.422*** (0.045)	–	0.511*** (0.030)	–0.141 (0.093)	–0.461*** (0.015)
Children under 3	–	0.843*** (0.143)	0.274*** (0.048)	–3.036*** (0.109)	–	0.571*** (0.047)	–0.077 (0.119)	–0.705*** (0.036)
Age	–0.337*** (0.003)	0.101*** (0.006)	0.173*** (0.004)	–0.271*** (0.002)	–0.054*** (0.001)	0.034*** (0.002)	0.047*** (0.012)	–0.042*** (0.001)
Log of income	4.778*** (0.073)	4.066*** (0.085)	3.231*** (0.009)	4.057*** (0.053)	0.825*** (0.018)	1.085*** (0.026)	1.424*** (0.100)	0.870*** (0.015)
Education level: basic general education	–1.657 (1.116)	5.941 (5.132)	33.617*** (0.060)	–0.161 (0.984)	0.788*** (0.217)	2.155** (0.972)	–1.737 (1.432)	0.872*** (0.201)
Education level: secondary general education	–0.948 (1.081)	6.842 (5.124)	35.104*** (0.058)	0.753 (0.966)	1.125*** (0.210)	2.451** (0.966)	–2.127 (1.416)	1.225*** (0.196)
Education level: secondary vocational education	0.993 (1.073)	7.470 (5.122)	35.649*** (0.063)	2.334** (0.961)	1.499*** (0.208)	2.555*** (0.965)	–2.056 (1.411)	1.547*** (0.194)
Education level: higher vocational education	4.498*** (1.074)	8.924* (5.121)	36.975*** (0.067)	5.017*** (0.962)	1.500*** (0.208)	2.506*** (0.965)	–2.472* (1.412)	1.552*** (0.194)
Isolation hard	–1.319*** (0.151)	–1.176*** (0.136)	–2.038*** (0.065)	–1.264*** (0.102)	–0.012 (0.039)	–0.058 (0.045)	–0.204 (0.159)	–0.027 (0.030)
Isolation soft	0.395*** (0.110)	0.495*** (0.100)	–0.078 (0.058)	0.464*** (0.074)	–0.079*** (0.030)	–0.058* (0.033)	–0.018 (0.119)	–0.066*** (0.023)
Dummy 2020	–2.440*** (0.084)	–2.473*** (0.076)	–1.824*** (0.059)	–2.454*** (0.057)	0.102*** (0.023)	0.142*** (0.026)	0.153* (0.093)	0.114*** (0.017)
Constant	–49.357*** (1.362)	–55.730*** (5.213)	–75.293*** (0.080)	–42.113*** (1.124)	–7.082*** (0.288)	–13.648*** (1.011)	–10.001*** (1.840)	–7.986*** (0.252)
Sigma constant	12.931*** (0.080)	9.626*** (0.061)	8.337*** (0.034)	11.475*** (0.052)	5.220*** (0.018)	3.799*** (0.018)	3.766*** (0.067)	4.789*** (0.014)
Observation	406509	154214	14337	575060	406510	154215	14337	575062

Note: *** indicates 1% significance level, ** indicates 5% significance level, * indicates 10% significance level. Robust standard errors are given in parentheses (). Each model specification incorporates dummy variables for quarters, with the base category assigned as the first quarter, and dummy variables for Russian regions, with the base category designated as the Altay region. I test the model specification with clustered standard errors at the regional level, which yield the same significance levels for the variables. The estimated coefficients cannot be interpreted as marginal effects, but marginal effects in case of the Tobit model have the same sign and significance. The set of estimated coefficients (control variables) also includes (but not stated in the table) type of locality, average age of household members, savings in household income, changes in financial assets in household income, housing area. Additionally, the model was tested with the inclusion of a self-Isolationlation index from Yandex (higher index = higher restrictions) in place of the conventional restrictions. This variable enables the monitoring of actual compliance with quarantine measures, as it accounts for the actual number of individuals present in public spaces. The modelling results indicate that the obtained estimates are robust to the proxy variable used for quarantine restrictions.

The impact of income growth on the share of expenditure on out-of-home food is generally positive but diminishes in absolute terms with an increase in the number of children in a household. Therefore, households without children increase their expenditure on out-of-home food significantly, in contrast with households that have children. This suggests that households without children have greater autonomy in allocating their expenditure, as well as a heightened interest in the consumption of out-of-home food. A positive difference is observed between households with higher vocational education levels and those with no basic education in all household groups. This finding suggests that as the level of education increases, there is a concomitant increase in the share of expenditure on food outside the home, irrespective of the household group.

The influence of hard quarantine measures on the proportion of spending on alcohol in all groups is statistically insignificant. The relaxation of quarantine restrictions within a region has been demonstrated to result in a decline in the proportion of alcohol expenditure among households with no children and up to two children. In contrast, the proportion of alcohol expenditure among households with three or more children remains unaltered following the relaxation of quarantine restrictions, thereby supporting Hypothesis 1. Our findings reveal that the effect of income is positive overall and that it increases with the number of children in the family. This may appear counterintuitive, as we are examining the proportion of expenditure allocated towards alcohol, rather than overall expenditures. Therefore, it is possible that adult children lving within the household may contribute towards this proportion.

We find that the share of alcohol expenditure is higher in households with higher vocational education level compared to households with no basic education in households without children and up to 3 children. Conversely, in large families, the correlation is inverse; that is, the proportion of alcohol expenditure declines with increasing educational attainment. This may be attributed to the fact that as household members attain higher levels of education, they become more aware of their role in their children's lives, thereby setting a positive example. Furthermore, given the labour-intensive nature of raising and educating children, educated parents may have limited time to consume alcohol. Summarising our findings, we can draw the following conclusions on consumer behaviour regarding alcohol and out-of-home food for different groups of households.

1) In the instance of enhanced quarantine restrictions within a region the proportion of expenditure on out-of-home food is observed to decline. Conversely, the relaxation of quarantine restrictions within a region is associated with an increase in the share of expenditure on out-of-home food. A similar relationship has been observed between the relaxation of quarantine measures and a decrease in the share of expenditure on alcohol, a key component in ensuring public health.

2) Income typification. Affluent Russian households faced fewer difficulties than high-income groups in other countries. The consumption behaviour of households from developed countries varies from those in Russia.

3) Education Level typification. Contrary to expectations and theory, as educational attainment rises, households increase the proportion of their expenditure on alcohol, irrespective of the severity of restrictions. The study shows that there are variations in the effects of socioeconomic characteristics, indicating differences in consumption behaviour between education and income groups.

4) Number of children typification. Households without children have more autonomy in deciding their consumption habits, resulting in a more substantial increase in the portion of out-of-home food expenditure as income grows.

6. Conclusion

This paper examines the impact of the COVID-19 pandemic on out-of-home food and alcohol expenditures in Russian regions. To test the hypotheses, we use microdata from the household budget survey conducted by the Federal State Statistics Service. To obtain targeted recommendations, households are categorised according to income, education level, and the number of children. Furthermore, we consider varying degrees of quarantine measures, encompassing areas with soft, medium, and hard quarantine restrictions.

The first hypothesis is confirmed, as evidenced by the decrease in the share of out-of-home food expenditure among households with children in regions subject to severe and moderate quarantine measures. On average, the results indicate that households with children experience a decline in the share of out-of-home food expenditure that is twice as strong as that observed among households without children. The second hypothesis is partially confirmed, as high-income households in regions with strict quarantine measures increased the share of expenditure on alcohol, as indicated by the results of t-test. Overall, the results indicate a propensity to increase alcohol expenditure, specifically among low-income households. Contrary to Hypothesis 3, the t-test results indicate that in regions with both strict and medium quarantine measures, high-educated households increase the share of alcohol expenditure under quarantine. Furthermore, regression analyses demonstrate that as educational attainment rises, households, in defiance of expectations, augment their alcohol expenditure, irrespective of the severity of restrictions.

We discovered a curious effect in which the share of expenditure on out-of-home food decreases regardless of the social group and the severity of quarantine restrictions. Notably, the decline is substantially less pronounced in areas with soft quarantine restrictions, as supported by both statistical tests and the results of the regression analysis. In a similar fashion, the proportion of alcohol expenditures decreased across almost all social strata when the quarantine restrictions in the region were relaxed, whereas in regions with hard and medium quarantine measures, the share of alcohol expenditure increased significantly, implying a negative effect of quarantine restrictions on the health of household members.

We highlight the following limitations of the study. *First*, we acknowledge that attitudes towards the pandemic significantly impact the decision to visit a restaurant and consume alcohol during quarantines. However, due to the limited availability of Federal State Statistics Service data on households' intentions to comply with the quarantine, we were unable to include this aspect in our analysis. *Second*, the breakdown of alcohol expenditure facilitates specific recom-

mendations for regulating alcohol consumption at the state level. At the household level, the Federal State Statistics Service does not provide detailed data on different types of alcohol expenditure. *Third*, the Federal State Statistics Service does not provide data on the form and place of employment of household members. Consequently, some effects of the pandemic on the structure of household consumption may not be fully captured. *Fourth,* a potential discrepancy exists between formal indicators of the severity of quarantine measures and their actual implementation in Russian regions. The available data fails to consider the degree of compliance with restrictions by the population, differences in enforcement between regions, or the dynamics of household adaptation.

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Изменения в расходах на питание и алкоголь вне дома во время пандемии COVID-19

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В данном исследовании изучаются изменения в расходах на питание и алкоголь вне дома во время пандемии COVID-19. Исследование посвящено изучению межгрупповых различий между домохозяйствами с учетом различий российских регионов по степени соблюдения карантинных ограничений. Для проверки гипотез исследования мы используем микроданные обследования бюджетов домашних хозяйств, проводимого Федеральной службой государственной статистики. Для сравнения расходов на питание и алкоголь вне дома в регионах с мягкими, средними и жесткими ограничительными мерами мы используем t-тест для сравнения средних и тест Колмогорова – Смирнова для сравнения распределений. Модель Тобита применяется для сравнения привычек домохозяйств разных социальных групп. Совместный анализ внедомашних расходов на еду и алкоголь позволяет отделить непроизвольные сбережения от стратегий преодоления, используя модели для цензурированных данных, что способствует углубленной оценке благосостояния домохозяйств в условиях потрясений. Полученные результаты свидетельствуют о сокращении расходов на продукты питания вне дома во всех социальных группах и при всех уровнях карантинных ограничений. Доля расходов на алкоголь снизилась почти во всех социальных группах в регионах с мягкими мерами, но значительно увеличилась в регионах со средними и жесткими ограничениями.

***Ключевые слова*:** домашние хозяйства; межгрупповой анализ; расходы на питание вне дома; расходы на алкоголь; COVID-19; жесткость карантинных мер.