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RESEARCH ARTICLE

Short-term effects of the COVID-19 pandemic on employment and income of the Russian population: which groups were affected the most?

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Abstract

The paper analyzes short-term factors of job loss, wage reduction and factors of household income reduction in Russia in the context of the coronavirus crisis. Panel data of the Russian Longitudinal Monitoring Survey - Higher School of Economics (RLMS-HSE) served as empirical basis of the study.

According to the study results, the highest risks of job loss are registered among females, young employees, unskilled workers, workers without professional education, and workers with low wages. However, almost the only factor of wage reduction (in case of retained employment) is employment in the most affected industries. Household income prior to the pandemic is the key determinant of household income reduction – the higher the level of material wellbeing, the higher the risk of income reduction. Increased probability of income reduction is also reported for families with children.

The study has confirmed the hypothesis about negative impact of vulnerable employment on employment and wages of individuals, as well as household income.

Keywords

COVID-19, coronavirus, vulnerable employment, wages, household income, RLMS-HSE

JEL codes: J21, J31, I31

Introduction

The COVID-19 pandemic has affected all spheres of people's lives, slowed down the economic development, and aggravated social problems. Measures taken by governments to contain the disease spread (temporary closure of enterprises and organizations, restrictions on mobility, lockdowns, quarantine measures), served as an impetus to the onset of economic

crisis comparable in scale to the crises caused by world wars (World Bank 2022). According to experts, as early as in 2020, the global economy experienced a 3% decline (IMF 2021).

The pandemic has made a dramatic impact on the labor market. According to the International Labor Organization, in 2020 compared to 2019, the total number of working hours in the world reduced by 8.8%, corresponding to the cut of 255 million full-time positions. Total earned income decreased by 8.3% during this period (ILO 2021). However, the impact of the crisis is uneven and significantly depends upon characteristics of the employment prior to the pandemic and socio-demographic characteristics of workers. In particular, workers employed in industries most affected by the epidemic, such as transport, construction, culture, leisure and entertainment, physical culture and sports, hospitality and tourism, catering, and household services turned out to be significantly more affected by the new coronavirus crisis (ILO 2021; Eurostat 2020; Adams-Prassl et al. 2020; Béland et al. 2020; Lopes and Carreira 2022). A relatively high risk of job loss/reduction in earned income is registered among workers with low education and qualification, low wages, as well as among young employees – this result is confirmed both at the global (ILO 2021; Eurostat 2020) and national level (Adams-Prassl et al. 2020; Alstadsæter et al. 2020; Aum et al. 2020; Bradley et al. 2021; Couch et al. 2022; Mongey et al. 2021; Pouliakas and Branka 2020; Yasenov 2020).

A steady decline in female employment/earned income was a characteristic feature of the coronavirus crisis, although in case of a recession, it is usually males that are affected the most (ILO 2021; Eurostat 2020; Adams-Prassl et al. 2020; Alon et al. 2020; Albanesi and Kim 2021; Dang and Nguyen 2021; Webster et al. 2022). Researchers associate a greater employment instability among females during the pandemic with the job-family conflict that has worsened during the pandemic – under quarantine restrictions, volumes of household chorus mainly performed by women (childcare, cooking, cleaning, etc.) has dramatically increased. Females were forced to adapt their employment in the labor market to meeting the increased family needs. The main adaptation strategies included reduction in working hours, transition to a flexible work schedule with cut in wages. Furthermore, compared to men, women are more likely to have jobs associated with close interpersonal contacts (for example, trade, catering, tourism, household services), that is, in those industries that have been heavily affected by the pandemic.

Deterioration of the labor market situation had a negative impact on the wellbeing of households - already in July 2020, 40% of households in high-income countries and 65%-70% of households in middle- and low-income countries experienced reduction in income (World Bank 2022). A study (Bundervoet et al. 2021) shows that 64% of families in developing countries faced reduced income. Decline in household income as a result of the pandemic in individual countries/groups of countries is also reported in research (Christelis et al. 2020; Kansiime et al. 2021; Pinkovetskaia, 2022; Morgan and Trinh 2021). The most important factor in income reduction in this case is a household member whose position in the labor market has worsened as a result of the pandemic (for example, Morgan and Trinh, 2021). A number of studies (Almeida et al. 2022; Vilar-Compte et al. 2022; Alstadsæter et al. 2020) say that in terms of socio-demographic composition, families with children under the age of 18 were the most vulnerable during the pandemic –the risk of income reduction was higher compared to families without children. There is evidence that families with a low material wellbeing prior to the pandemic experience greater risks of income reduction (Vilar-Compte et al. 2022; Morgan and Trinh 2021 (for the Philippines)), but other studies didn't find any significant impact of the prior to the pandemic income on the risk of income

reduction (Morgan and Trinh 2021 (for all ASEAN countries except the Philippines); Long et al. 2021).

As in other countries, the COVID-19 pandemic in Russia has resulted in economic downturn. According to official statistics (Russian State Statistic Service (Rosstat) 2022) in 2020, Russia's GDP decreased by 2.7%, while population's real income - by 1.4% compared to 2019. The employment rate during this period decreased from 59.8% to 58.4% while the overall unemployment increased from 4.6% to 5.8%. At the same time, the actual average monthly wages of employees of organizations in 2020 increased by 3.8%. However, this indicator does provide for a full estimation of changes in the wage levels in the country, since it includes only employees of organizations and does not include information about those employed outside organizations (individual entrepreneurs, individuals, etc.). In addition, official statistics data do not allow us to analyze changes in employment and income of individual socio-demographic groups of population.

The literature devoted to assessing effects of the coronavirus pandemic on employment and income indicators in Russia is rather limited, which is largely due to lack of empirical data. The study (Gimpelson 2021) shows that the employee's demographic characteristics, such as gender, age, level of education, parental status, do not affect the risk of wage reduction. The determining factors of wage reduction include type of activity (for those employed in construction, transport, trade, services, the risk of reduced earned income is higher) and place of residence (employees living in Moscow and St. Petersburg more often experienced reduction in wages). The study results (Tikhonova 2021) indicate that the impact of the pandemic on employment and economic situation varies across different professional groups of workers. Blue-collar workers face the most severe consequences of the crisis, while employees with higher education turned out to be more sustainable in the labor market has.

The study (Grishina 2021) analyzes changes in household income during the first year of the pandemic. A subjective assessment of income dynamics given by the respondents during the survey is used as an indicator of income reduction. The study shows that in 2020, more than half of the respondents reported reduced household income, while higher risks of reduced income are registered among people with children under the age of 18, as well as residents of Moscow and St. Petersburg.

This paper contributes to the study of short-term effects of the coronavirus pandemic on employment and income of the Russian population. The paper analyzes various socio-demographic and economic factors of the probability of job loss and reduction in earned income. The study also focuses on the risks of household income reduction. Additionally, the paper tests the assumption about negative impact of vulnerable employment on employment and income of the population during the new crisis type, made by the authors two years ago in the paper (Kartseva, Kuznetsova 2020). Vulnerable employment is determined with due regard to the following three main vectors according to which epidemiological restrictions can affect income of employees – self-employment/individual entrepreneurship, employment in the most affected industries and precarious employment. The study results can be used to develop social policy measures in the context of epidemiological crisis.

The article is structured as follows: section II describes in detail data that are the study empirical basis, and outlines basic principles of variable construction. Section III is devoted to the research methodology. Section IV discusses the study results. Section V presents main conclusions of the study.

2. Data and descriptive statistics. Variable construction

2.1 Data. Descriptive statistics

Panel data of the 28th and 29th rounds of the Russian Longitudinal Monitoring Survey - Higher School of Economics (RLMS-HSE) in 2019 and 2020 served as empirical basis of the study. The RLMS-HSE survey is an annual survey of the population conducted on the basis of a probability stratified multi-stage territorial sampling[1]. The RLMS-HSE data contain detailed information about socio-demographic and economic characteristics of the respondent and their household. In particular, big blocks of the survey questions are devoted to the respondent's employment in the labor market and their household income. An important factor for choosing the empirical basis of the study was panel structure of the RLMS-HSE survey. The panel data structure makes it possible to analyze changes in employment and economic situation at the micro level, and identify socio-demographic variation of these changes. Additionally, the study uses aggregated indicators published by Rosstat (the cost of a fixed basket of consumer goods and services, subsistence minimum, unemployment rate) to control regional characteristics (Rosstat 2022).

When studying changes in employment characteristics, the main focus of the study is people of working age as of 2019 (females aged 18-54 and males aged 18-59). In order to assess the pandemic impact on employment, we have limited the sample to those individuals who had paid employment in the labor market in 2019. The sample included only those respondents whose information was present in the data for both 2019 and 2020. The total sample size of the study equaled to 5784 individuals. Tables P1 and P2 (Annex) present distribution of the respondents by main socio-demographic group, as well as characteristics of their employment in 2019.

The paper has also analyzed changes in household income. In the course of the analysis, the RLMS-HSE data on households were combined with data on individuals, making it possible to combine information on household income and employment of household members. The study object in this case is a household. The sample selection criteria included availability of household income data in 2019 and 2020, as well as values of independent variables included in the regression analysis. The final sample size equaled to 6,198 households. Table P3 (Annex) outlines main socio-demographic characteristics of households.

- A separate objective of the study is to test the hypothesis about the impact of vulnerable employment on the probability of deteriorated position of a person in the labor market and their reduced household income during the COVID-19 pandemic, made by the authors in their previous paper (Kartseva, Kuznetsova 2020). In the context of the pandemic, workers of the following three groups are considered vulnerable:
- self-employed and individual entrepreneurs;
- employees of non-governmental enterprises of the industries most affected by the pandemic (transport, culture, leisure and entertainment, physical culture and sports, hospitality and tourism, trade, catering, household services and education[2]);

1 To learn more about RLMS-HSE and obtain microdata of the survey, please visit the HSE website at www.hse.ru/rlms/

2 The list of the most affected industries was determined by the Russian government. URL: https://www.rbc.ru/business/30/03/2020/5e819d039a7947925edc003a. (Accessed 15.06.2022)

- workers with precarious employment (Kartseva, Kuznetsova 2020). Precarious employment is determined according to the approach proposed in the papers (Bobkov 2017; Bobkov et al. 2017). An employment is considered precarious if at least one of the following signs is present: low wages (less than the regional subsistence minimum); unofficial wages; work without official contract; salary delay; salary reduction, involuntary reduction of working hours; forced unpaid leave.

The study constructs an indicator of vulnerable employment, which takes the value 1 if the employee is attributed to at least one of the above groups and 0 – otherwise. In 2019, half of the employees (50.4%) had employment recognized as vulnerable (see Table. P2, Annex).

2.2 Job loss and wage reduction

Job loss

We believe that a person lost their job if in 2019 the respondent had a job, and in 2020 they are is unemployed (regardless of whether they became unemployed or left the workforce). According to calculations, 6.9% of people who had paid employment in 2019 lost their job in 2020. Relatively more often, women, young people (16-29 years old), people with lower education (general secondary education and lower), residents of metropolises and families with 3 or more children lost their job (see Table. P4, Annex). In the context of employment characteristics, workers in such industries as trade, household services, catering, hospitality and tourism, low-skilled workers, self-employed, and workers with low wages were relatively more likely to lose their job (see Table P5, Annex).

Wage reduction

Analysis of changes in wages compared the 2019 employee's salary with the one in 2020 (the analysis is carried out only for those employees who remained employed in 2020). To ensure regional comparisons, nominal wage indicators are adjusted to the cost of a fixed basket of consumer goods and services in the region. To ensure intertemporal comparisons, wages in 2020 are adjusted to the 2019 prices. The analysis does not include potential growth of wages that could have occurred without the pandemic.

58% of the employees experienced reduction in wage in 2020 compared to 2019. On average, wages were reduced by 16%. In order to exclude errors related to the wage measurement error, we use a 10% reduction in wage as a criterion for wage reduction. In other words, we believe that an employee's salary has decreased if their salary in 2020 was 10% or more lower than in 2019[1]. According to this criterion, wages were reduced for every fourth employee (25%). The probability of wage reduction insignificantly differs in the context of individual socio-demographic groups of workers (see Table. P4, Annex). Males, middle-aged employees (30-44 years old), employees with higher education, as well as residents of large cities experienced reduction in wages somewhat more often. In terms of employment characteristics, there is a relatively high share of those experienced reduction in wages among employed in trade, household services, catering, hospitality and tourism, construction, transport and communications, and those self-employed (see Table. P5, Annex).

1 To test sustainability of the results the study also used a 5% and 20% reduction in wage criteria. The obtained measurements hardly differ. Results of a similar analysis eith the use of these criteria are available upon request.

2.3 Household income. Descriptive statistics

The basis of the analysis of changes in household income in the context of the pandemic is the indicator of per capita household income, defined as the ratio between the total nominal household income and the number of its members. We compare per capita household income in 2019 and 2020. By analogy with wages, in order to ensure intertemporal and inter-regional comparisons, per capita incomes are adjusted to the cost of a fixed basket of consumer goods and services in the region and to the 2019 prices.

It should be noted here that specifics of income data collection under the Russian Longitudinal Monitoring Survey may influence assessment of the pandemic consequences. The fact is that within the framework of the Survey information about income is collected at the end of the year as of 30 days prior to the Survey. In this regard, comparing 2019 and 2020, we cannot take into account financial assistance that was provided in the midst of the pandemic and quarantine to various categories of households, including families with children. Thus, our comparisons are more focused on assessing longer-term consequences of the epidemiological crisis.

In general, according to the RLMS-HSE data, 53% of the households experienced per capita household income reduction in 2020 compared to 2019. The average reduction equaled to 20%. The paper has considered the following three variants of the per capita household income reduction indicator: a 10% and over reduction, 20% and over, and 30% and over reduction. An expanded range of income reduction indicators allows us to get an idea of sustainability of impacts of various factors, as well as how they are associated with weaker or, vice versa, stronger income shocks.

In 2020, 31% of the households faced a 10% and over reduction in income, income of 20% of the households was reduced by 20% and over, and 13% of the households experienced a 30% and over reduction in income (Table P6, Annex). Families with children under the age of 18, households in megapolises and regional centers, as well as households with vulnerable employees more often experienced reduction in income. (Table P6, Annex).

During the COVID period families with high income were affected the most. We have considered quintiles of per capita household income in 2019 as income groups. It turned out that in 2020, about 17% of the poorest households and more than half of the households from the highest income group experienced a rather insignificant reduction in income - by 10% and over. A significant reduction in income is also much more often observed among households of the highest income quintile: about 30% of the households from the fifth group experienced a 30% and over reduction in per capita income over a year. For comparison: among households of the 1st and 2nd quintile, such a significant reduction in income is much less common, registered in 7-8% of cases. Therefore, income mainly decreased among those who had something to lose.

3. Methodology

To identify risk factors of job loss and wage reduction, as well as the risk of household income reduction, it is not enough to simply compare the average risk indicators by individual group. It is necessary to conduct an econometric analysis to determine significance of a particular factor, other characteristics of the individual or household being equal. Below is a summary of the models used in the study.

3.1 Risk of job loss

The study has undertaken an econometric analysis of socio-demographic and economic factors determining the probability of job loss in 2020. Let's remember that the analysis is carried out for those individuals with paid employment in 2019. The following logit model has been evaluated (M1):

$$P\left(lost_i = 1 \middle| x_i\right) = \Lambda\left(dem_i'\beta + work_i'\gamma + \delta unreg_i\right), \quad (1)$$

$lost_i$ is employment indicator of a person in 2020 (1 — employed, 0 — otherwise), dem_i is a vector of socio—demographic characteristics of an individual and their household that potentially affect their employment (including such indicators as gender and age of the agent, education, place of residence, marital status, paternal status with children of different ages), $work_i$ is a vector of indicators characterizing employment of a person in 2019 (including the employment type according to the Russian Classification of Occupations 010-2014), indicators of industry classification of employment, indicator of self-employment and low wages (below the regional subsistence level for the third quarter of 2019) and $unreg_i$ is the 2020 regional unemployment rate. The regional unemployment rate is included in the set of explanatory variables in the analysis of employment characteristics as a factor characterizing local labor market strains, which significantly vary across the Russian regions.

To determine significance and magnitude of the vulnerable employment effect on the actual probability of job loss in the short term during the pandemic, the following logit model has been evaluated(M2):

$$P\left(lost_i = 1 \middle| x_i\right) = \Lambda\left(dem_i'\beta + \gamma vulemp_i + \delta unreg_i\right) \quad (2)$$

$lost_i$ is employment indicator of a person in 2020 (1 — employed, 0 — otherwise), dem_i is a vector of socio—demographic characteristics of an individual and their household that potentially affect their employment (including such indicators as gender and age of the agent, education, place of residence, marital status, paternal status with children of different ages), $vulemp_i$ is an indicator of vulnerable employment in 2019, and $unreg_i$ is the 2020 regional unemployment rate. The model (2) does not include employment characteristics of an individual, since the vulnerable employment indicator is largely based on them.

3.2 Risk of wage reduction

For those people who remained employed in 2020, determinants of the probability of wage reductions has been evaluated. The study used logit models (M3 and M4) similar to those used to assess the risk of job loss:

$$P\left(wage\_loss_i = 1 \middle| x_i\right) = \Lambda\left(dem_i'\beta + work_i'\gamma + \delta unreg_i\right), \quad (3)$$

$$P\left(wage\_loss_i = 1 \middle| x_i\right) = \Lambda\left(dem_i'\beta + \gamma vulemp_i + \delta unreg_i\right), \quad (4)$$

$wage\_loss_i$ is an indicator of a 10% and more reduction in wages in 2020 (compared to 2019), dem_i is a vector of socio-demographic characteristics of a person and their household, $work_i$ is a vector of employment indicators of a person in 2019), $vulemp_i$ — a vulnerable employment indicator in 2019, and $unreg_i$ is the 2020 regional unemployment rate .

3.3 Risk of household income reduction

The study also used a regression logit model (M5) to assess factors influencing the risks of household income reduction:

$$P\left(hhinc\_loss_i = 1 \middle| x_i\right) = \Lambda\left(hh_i'\beta\right), \quad (5)$$

$hhinc\_loss_i$ is the indicator of a 10%, 20% and 30% reduction in per capita household income in 2020 (compared to 2019), hh_i is a vector of household characteristics in 2019, including the number of children under the age of 18, family members of retirement age, members with vulnerable employment, members with other employment, type of household place of residence, one of the five quintile income groups the household is affiliated with in 2019.

4. Results

4.1 Job loss

Table 1 presents evaluation results of the job loss logit models during the coronavirus pandemic (M1 and M2 models).

The conducted econometric analysis shows statistically significant gender variation in the probability of job loss – the probability of becoming unemployed is 2 percentage points (p.p.) higher among females compared to males. Distribution by age shows that young people (aged 16 – 29) experience the highest risk of job loss. The risk of job loss is 3 p.p. higher among young employees compared to employees of the middle age. For the older age group (45 years and over), the probability of job loss does not statistically differ between older employees (45 and over) and employees of the middle age.

The study results failed to identify any significant impact of being married/having a partner on the risk of job loss. The presence of one or two children under the age of 18 is also insignificant in terms of the probability of job loss. However, if an employee has three or more children, then the probability of job loss is statistically significantly higher compared to the one without children. Further analysis showed that this effect is registered among females only –three and more children increase the probability of job loss by 3 p.p. (evaluation results of M1 and M2 models on subsamples of men and women are available upon request).

Education is the most important factor for maintaining employment during the pandemic. Employees without professional education were more likely to lose their job by 2-4 p.p. (depending on the model) compared to employees with higher education. A similar effect is registered among workers with basic vocational education (3 p.p.).

In the short term, the pandemic-related crisis has had a greater impact on the employment of residents of metropolises (Moscow, St. Petersburg). For employees living in Moscow and St. Petersburg, the risk of job loss is significantly higher on average compared to those living in regional centers. This is largely due to the employment structure of metropolises – there is a high share of services out there, which were affected the most during the pandemic. Employees in cities that are not regional centers, on the contrary, experienced a slightly lower risk of job loss, but this effect is statistically insignificant.

The employment characteristics prior to the pandemic have a significant impact on the probability of job loss during the crisis period. Those employed in trade, hospitality and tourism, household services, and catering had significantly higher risks of job loss. Unskilled and mid-skilled workers were more likely to lose their job compared to highly skilled work-

ers (by 5 p.p. and 3 p.p, respectively). In addition, a higher risk of job loss was registered among self-employed and workers with low earned income.

The study has confirmed the hypothesis earlier made by the authors (Kartseva, Kuznetsova 2020) that vulnerable employment prior to the pandemic has a statistically significant negative impact on the probability of employment during the pandemic (M2 model). For an employee with vulnerable employment in 2019 the probability of job loss in 2020 is 5 p.p. and more higher compared to other employees.

4.2 Wage reduction

Table 1 also presents results of econometric assessment of the wage reduction risk factors during the pandemic (M3 and M4 models).

The analysis failed to identify any significant variation in the probability of wage reduction by gender and age. The risk of pay cuts during the pandemic hardly differs among workers with different levels of education. A slightly lower probability of wage reduction is registered among workers with secondary vocational education; however, this result is statistically insignificant. Being married/having a partner is not a significant factor in terms of the probability of wage reduction. In contrast to the risk of job loss, the probability of wage reduction is not statistically different among workers (both men and women) with and without children.

Compared to employees living in regional centers, workers from other cities (which are not regional centers) were more likely to experience wage reduction. On the contrary, wage reduction among those employed in rural areas, was less frequently reported.

Certain characteristics of employment prior to the pandemic significantly affect the risk of wage reduction. A relatively high probability of earned income reduction was registered among those employed in such industries as trade, hospitality and tourism, household services, catering, construction, transport and communications. Employees with low wages are significantly less likely to experience reduction in earned income compared to employees with higher earnings. The employment type and qualification of the employee have no statistically significant impact on the risk of wage reduction.

Vulnerable employment is the most important significant factor of earnings reduction. The probability of wage reduction among those with vulnerable employment prior to the pandemic is 4 p.p. higher compared to other workers.

Table 1. Evaluation of the models of job loss and wage reduction factors, marginal effects

Factors	Job loss		Wage reduction	
	M1	M2	M3	M4
Social and demographic characteristics of respondent				
Gender (reference category – males)				
Female	0.018**	0.018**	-0.017	-0.024
	[0.007]	[0.007]	[0.014]	[0.019]
Age of the respondent (reference category – 30-44 years)				
16 – 29	0.029***	0.028***	-0.019	-0.018
	[0.009]	[0.009]	[0.018]	[0.018]
45 – 54/59 (females/males)	0.004	0.009	-0.009	-0.013
	[0.009]	[0.008]	[0.016]	[0.015]

Factors	Job loss		Wage reduction	
	M1	M2	M3	M4
Education of the respondent (reference category – higher professional education)				
General secondary education and lower	0.023**	0.044***	-0.019	-0.031
	[0.011]	[0.010]	[0.023]	[0.021]
Primary vocational edication	0.009	0.027***	-0.016	-0.022
	[0.010]	[0.009]	[0.018]	[0.016]
Secondary vocational education	-0.002	0.008	-0.028*	-0.035*
	[0.010]	[0.010]	[0.017]	[0.019]
Place of residence of the respondent (reference category – regional centers)				
Moscow, St. Petersburg	0.073***	0.071***	0.034	0.032
	[0.012]	[0.012]	[0.025]	[0.025]
Other cities (not regional centers)	-0.016*	-0.012	0.036**	0.028*
	[0.009]	[0.009]	[0.015]	[0.015]
Rural areas	-0.006	0.006	-0.018	-0.033*
	[0.009]	[0.009]	[0.017]	[0.018]
Marital status (reference category – not married/ not in a partnership)				
Married/in a partnership	-0.009	-0.008	-0.010	-0.011
	[0.008]	[0.008]	[0.015]	[0.016]
Number of children under the age of 18 (reference category – no children)				
1 child	-0.005	-0.006	0.011	0.013
	[0.009]	[0.008]	[0.015]	[0.015]
2 children	0.003	0.005	0.005	-0.009
	[0.010]	[0.010]	[0.018]	[0.018]
3 and more children	0.023*	0.022*	0.004	0.003
	[0.013]	[0.013]	[0.029]	[0.028]
Type of employment of the respondent				
Type of economic activity (reference category – manufacturing)				
Set of dummy variables	(+) trade, services		(+) construction; transport and communications; trade, services	
Qualification (reference category – high skills (codes 1 – 3 under the Russian Classification of Occupations 010-2014))				
Low-skilled (code 9 under Job classifier 010-2014)	0.046***		-0.006	
	[0.014]		[0.030]	
Mid-skilled (codes 4 – 8 under Job classifier 010-2014)	0.034***		-0.013	
	[0.009]		[0.016]	
Type of employment (reference category – employees)				
Self-employed, individual entrepreneurs	0.035***		0.022	
	[0.010]		[0.022]	
Earned income				
Earned income below the regional subsistence minimum	0.049***		-0.199***	
	[0.010]		[0.038]	

Factors	Job loss		Wage reduction	
	M1	M2	M3	M4
	Vulnerable employment			
Vulnerable employment		0.052***		0.038***
		[0.007]		[0.067]
	Regional characteristics of the labour market			
Unemployment rate	0.010***	0.010***	0.000	-0.000
	[0.002]	[0.002]	[0.005]	[0.005]
Number of observations	5535	5771	4960	4999

Note: ***, **, * — significance at 1, 5 and 10% levels, respectively. Standard errors are indicated in parentheses.

4.3 Household income reduction

The paper has analyzed factors of household income reduction in 2020 compared to 2019. As a dependent variable, three indicators of per capita household income reduction have been considered (a 10%, 20%, and 30% reduction). The inclusion of several variants of the indicator in the analysis makes it possible to identify factors associated with both insignificant and more significant changes in income.

Table 2 outlines results of the regression analysis of the relationship between the probability of household income reduction and socio-demographic and economic characteristics of the household and its members. It is shown that children under the age of 18 in the household significantly increase the risks of income reduction – the higher the number of children, the higher the probability of income reduction. For example, for families with one child, the probability of a 30% reduction in income is 4 p.p. higher compared to families without children, while for families with 3 or more children – by 14 p.p. Having pensioners in the family, on the contrary, had a small deterrent effect, reducing the probability of income reduction by 2-3 p.p. for families with one pensioner and by 4-5 p.p. for families with two or more pensioners.

Household income on the eve of the pandemic turned out to be the most important factor of income reduction in 2020. As it was already mentioned in the discussion of descriptive statistics (Section II and Table P6, Annex), more well-off families were more likely to lose income. The regression analysis results confirm this finding. In particular, the risks of a 30% reduction in household income among the poorest quintile were 2 p.p. lower compared to the third (middle) income group, and 26 p.p. higher among the quintile with the highest income. For a 20% reduction in income, similar values equal to 7 p.p. and 28 p.p., respectively, and 15 p.p. and 26p.p. for a 10% reduction. A possible explanation for a higher impact of the pandemic on income of more well-off households is that such households are more integrated into the labor market and focused on earned income, and they are also more likely to include employees of the most quarantine-affected industries. Our results are indirectly confirmed by decreased income inequality recorded by official statistics. Thus, according to Rosstat data, the Gini coefficient (a measure of income inequality in a population) decreased from 0.412 in 2019 to 0.406 in 2020, and the coefficient of funds, measuring the differences between the decile groups with maximum and minimum income - from 15.5 to 14.8 (Rosstat 2021), that is, the reduction in inequality was largely due to a relative decrease in income of the richest groups.

Higher risks of income reduction are observed for households living in the metropolises (significant for small income shocks) and in rural areas. It should be particularly noted here that at the level of descriptive analysis, higher risks of income reduction in rural households were not identified: the share of those who faced income reduction is slightly lower compared to the sample average (see Table P6, Annex). This is due to the fact that households with lower income in 2019 were less likely to experience income reduction during the pandemic. Inclusion of information about income on the eve of the pandemic in the model makes it possible to better understand what has happened to poorer households, which, in particular, include families living in rural areas.

The impact of the number of employed household members on the risks of income reduction during the pandemic depends upon the employment type. Thus, workers with vulnerable employment in the household significantly increase the risk of a 10% reduction in income. At the same time, other workers in the household (without vulnerable employment) significantly reduce the risks of income shock – by 2-3 p.p. for families with 1 non-vulnerable worker and by 4-5 p.p. for families with 2 or more members with non-vulnerable employment. It should be noted here that the latter fact, as in the case of the risk of income reduction among rural households, is not distinguishable when analyzing descriptive statistics (on average, 29% of the households in the sample and 32-34% of the households with vulnerable employment experienced a 10% or more reduction in income, see Table P6, Annex) and is defined only when information about household income on the eve of the pandemic is included in the regression model.

Table 2. Regression analysis of the factors of per capita household income reduction in 2020 compared to 2019, logit model, marginal effects

Factors	Per capita income in 2020 reduced by:		
	10%	20%	30%
Number of children under the age of 18 in the household (reference category – no children)			
1 child	0.066***	0.070***	0.041***
	[0.016]	[0.014]	[0.012]
2 children	0.122***	0.081***	0.049***
	[0.021]	[0.019]	[0.017]
3 and more children	0.220***	0.172***	0.137***
	[0.034]	[0.034]	[0.032]
Number of pensioners in the household (reference category – no pensioners)			
1 pensioner	-0.031**	-0.025**	-0.023**
	[0.014]	[0.012]	[0.010]
2 and more pensioners	-0.040**	-0.031**	-0.047***
	[0.017]	[0.015]	[0.012]
Number of household members with vulnerable employment (reference category – no vulnerable employment)			
1 member	0.052***	0.035***	0.016
	[0.014]	[0.012]	[0.010]
2 and more members	0.044**	0.014	0.001
	[0.019]	[0.016]	[0.013]

Factors	Per capita income in 2020 reduced by:		
	10%	20%	30%
Number of household members with other employment (reference category – no other employment)			
1 member	-0.028**	-0.035***	-0.036***
	[0.013]	[0.011]	[0.010]
2 and more members	-0.048***	-0.041***	-0.044***
	[0.018]	[0.015]	[0.013]
Type of place of residence (reference category – reginal centers)			
Moscow and St. Petersburg	0.040**	0.005	0.004
	[0.019]	[0.016]	[0.013]
Other cities	0.019	0.008	-0.003
	[0.013]	[0.012]	[0.010]
Rural settlement	0.079***	0.054***	0.033***
	[0.016]	[0.014]	[0.013]
Quintile income group (reference category – 3rd group, mid-level income)			
1st group (the poorest)	-0.147***	-0.066***	-0.024**
	[0.016]	[0.013]	[0.010]
2nd group	-0.057***	-0.039***	-0.017
	[0.017]	[0.014]	[0.011]
4th group	0.118***	0.099***	0.062***
	[0.019]	[0.016]	[0.013]
5th group	0.263***	0.280***	0.256***
	[0.019]	[0.018]	[0.017]
Number of observations	6198	6198	6198

Note: ***, **, * — significance at 1, 5 and 10% levels, respectively. Standard errors are indicated in parentheses.

5. Conclusions

The paper has undertaken an econometric study of the short-term effects of the epidemiological crisis on employment and income of the Russian population. In particular, factors deteriorating position in the labor market have been identified, namely, factors of job loss and wage reduction. It is shown that the highest probability of job loss in the first year of the pandemic was observed among young employees (aged 16-29), workers without professional education and workers with low wages, whose employment is traditionally considered precarious. Other things being equal, young and low-skilled workers have less specific human capital, and a company can easily dismiss such workers in crisis situations and easily hire them during the period of growth.

Like in other countries, in Russia, women lost their job more often than men during the pandemic. Women with three or more children experienced the highest risks of job loss.

To a large extent, the observed gender variation of the effect is explained by the sharply increased demand for housework (child care, housekeeping) during the pandemic. Thus, socio-demographic characteristics of the employee are significant determinants of job loss during the coronavirus crisis. However, the study failed to identify any significant impact of socio-demographic characteristics on the probability of wage reduction among those who retained employment.

From the point of view of employment characteristics, high risks of job loss were registered among employees of the industries most affected by the coronavirus crisis. In addition, a significantly higher probability of job loss was registered among workers with low and mid-level skills, self-employed and individual entrepreneurs, as well as workers with low earned income. Employment in the industries most affected by the pandemic turned out to be almost the only significant risk factor for the probability of earned income reduction.

The analysis has confirmed the hypothesis earlier made by the authors (Kartseva, Kuznetsova 2020) about impact of the complex indicator of vulnerable employment on the probability of job loss/wage reduction. This indicator aggregates information about the three risks most relevant in the context of the pandemic – employment in the most affected industries, self-employment and precarious employment. According to the results obtained, vulnerable employment prior to the pandemic increases the probability of job loss during the pandemic by 5 p.p., and increases the probability of earned income reduction by 4 p.p.

It should be noted here that in terms of risk factors for workers in the labor market during the pandemic, Russia hardly differs from other countries. Numerous foreign studies identify almost the same groups of employees with increased risks of job loss /income reduction during the pandemic as in Russia – young employees, workers with low education/skills, women, parents with children, workers in the most affected industries (see, for example, ILO 2021; Adams-Prassl et al. 2020; 2020; Aum et al. 2020; Dang and Nguyen 2021; Couch et al. 2022; Lopes and Carreira 2022; Mongey et al. 2021; Pouliakas and Branka 2020). The study results also confirm conclusions for Russia (Gimpelson 2021; Tikhonova 2021). Our study complements these studies though considering factors of job loss and income reduction separately, as well as analyzing the impact of vulnerable employment.

Additionally, the study has analyzed factors of per capita household income reduction. The best predictor of the risk of income shock in 2020 was the household income a year earlier – the more well-off the family, the higher the risk of income reduction. For example, the probability of a 30% reduction in income among the poorest quintile households was 2 p.p. lower compared to the third (middle) income group household, and 26 p.p. higher for the highest income quintile households.

Despite unprecedented support measures aimed at sustaining income of families with children during the pandemic, families with children under the age of 18, all other things being equal, were more affected by income reduction. The study results confirm the estimates of future changes in income of families with children obtained by the study (Pishnyak et al. 2021) using a micro–modeling – compensation payments mitigate the crisis impact for families with children, not completely leveling it. Pensioners in the household reduce the risk of per capita income reduction, which is largely due to sustainability of their income.

Members with vulnerable employment in the household significantly increase the risks of income reduction, while members with other employment in the household, on the contrary, significantly reduce them.

As for the positioning of the household income reduction factors identified by the authors in earlier studies, both similarities and certain differences can be noted. Similarities

include significantly higher risks of income reduction among households with children (Vilar-Compte et al. 2022; Alstadsæter et al. 2020; Grishina 2021); among households of workers whose status has worsened during the crisis (Morgan and Trinh 2021), in our case these are household members with vulnerable employment; and among households living in metropolises (Grishina, 2021).

The new results include the following: in 2020, households with higher income were affected the most. Studies based on data on other countries, show a different relationship: either higher risks for the poor (Vilar-Compte et al. 2022), or no significant relationship between income on the eve of the crisis and the risk of income reduction (Morgan and Trinh 2021; Long et al. 2021). Moreover, we were able to show that evaluation of household income on the eve of the crisis allows us to clarify influence of a number of factors, in particular, to identify increased risks for households living in rural areas, as well as a lower probability of income reduction among households with workers with non-vulnerable employment.

An important limitation of this study is impossibility of analyzing changes in employment and income that occurred during the year between the two rounds of the survey. This limitation is due to the peculiarities of the RLMS-HSE data.

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Annex

Table P1. Distribution of the respondents by major social and demographic group, 2019

Group (as of 2019)	Share in sampling, %
Gender	
Females	51.7
Age	
16-29	17.8
30-44	51.8
45+	30.4
Education	
General secondary education or lower	12.4
Primary vocational education	28.2
Secondary vocational education	23.2
Higher professional education	36.2

Group (as of 2019)	Share in sampling, %
Place of residence	
Metropolises (Moscow, St. Petersburg)	10.6
Regionalcenter	34.5
Other cities	27.8
Rural area, urban-type settlement	27.1
Marital status	
Married/in a partnership	75.6
Number of children under the age of 18	
None	40.2
1 child	32.0
2 children	21.3
3 and more children	6.5

Table P2. Employment characteristics of the respondents, 2019

Group (as of 2019)	Share in sampling, %
Type of economic activity	
Agriculture	3.9
Manufacturing	16.7
Construction	7.7
Transport and communications	9.9
Education, science, culture	13.5
Healthcare, social services	7.5
Finances, real estate, law	4.2
Public administration	2.3
Trade, household services, catering, hospitality and tourism	24.3
Housing and communal services	3.7
Other	6.5
Qualification	
Unskilled (code 9 under Russian Classification of Occupations 010-2014)	6.6
Mid-skilled (codes 4–8 under Russian Classification of Occupations 010-2014)	49.0
Highly skilled (codes 1–3 under Russian Classification of Occupations 010-2014)	44.4
Type of employment	
Self-employed, individual entrepreneurs	9.5
Earned income	
Below the regional subsistence level	8.1
Vulnerable employment	
Employment is vulnerable	50.4

Table P3. Distribution of the households by major social and demographic characteristic

Group (as of 2019)	Share in sampling, %
Number of children under the age of 18	
None	64
1 child	19.7
2 children	0
3 and more children	12.2
Number of pensioners	
None	46
1 pensioner	36.4
2 and more pensioners	17.6
Place of residence	
Metropolises (Moscow, St. Petersburg)	1.8
Regional center	32
Other cities	33.1
Rural area, urban-type settlement	23
Number of household members with vulnerable employment	
None	58.5
1 member with vulnerable employment	29.7
2 and more members with vulnerable employment	118
Number of household members with other employment	
None	56.1
1 member with other employment	30.8
2 and more members with other employment	13.1
Income group	
1st (low income)	20
2nd	19.6
3rd	19.6
4-h	19.8
5th (high income)	21

Table P4. Share of those who lost their job and share of those experienced wage reductions in 2020 compared to 2019 by main social and demographic group

Group (as of 2019)	Lost their job, %	10% and over wage reduction, %
All employees	6.9	24.8
Gender		
Males	6.2	26.4
Females	7.7	23.3

Group (as of 2019)	Lost their job, %	10% and over wage reduction, %
	Age	
16-29	9.9	23.8
30-44	6.1	25.9
45+	6.5	23.6
	Education	
General secondary education or lower	11.9	24.1
Primary vocational education	7.8	25.0
Secondary vocational education	6.0	22.7
Higher professional education	5.1	26.4
	Place of residence	
Metropolises (Moscow, St. Petersburg)	11.9	28.3
Regional center	6.5	24.9
Other cities	4.9	27.3
Rural area, urban-type settlement	7.5	20.9
	Marital status	
Married/in a partnership	6.4	24.8
	Number of children under the age of 18	
None	7.3	24.1
1 child	6.1	25.7
2 children	6.5	25.4
3 and more children	10.1	24.0

Table P5. Share of those who lost their job and share of those experienced wage reductions by employment characteristic prior to the pandemic compared to 2019

Group (as of 2019)	Lost their job, %	10% of more wage reduction, %
All employees	6.9	24.8
	Type of economic activity	
Agriculture	8.1	24.9
Manufacturing	5.7	22.8
Construction	7.7	31.9
Transport and communication	5.8	27.4
Education, science, culture	5.5	21.2
Healthcare, social services	4.4	20.8
Finances, real estate, law	5.5	27.3
Public administration	5.3	16.1
Trade, household services, catering, hospitality and tourism	9.7	28.0
Housing and communal services	8.6	19.1
Other	5.9	25.6

Group (as of 2019)	Lost their job, %	10% of more wage reduction, %
Qualification		
Unskilled (code 9 under Russian Classification of Occupations 010-2014)	12.4	22.1
Mid-skilled (codes 4–8 under Russian Classification of Occupations 010-2014)	8.3	24.9
Highly skilled (codes 1–3 under Russian Classification of Occupations 010-2014)	4.5	25.1
Type of employment		
Self-employed, individual entrepreneurs	12.6	27.8
Earned income		
Below the regional subsistence level	15.3	9.6
Vulnerable employment		
Employment is vulnerable	9.6	26.8

Table P6. Share of the households experienced wage reduction by social and demographic characteristic

	Per capita income reduced by:		
Group (as of 2019)	10%	20%	30%
All people	30.9	19.9	13.2
Number of children under the age of 18			
None	29.6	19.0	12.9
1 child	32.8	22.8	14.5
2 children	32.1	18.7	11.6
3 more children	36.5	23.3	16.9
Number of pensioners			
None	34.6	23.0	15.9
1 pensioner	28.1	17.6	11.9
2 and more pensioners	26.1	15.9	8.7
Place of residence			
Metropolises (Moscow, St. Petersburg)	34.5	21.1	15.0
Regional center	31.6	21.3	14.7
Other cities	29.4	18.7	11.8
Rural area, urban-type settlement	29.9	19.0	12.3
Number of household members with vulnerable employment			
None	26.8	16.9	11.2
1	36.1	24.0	16.0
2 and more	37.9	24.4	16.4
Number of household members with other employment			
None	28.9	18,6	12.7
1	33.8	21.6	14.0
2 and more	32.3	21.3	13.3

	Per capita income reduced by:		
Group (as of 2019)	**10%**	**20%**	**30%**
Income group			
1st (low income)	16.5	10.7	7.5
2nd	22.5	11.4	6.5
3rd	26.6	14.3	7.6
4th	36.7	22.6	12.8
5th (high income)	50.7	39.3	30.6

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