RUDN Journal of Economics
Вестник Российского университета дружбы народов. Серия: Экономика
ISSN 2313-2329 (Print); ISSN 2408-8986 (Online)
2024 Vol. 32 No. 2 205–221
http://journals.rudn.ru/economics

МИРОВОЙ РЫНОК ТРУДА И МЕЖДУНАРОДНАЯ МИГРАЦИЯ

GLOBAL LABOUR MARKET AND INTERNATIONAL MIGRATION

DOI: 10.22363/2313-2329-2024-32-2-205-221
EDN: HVYDHG
UDC 339.9

Research article / Научная статья

Human Capital and Income Decline: Evidence from the Russian Longitudinal Monitoring Survey 2019–2022

Svetlana A. Balashova[1] ✉, **Bella V. Gabrielyan**[2,3]

[1] *RUDN University,*
6 Miklukho-Maklaya St, Moscow, 117198, Russian Federation

[2] *Yerevan Branch of the Russian Economic University named after G.V. Plekhanov,*
5/2 Arzumanyan St, 0015, Republic of Armenia

[3] *Institute of Economics after M. Kotanyan,*
15 Grigor Lusavorich St, Yerevan, 0015, Republic of Armenia

✉ balashova-sa@pfur.ru

Abstract. Human capital is widely regarded as a fundamental driver of economic growth, at least in the innovative and knowledge-based economy. However, the empirical evidence linking human capital with economic outcomes has been problematic both at macroeconomic and microeconomic levels. The estimates obtained in this study, based on RLMS data, show that the conditional probability of a worsening financial situation for people with higher education increased significantly in 2020 and 2022 compared to 2019. Using logit analysis, we calculated the odds ratios for worsening finances for three groups: currently employed versus not employed, reported poor health versus good health, and with tertiary education versus no tertiary education. Individuals with poor health are 20 % more likely to experience a decline in income than those in good health, but worryingly, after 2020 those with tertiary education are also about 1.2 times more likely to experience a decline in income than those with secondary education or less. It does not cast doubt on the positive impact of human capital on the knowledge-based economy. But it raises the question to what extent the characteristics of the knowledge-based economy are maintained during crises.

The other question is the extent to which tertiary education today meets the expectations of the labour market and whether the education system has the foresight to ensure a high return on investment in human capital.

Keywords: human capital, income decline, RLMS, logit model, tertiary education

Article history: received January 10, 2024; revised February 18, 2024; accepted March 1, 2024.

For citation: Balashova, S.A., & Gabrielyan, B.V. (2024). Human capital and income decline: Evidence from the Russian Longitudinal Monitoring Survey 2019–2022. *RUDN Journal of Economics, 32*(2), 205–221. https://doi.org/10.22363/2313-2329-2024-32-2-205-221

Человеческий капитал и снижение дохода: по результатам российского мониторинга экономического положения и здоровья населения в 2019–2022 гг.

С.А. Балашова[1], Б.В. Габриелян[2,3]

[1]Российский университет дружбы народов,
Российская Федерация, 117198, Москва, ул. Миклухо-Маклая, д. 6

[2] Ереванский филиал РЭУ им.Г.В.Плеханова,
Армения, 0015, Ереван, ул. Арзуманяна, д. 5/2

[3] Институт экономики им. М. Котаняна НАН РА,
Армения, 0015, Ереван, ул. Григора Люсаворича, д. 15

✉ balashova-sa@pfur.ru

Аннотация. Человеческий капитал признается фундаментальной движущей силой экономического роста, по крайней мере, в инновационной, основанной на знаниях экономике. Этот тезис многократно обосновывается в работах ведущих экономистов, посвященных экономическому росту. Однако эмпирические исследования, связывающие человеческий капитал с экономическими результатами, не дают безусловного подтверждения этого тезиса как на макроэкономическом, так и микроэкономическом уровнях. В исследовании рассматривается вопрос о вкладе человеческого капитала в вероятность ухудшения экономических результатов домохозяйств на фоне кризисных явлений. Оценки, полученные на основе данных Российского мониторинга экономического положения и здоровья населения (RLMS, НИУ ВШЭ), показывают, что условная вероятность ухудшения финансового положения для людей с высшим образованием значительно увеличилась в 2020 и 2022 гг. по сравнению с 2019 г. С помощью логит-анализа мы рассчитали отношения шансов ухудшения финансового положения для трех групп: работающие в настоящее время и неработающие, сообщившие о плохом здоровье по сравнению с группой респондентов с хорошим здоровьем, группа респондентов с высшим образованием по сравнению с тем, у кого нет диплома о высшем образовании. Люди с плохим здоровьем имеют на 20 % больше шансов снижения доходов, чем люди с хорошим здоровьем, что является негативным, но ожидаемым результатом. Однако вызывает тревогу то, что после 2020 г. для людей с высшим образованием шанс ухудшения финансового положения семьи также в 1,2 раза выше, чем у людей, не имеющих высшего образования. Эти оценки не ставят под сомнение положительное влияние человеческого капитала на экономику, основанную на знаниях. Но возникает вопрос, в какой степени черты экономики, основанной на знаниях, сохраняются во время кризисов. Возникает и другой

вопрос, в какой степени высшее образование сегодня соответствует ожиданиям рынка труда и способна ли система образования обеспечить высокую отдачу от инвестиций в человеческий капитал.

Ключевые слова: человеческий капитал, снижение доходов, РМЭЗ, логит-модель, высшее образование

История статьи: поступила в редакцию 10 января 2024 г., проверена 18 февраля 2024 г., принята к публикации 1 марта 2024 г.

Для цитирования: *Balashova S.A., Gabrielyan B.V.* Human capital and income decline: Evidence from the Russian Longitudinal Monitoring Survey 2019–2022 // Вестник Российского университета дружбы народов. Серия: Экономика. 2024. Т. 32. № 2. С. 205–221. https://doi.org/10.22363/2313-2329-2024-32-2-205-221

Introduction

Human capital theory, initially formulated by Backer, suggests that individuals invested in their education and improvement of their skills are more effective and therefore justify higher earnings compared to those who are less skilled (Becker, 1993).

Many studies based on surveys and microdata also suggest that the more educated people are, as a rule, receive higher income than less educated. One of the first evidences came from studies of Jacob Mincer (Mincer, 1958), who is regarded as a father of modern labour economics.

The economic benefits are not limited to individuals[1]. Higher education is an advantage that allows a person to realise themselves and contribute to the development of the economy and society. There are various studies that analyse the role of education in reducing inequality (Abdullah, Doucouliagos, & Manning, 2015)

The majority of scholars and experts consider human capital, of which education is the main accumulator, as one of the main drivers of economic growth (see, for example (Romer, 1989) and literature review in (Bulina, Mozgovaya, & Pakhnin, 2020)). This hypothesis has a lot of empirical support for various countries including Russia (Balashova, Lazanyuk, & Matyushok, 2018). Of course, it is necessary to consider arguments of Professor Daron Acemoglu and others (Acemoglu, Gallego, & Robinson, 2014; Acemoglu, Johnson, & Robinson, 2005) that without appropriate institutions, the effect of human capital on economic development is small in the long-run.

In general, human capital consists of various assets which are valuable individually, for the companies and for the society. According to the World Bank definition, "human capital consists of the knowledge, skills, and health that people invest in and accumulate throughout their lives, enabling them to realize their potential as productive members of society."[2] So, studying the effect of human capital on personal income and economic

[1] OECD: Education at a Glance. Retrieved November 11, 2023, from https://www.oecd-ilibrary.org/education/education-at-a-glance-2023_e13bef63-en

[2] The Human Capital Project. Retrieved November 11, 2023, from https://www.worldbank.org/en/publication/human-capital

growth also consider investment in healthcare systems (if studying at the macro-level) or personal health state (if studying at micro-level).

In this study, we examine the impact of human capital (such aspects as education, employment, and health state) on personal income mobility. The study is based on "Russia Longitudinal Monitoring survey, RLMS-HSE", conducted by National Research University "Higher School of Economics" and OOO "Demoscope" together with Carolina Population Center, University of North Carolina at Chapel Hill and the Institute of Sociology of the Federal Center of Theoretical and Applied Sociology of the Russian Academy of Sciences[3] and consider the period 2019 to 2022. By personal income mobility, we understand respondents' subjective assessment of changes in their family's financial situation over the previous year. In particular, we examine the relationship between educational attainment and the possibility of downward income mobility, controlling for variables such as health, income and occupation.

The motivation for our study lies in the following stylised facts. Following the global financial and economic crisis of 2008–2009, the Russian economy grew until 2014 (Voskoboynikov, 2017), and this growth was accompanied by an increase in the real personal income of the population. However, statistical data[4] show that while nominal personal incomes have been growing in the following years as well, the real per capita incomes have been declining since 2014. This trend stops in 2018–2019, but against the background of the pandemic and the Russian economy slumps in 2022, the decline in real personal income is repeated in 2020 and 2022.

In the structure of the personal income of the population, the main share is made up of income from work (more than 57 % over the whole observation period), as well as social payments (their share is 18–19 % in 2013–2019, increasing to 21.5 % in 2020, then falling to 20.2 % in 2022).[5]

The extremely unequal distribution of cash income among the population, which emerged in the early 2000s (Varshavsky, 2019), decreased in 2020 according to formal indicators (there was a decrease in the Gini coefficient and the decile coefficient of funds), but as the analysis shows, this was not due to a more equal distribution of income, but to the impact of COVID-19 restrictions on the incomes of wealthy Russians (Balashova, 2022)

The average income per capita in 2013 prices is almost the same in 2020 as it was in 2013. However, the share of the population with a per capita income of more than 45 thousand roubles per month (In 2013 prices) decreased from 13.3 % in 2013 to 8.2 % in 2020, while the share of the population with incomes of 10 to 27 thousand roubles per month per person (In 2013 prices) increased from 47 to 56 %. At the same time (thanks to an increase in social benefits and pro-poor growth in previous years (Dang et al., 2020)) the share of low-income Russians (with an income of less than 10 thousand rubles per person in 2013 prices) decreased.

[3] RLMS-HSE web sites. Retrieved November 11, 2023, from https://rlms-hse.cpc.unc.edu, https://www.hse.ru/org/hse/rlms

[4] Federal State Statistics Service. Standard of living. Retrieved November 11, 2023, from https://rosstat.gov.ru/folder/13397

[5] Authors' calculation based on Rosstat data.

The questions in our study are to what extent education, good health and having a job reduce the likelihood of a worsening financial situation in the context of a general decline (or freezing) in real incomes.

Logit models were used to analyse the probability of a deterioration in the financial situation of Russians, according to their subjective assessment, in the context of the COVID-19 pandemic and the 2022 crisis, depending on a number of factors. The dependent variable of the regression model to determine the corresponding probability was a dummy variable taking the value 1 if the respondent reported a deterioration in the family's financial situation in the previous year, and 0 otherwise (answers in this case ranged from "no change" to "significantly improved"). The explanatory variables were demographic indicators (gender, age), educational attainment, income, employment and occupation.

Estimates show that Russians with higher education, employees or entrepreneurs were more likely to see their financial situation deteriorate in 2020. Russians working in state-owned enterprises turned out to be more protected.

The probability of a decrease in income for people with tertiary education increased in 2021 and 2022. This indicates, on the one hand, a decrease in the demand for people with higher education in the modern Russian economy and, on the other hand, the problems of "mismatch" between the product of the education system and the demand in the labour market.

Data and Methodology

Characteristics of survey respondents

The initial data for the analysis are data from The Russia Longitudinal Monitoring Survey — Higher School of Economics (RLMS-HSE). Based on a national sample, households (more than 4.5 thousand) are surveyed using a specially developed questionnaire, as well as each member of the household (more than 12 thousand people). The sample is a representation of the population of the Russian Federation, covers all regions of Russia, and reproduces the sex and age structure of the population.

For the purposes of this research, we retrieved data on individuals born no earlier than 2002 who received non-zero income in the last month before the survey. By definition, it includes various types of income such as capital income, labour income, pensions, subsidies and others. That is, it includes regular income and occasional income. To reduce the effects of outliers, we only keep individuals with a positive income level.

The age-sex diagram (Figure 1) breaks down the considered sample into male and female genders and age ranges. The diagram represents the total number of males/females who are of a certain age: born before 1964, born between 1964 and 1984 (so called "generation X"), and born between 1985 and 2002 (so called "generation Y") (discussion about differences between generations see, for example, in (Parry & Urwin, 2011)) . There is a large proportion of the population aged 55 and over, and a disparity between older men and women, which reflects the age and gender structure

of the Russian population as a whole.[6] Features of demographic development in Russia from the 1940s to 2020 and the contribution of various components to the demographic dynamics can be found in (Ryazantsev & Rybakovskii, 2021).

Figure 1. Age-sex structure of the representative sample in 2019
Source: compiled by the authors.

Table 1 shows the distribution of the survey respondents by their education and occupation. The data shows a steady increase in the percentage of respondents with higher education diplomas. Additionally, there is a small number of entrepreneurs and a relatively large group of people currently employed by state-owned enterprises or organizations

Table 1

Breakdown of respondents by education and occupation, 2019–2022

Education and occupation	2019	2020	2021	2022
Higher education Diploma and more	2541 (27.93%)	2569 (28.44%)	2595 (29.06%)	2592 (29.78%)
Currently working	4783 (52.57%)	4645 (51.42%)	4708 (52.72%)	4767 (54.77%)
Including work in a state-owned enterprise or in the civil service	1941 (21.33%)	1969 (21.80%)	1924 (21.55%)	1911 (21.96%)
Entrepreneurs	123 (1.35%)	124 (1.37%)	110 (1.23%)	135 (1.55%)
Number of respondents	9098	9034	8930	8703

Source: Authors' calculation based on RLMS-HSE data.

[6] Male and female population in Russia as of January 1, 2023, by age group. Retrieved November 11, 2023, from https://www.statista.com/statistics/1005416/population-russia-gender-age-group/

Of the working respondents, most are employed in trade and services, education, transportation and communication (Figure 2). Each of the other sectors employs less than 9 % of the working respondents, but all major economic sectors are represented in the survey.

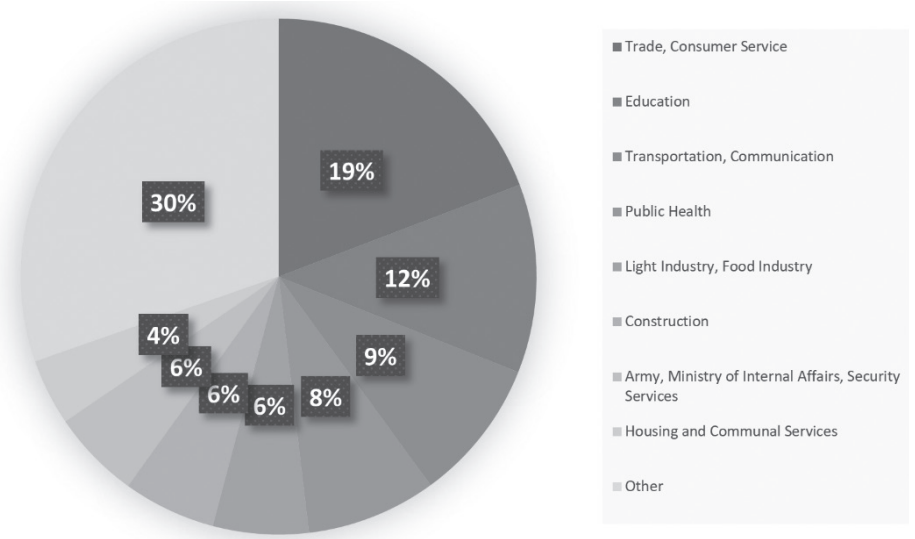

Figure 2. Breakdown of the sample by Industry in 2019, %
Source: compiled by the authors.

For our analysis, answers to the question: *«What is the total amount of money that you personally received in the last 30 days. Please include everything: wages, retirement pensions, premiums, profits, material aid, incidental earnings, and other receipts» form the variable INCOME*. Data is cleaned from outliers. Table 2 shows descriptive statistics of the variable *INCOME*.

Table 2

Descriptive statistics of the variable *INCOME*, 2019–2022

Year	Mean	Median	The Lower quartile (Q1)	The upper quartile (Q3)	Standard deviation
2019	26300	20100	14800	30700	21546
2020	27100	21400	15000	32000	21902
2021	31150	25900	18250	37000	23898
2022	33200	27000	19000	40000	26625

Source: Authors' calculations based on RLMS-HSE data.

The variation of current income is very high. It is worth noting that the bottom 25 % of the population with low income (the lower quartile) received no more than 14 800 rubles per month in 2019, while 75 % of the population (the upper quartile) received no more than 30 700 rubles per month. In nominal terms, the lower and upper

quartiles boundaries increased significantly in 2022 compared to 2019. However, high inflation in 2021 and especially in 2022 has devalued this growth.

Despite the average increase in nominal income, a significant proportion of respondents reported a deterioration in their financial situation (Figure 3), for both objective and subjective reasons. According to Rosstat[7], the real disposable income of the population (relative to the previous year) was 98 % in 2020, 103.3 % in 2021, and 98.1 % in 2022. Of course, not everyone experienced income downward. However, the proportion of respondents reporting a deterioration has increased in the following years compared to 2019. The highest value (28 % of all respondents) was observed in 2020, which is obviously related to COVID-19 epidemic and mitigation measures. However, in 2021 and 2022, 24 % of all respondents reported a worsening of their financial situation. Of these respondents, about 60 % were women, with a slight increase in the proportion of women in 2021 and 2022. However, taking into account the gender structure of the population (see Figure 1), we can see that gender is not a significant factor associated with a decrease in income.

More worrying is the fact that the proportion of those with tertiary education who reported that family finances had worsened increased. This proportion was on the rise from 27 % in 2019 to 32 % in 2022 (Figure 3).

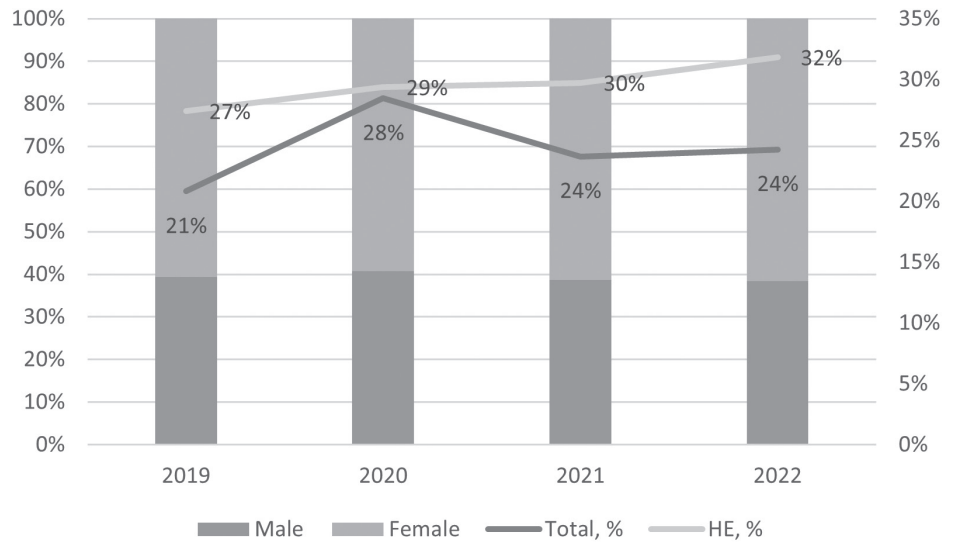

Figure 3. Percentage of respondents reporting deterioration overall (black line, right axis), by gender (bar, left axis) and with tertiary education (grey line, right axis), %

Source: Authors' calculations based on RLMS-HSE data.

Pearson's chi-squared test supports the hypothesis that there is a statistically significant difference between the expected frequencies and the observed frequencies of highly educated people among those who reported deterioration in 2022 compared

[7] Federal State Statistics Service. Standard of living. Retrieved November 11, 2023, from https://rosstat.gov.ru/folder/13397

to 2019 ($\chi^2_{stat} = 9.315$, $p - value = 0.002$). This result can be interpreted as a rise of an unconditional probability of income downwards among educated people. To estimate the conditional probability, we use the probability model with several explanatory variables.

Empirical Model

Logit model is one of the popular binary choice or qualitative response models. It is often applied to poverty analysis (Rusnak, 2012). In these models the outcome *Y* takes the two values: 1 if events occurs and 0 otherwise. In the logit model the probability *P* of the occurrence of the event $Y = 1$ is determined by the function

$$P\left[Y = 1\right] = p_i = F\left(Z_i\right) = \frac{1}{1 + e^{-Z_i}}, \tag{1}$$

where Z_1 is a linear function of the explanatory variables in observation *i*.

$\frac{p}{1-p}$ denote odds that *Y* assumes the value 1.

The marginal effect of *Z* on the probability is given by the derivative of *P* with the respect to *Z*:

$$\frac{dp}{dZ} = \frac{e^{-Z}}{\left(1 + e^{-Z}\right)^2}. \tag{2}$$

We use a logit model to assess the influence of socio-demographic factors on the likelihood of an individual's finances deteriorating.

In this research the outcome variable is denoted WORSE, being assigned 1 if a respondent reported that the household finance had worsened during the last 12 months and 0 otherwise. Explanatory variables are current income (In log-form) and a set of dummy variables.

$$Z = \beta_1 + \beta_2 \log\left(Income\right) + \sum \gamma_j Dummy_j + \epsilon_i. \tag{3}$$

This set includes GENDER (being assigned 1 for men and 0 for women), HEALTH (being assigned 1 if a respondent reported poor health and 0 otherwise), JOB (1 if currently employed, 0 otherwise), EDUCATION (1 if university degree, 0 otherwise), BUSINESSMEN (1 if a primary occupation in the present time is an entrepreneur and 0 for others). Model variants include a MOSCOW dummy variable assigned 1 for Muscovites, MIGRATION (assigned 1 for those born abroad and moved to RF after 2000, 0 otherwise), GOV (1 if working in a government enterprise, 0 otherwise).

The logit model is fitted by maximum likelihood estimation. This is because the maximum likelihood estimator has good properties in large samples (Horowitz & Savin, 2001). In particular, it is asymptotically efficient; that is, it is the most precise estimator in large samples. In our case the sample is quit large and consists

of about 9000 observations. After estimation of the unknown parameters β, γ from (3), probability is calculated from (1) for any values of explanatory variables.

The marginal effect of income (In log) on the probability is the following:

$$\frac{dp}{dZ}\cdot\frac{\partial Z}{\partial Log\left(Income\right)}=\beta_2\cdot\frac{e^{-Z}}{\left(1+e^{-Z}\right)^2}. \tag{4}$$

The marginal effect of any dummy variable on the probability is the following:

$$P\left[WORSE=1|\overline{X},\text{Dummy}_j=1\right]-P\left[WORSE=1|\overline{X},\text{Dummy}_j=0\right], \tag{5}$$

where $\overline{X}$ denotes the means of all the other variables in the model (Greene, 2008, p.770) .

The marginal effect of each variable depends on the values of other variables, included in equation (3). Simply taking the derivative with respect to the binary variable as in (4) provides an approximation that is often accurate, but that depend on the data.

We can also define the odds ratio $\theta_j = P1_j/P0_j$:

$$\begin{aligned} P1_j &= \frac{P\left[WORSE=1|\overline{X},\text{Dummy}_j=1\right]}{P\left[WORSE=0|\overline{X},\text{Dummy}_j=1\right]};\\ P0_j &= \frac{P\left[WORSE=1|\overline{X},\text{Dummy}_j=0\right]}{P\left[WORSE=0|\overline{X},\text{Dummy}_j=0\right]}. \end{aligned} \tag{6}$$

When $\theta_j > 1$, the odds the $WORSS = 1$ are higher for the category of respondent with $Dummy_j = 1$, then for those with $Dummy_j = 0$.

Logit analysis results

The probability of occurrence the decline of family finances is assessed by equation (1) with the following explanatory variables: log (INCOME), GENDER, HEALTH, JOB, an interaction of the variables JOB*GENDER to account for possible differences in the marginal effect of job on probability between men and women, EDUCATION, BUSINESSMEN. The model is fitted by maximum likelihood estimation, and this uses an iterative process to estimate the parameters.

The corresponding regression output is shown in Table 3. As there is no measure of goodness of fit equivalent to R^2 in maximum likelihood estimation, the likelihood ratio LR statistic is reported. This statistic is distributed as a chi-squared statistic with $k - 1$ degrees of freedom, where $k - 1$ is the number of explanatory variables, under the null hypothesis that the coefficients of the variables are all jointly equal to zero. The significance of an individual coefficient can be evaluated via its asymptotic t statistic.

All regressions are statistically significant. As regards the coefficients, the coefficients on the variables INCOME (In logarithms) and HEALTH are significant at the 1 % level of significance for each year considered.

For the year 2019 only these two variables (INCOME and HEALTH) influence the probability. Variations in gender, occupation and education appear to have negligible effects.

To calculate the marginal effect of an explanatory variable on the probability we need to calculate the differential (2) for any given value and then multiply it by the corresponding coefficient.

For example, let's calculate the probability that a woman with no tertiary education, not currently working with income of 15,000 rubles (the upper limit of the first quartile in 2019) and good health would experience a deterioration in her finances. In this case

$$Z = -0.18 * \log(15000) + 0.40 = -1.336,$$

$$b_2 \cdot \frac{e^{-Z}}{\left(1+e^{-Z}\right)^2} = 0.03,$$

where $b_2 = -0.18$. This means that a 10 % increase in income, other things being equal, reduces the probability of income downward by 0.3 percentage points (than is from 20.8 % to 20.5 %). Th effect is not large but significant.

Table 3

The estimations of the parameters of logit-model for different years, 2019–2022

Explanatory variables	2019	2020	2021	2022
Log (INCOME)	−0.18*** (0.04)	−0.48*** (0.05)	−0.36*** (0.04)	−0.16*** (0.05)
GENDER	0.05 (0.08)	−0.05 (0.07)	−0.14** (0.08)	0.04 (0.08)
HEALTH	0.40*** (0.07)	0.26*** (0.07)	0.23*** (0.08)	0.18*** (0.08)
JOB	−0.07 (0.08)	0.35*** (0.07)	−0.04 (0.07)	−0.10 (0.07)
JOB*GENDER	−0.10 (0.10)	0.18* (0.1)	0.18* (0.1)	−0.13 (0.11)
EDUCATION	0.08 (0.06)	0.18*** (0.06)	0.18*** (0.06)	0.21*** (0.06)
BUSINESSMEN	0.12 (0.23)	0.94*** (0.19)	0.48** (0.21)	0.55*** (0.19)
Constant	0.40 (0.38)	3.52*** (0.5)	2.37*** (0.42)	0.51 (0.47)
Number of observations	9045	8789	8930	8703
LR statistic	85.61***	132.6***	95.14***	62.2***

Notes. * denotes 0.1 < p-value < 0.054; ** denotes 0.01 < p-value < 0.05; *** denotes p-value < 0.01.
Source: Authors' calculation.

Deterioration in health is a much greater contributor to the risk of financial deterioration for any level of income. The probability of deterioration of finances in 2019 is plotted as function of INCOME and HEALTH in Figure 4. The probability is very high for both categories of people (those in good health and those in poor health) (around 40 %) if we look at people with low income. However, the likelihood of a drop in income is much higher for those in poor health than for those in good health when we look at people on the median income (26 % vs. 19 %), with the difference increasing as income rises.

It should be noted that the impact of these two variables remains significant for the other years as well, however the marginal effects are different.

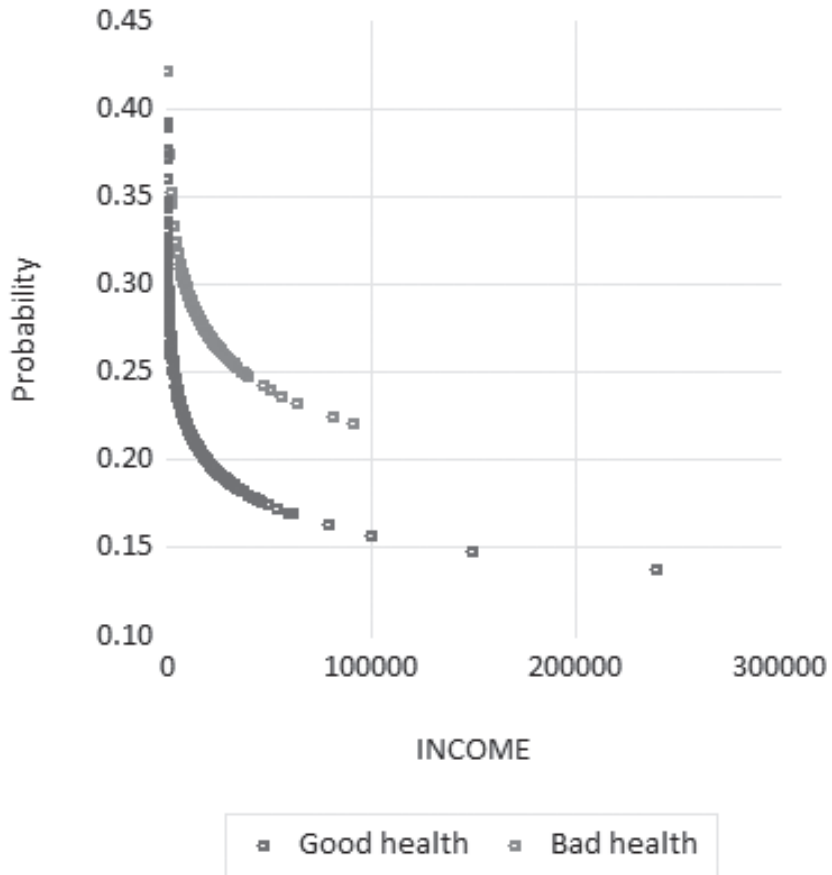

Figure 4. Cumulative effects of INCOME for different health states for the 2019 survey
Source: compiled by the authors.

The financial impact of the pandemic COVID-19 was observed in all countries and for any socio-economic categories (Khetan et al., 2022). Entrepreneurs, small and medium-sized enterprises in many sectors have found themselves in a very difficult situation (Yao & Liu, 2023). Our estimate (see Table 3) shows that entrepreneurs had the highest risk of a deterioration of their financial situation in 2020. For example, a man with no tertiary education, a median income and good health had a 42 % risk

of financial deterioration if he was an entrepreneur in 2020. The marginal effect according to formula (4) is estimated at 0.22 points: for respondents with average values of other variables, the risk of financial deterioration is estimated at 28 %, and for entrepreneurs at 50 %.

A significant difference in the results of the 2020 survey compared to the other years is that those with a job had a higher risk of financial worsening than those without a job. The probability is assessed to be higher for men than for women, although the corresponding coefficient (at JOB*GENDER in Table 3) is statistically significant only at the 10 % level. This is due to the fact that in 2020, many companies laid off their employees or transferred them to minimum-wage jobs. On the other hand, it is worth noting that in 2021 and 2022, being employed has a negative but insignificant effect on the probability of having a downward income trajectory.

The same is true for those with tertiary education, who are more likely to be worse off than those without tertiary education. But this is not just a feature of 2020.

According to the assessment results for 2021, respondents with higher education and entrepreneurs are still more likely to experience a deterioration in their financial situation (the corresponding regression coefficients are significant). The dependence on the gender of the respondent also becomes significant: unemployed women have a higher risk of financial deterioration than men. However, this probability is slightly lower for working women.

Based on the results of the 2022 assessment, respondents with higher education and entrepreneurs have a higher risk of experiencing a deterioration in their finance.

The summary of the average marginal effects of INCOME, HEALTH and EDUCATION are plotted in Figure 5.

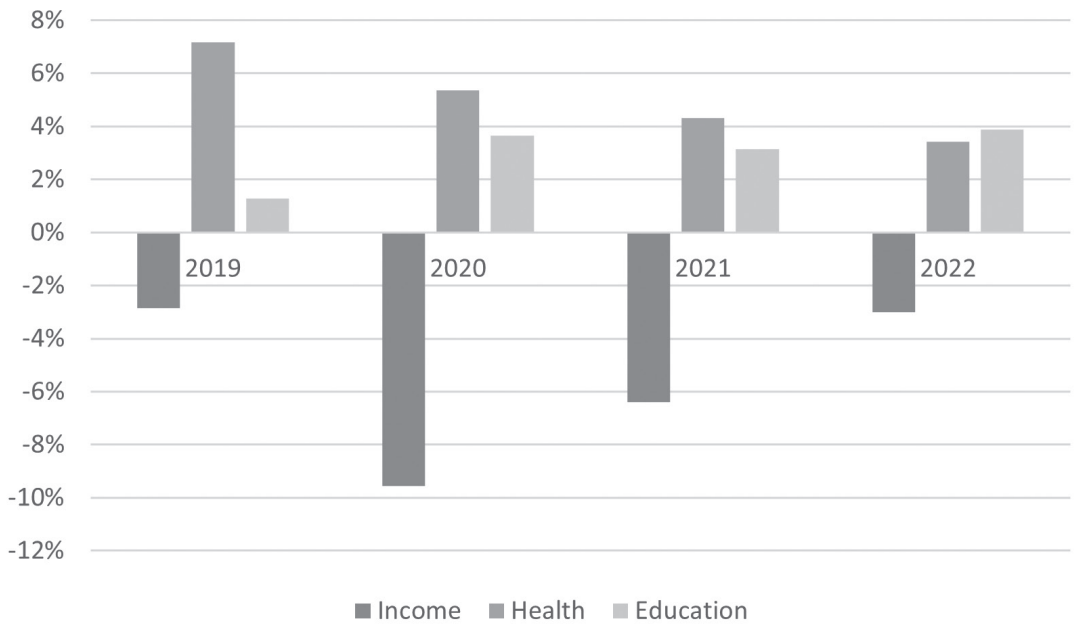

Figure 5. The average marginal effects of INCOME, HEALTH, and EDUCATION on the probability of financial deterioration

Source: compiled by the authors.

In 2020 and 2021, income has the largest impact on income mobility of the three factors considered. There is an inverse relationship between income and the probability of falling: the higher the income, the lower the probability of falling. The marginal effect of income in 2022 is almost the same as in 2019 and lower (In absolute terms) than the effect of health and education. Moreover, from 2019 to 2022, the influence of higher education on income has risen while the influence of health has diminished.

Variations of the model show that the place of residence of respondents did not have a significant impact on the likelihood of a deterioration in their financial situation, except for those who lived in Moscow. Residing in Moscow increases the probability of financial deterioration which may seem counterintuitive. On average, Moscow residents receive higher incomes than others. Residents with lower incomes in Moscow are more likely to experience financial difficulties than those in other regions. Employed Muscovites with upper-middle incomes faced a high risk of financial decline in both 2020 and 2022. Along with government subsidies for low-income households, there was a slight decrease in inequality in 2020 and 2022. This is in line with findings of (Nartikoev & Peresetsky, 2019) that "during the crisis periods the nominal level of income inequality decreases, in contrast to common apparent belief that negative macroeconomic shocks induce higher inequality."

In the context of anti-COVID measures, respondents who worked at state-owned enterprises or organizations were less likely to experience financial deterioration compared to those who worked at private companies. The difference in probability between these two groups is estimated to be about 10 %. However, in 2021 and 2022 this factor had a negligible effect.

The odds ratio (6) offers a different viewpoint on the variations in probability between different socio-demographic groups. Table 3 provides estimations from which we calculated the odds ratios for three groups: currently employed versus not, poor health versus good health, and tertiary education versus no tertiary education. Figure 6 demonstrates that currently employed individuals had significantly greater odds than those who were not employed in 2020. As expected, individuals with poor health are more likely to experience a decline in income compared to those with good health. The decrease in these odds from 2019 to 2022 is a very positive indication.

An alarming note, however, is the increase in the odds of income decline for those with tertiary education.

On the one hand, this may indicate a prolonged impact of the pandemic on the economy as a whole and on the labour market. When economic growth is slow, accumulated human capital yields lower returns than when growth rates are high, especially through technological and innovative development. On the other hand, as trade and consumer services have the largest share in the employment structure (see Figure 1), this suggests that the demand for skilled professionals is decreasing.

The growing risk of declining income for educated people is a challenge for the educational system today. As stated in (Kuzminov, Sorokin, & Froumin, 2019),

in the 21st century "fundamentally new trends in socio-economic dynamics pose unprecedented challenges to education systems around the world, including Russia." If there is a "mismatch" between education and the labour market, the potential of human capital will not be realised to the benefit of the economy and society.

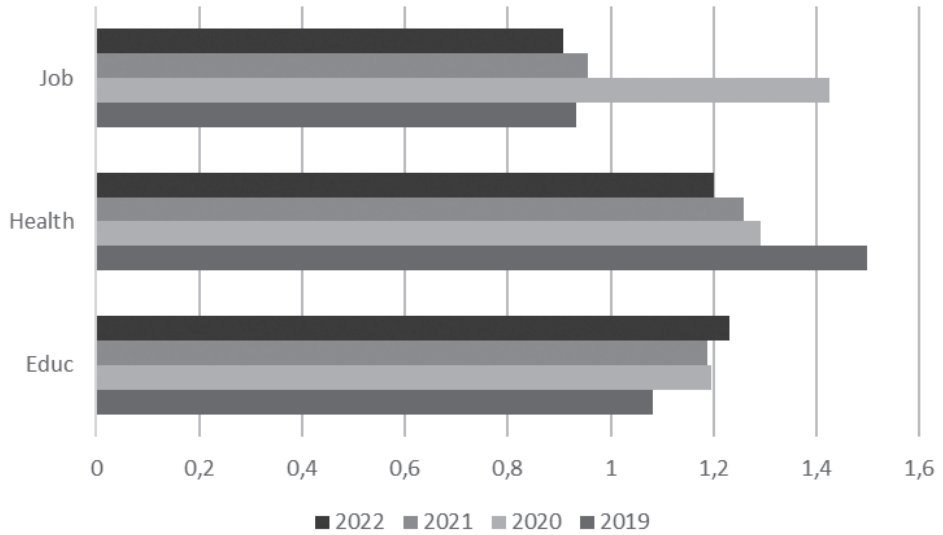

Figure 6. The odds ratio for different sociodemographic groups, 2019–2022
Source: compiled by the authors.

Conclusion

However, analysis based on the Russian Longitudinal Monitoring Survey shows that investment in tertiary education does not prevent personal income from falling. Moreover, the conditional and unconditional probability of financial deterioration has increased for educated people compared to others against the background of the 2020 and 2022 crises.

On the one hand, it raises the question of the demand for highly educated people for the current structure of the economy. On the other hand, it is a challenge for the education system to anticipate future labour market needs and to ensure a high return on investment in human capital.

References

Abdullah, A., Doucouliagos, H., & Manning, E. (2015). Does education reduce income inequality? a meta-regression analysis. *Journal of Economic Surveys*, *29*(2), 301–316. https://doi.org/10.1111/joes.12056

Acemoglu, D., Gallego, F.A., & Robinson, J.A. (2014). Institutions, human capital, and development. *Annu. Rev. Econ.*, *6*(1), 875–912.

Acemoglu, D., Johnson, S., & Robinson, J.A. (2005). Institutions as a fundamental cause of long-term growth. *Handbook of Economic Growth, 1*, 1138. https://doi.org/10.3386/w10481

Balashova, S. (2022). Recent Trends in Personal Income and the Impact of Covid-19: Case of Russia. In A.P. Duarte, S. Redzepagic, & F.S. Murta (Eds.), *The european integration process crisis and resilience in the aftermath of the covid-19 pandemic* (pp. 409–426). Coimbra University Press. https://doi.org/10.14195/978-989-26-2364-1

Balashova, S., Lazanyuk, I., & Matyushok, V. (2018). Growth Scenarios for the Russian Economy. In B.S. Sergi (Ed.), *Exploring the Future of Russia's Economy and Markets: Towards Sustainable Economic Development* (pp. 235–256). London: Emerald Publishing Limited. https://doi.org/10.1108/978-1-78769-397-520181013

Becker, G. (1993). *Human Capital. A Theoretical and Empirical Analysis, with Special Referenceso Education* (3d ed.). University of Chicago Press.

Bulina, A., Mozgovaya, K., & Pakhnin, M. (2020). Human capital in economic growth theory: Classical models and new approaches. *St Petersburg University Journal of Economic Studies*, *36*(2), 163–188. https://doi.org/10.21638/spbu05.2020.201

Dang, H.A. H., Lokshin, M.M., Abanokova, K., & Bussolo, M. (2020). Welfare Dynamics and Inequality in the Russian Federation During 1994–2015. *European Journal of Development Research*, *32*(4), 812–846. https://doi.org/10.1057/s41287-019-00241-3

Greene, W.H. (2008). *Econometric Analysis* (6th ed., Vol. 97.). Pearson Prentice Hall. https://doi.org/10.1198/jasa.2002.s458

Horowitz, J.L., & Savin, N.E. (2001). Binary response models: Logits, probits and semiparametrics. *Journal of Economic Perspectives*, *15*(4), 43–56. https://doi.org/10.1257/jep.15.4.43

Khetan, A.K., Yusuf, S., Lopez-Jaramillo, P., Szuba, A., Orlandini, A., Mat-Nasir, N., & Leong, D.P. (2022). Variations in the financial impact of the COVID-19 pandemic across 5 continents: A cross-sectional, individual level analysis. *EClinicalMedicine*, *44,* 1–10. https://doi.org/10.1016/j.eclinm.2022.101284

Kuzminov, Ya., Sorokin, P., & Froumin, I. (2019). Generic and Specific Skills as Components of Human Capital: New Challenges for Education Theory and Practice. *Foresight and STI Governance*, *13*(2), 19–41.

Mincer, J. (1958). Investment in Human Capital and Personal Income Distribution. *Journal of Political Economy*, *66*(4), 281–302.

Nartikoev, A., & Peresetsky, A. (2019). Modeling the dynamics of income distribution in Russia. *Applied Econometrics*, *54,* 105–125. Retrieved from https://econpapers.repec.org/article / risapltrx/0370.htm

Parry, E., & Urwin, P. (2011). Generational Differences in Work Values: A Review of Theory and Evidence. *International Journal of Management Reviews*, *13*(1), 79–96. https://doi.org/10.1111/j.1468-2370.2010.00285.x

Romer, P.M. (1989). Human capital and growth: theory and evidence. *National Bureau of Economic Research*, (3173), 51.

Rusnak, Z. (2012). Logistic Regression Model. *Econometrics*, *1*(35), 9–23.

Ryazantsev, S.V., & Rybakovskii, L.L. (2021). Demographic Development of Russia in the 20th–21st Centuries: Historical and Geopolitical Dimensions. *Herald of the Russian Academy of Sciences*, *91*(5), 516–524. https://doi.org/10.1134/S1019331621050075

Varshavsky, A.E. (2019). Excessive income inequality — problems and threats for Russia. *Sotsiologicheskie Issledovaniya*, (8), 52–61. https://doi.org/10.31857/S013216250006136-2

Voskoboynikov, I.B. (2017). Sources of long run economic growth in Russia before and after the global financial crisis. *Russian Journal of Economics*, *3*(4), 348–365. https://doi.org/10.1016/j.ruje.2017.12.003

Yao, Z., & Liu, Y. (2023). How Covid-19 impacts the financing in SMEs: Evidence from private firms. *Economic Analysis and Policy*, *79,* 1046–1056. https://doi.org/10.1016/j.eap.2023.06.036

Bio notes / Сведения об авторах

Svetlana A. Balashova, PhD, Head of Department of Economic and Mathematical Modeling, RUDN University. ORCID: 0000-0003-1797-8825. E-mail: balashova-sa@pfur.ru

Балашова Светлана Алексеевна, кандидат физико-математических наук, доцент, заведующая кафедрой экономико-математического моделирования, Российский университет дружбы народов. ORCID: 0000-0003-1797-8825. E-mail: balashova-sa@pfur.ru

Bella V. Gabrielyan, PhD, Associate Professor. Head of the Economic Sciences Department, European Economic University named after G.V. Plekhanov, Leading Researcher at the Institute of Economics named after M. Kotanyan NAS RA, Yerevan, Armenia. ORCID: 0000-0002-7428-7900. E-mail: bvgabrielyan@mail.ru

Габриелян Белла Валерьевна, кандидат экономических наук, доцент, заведующая кафедрой «Экономические науки», РЭУ им. Г.В. Плеханова, ведущий научный сотрудник Института экономики им. М. Котаняна НАН РА, Ереван, Армения. ORCID: 0000-0002-7428-7900. E-mail: bvgabrielyan@mail.ru