

EDUCATION-JOB MISMATCH AS A DETERMINANT OF HEALTH: EVIDENCE FROM THE RUSSIAN FEDERATION

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1. Introduction

This paper aims at investigating whether different types of educational mismatch affect health of the Russian working population. More precisely, this study estimates the effects of both vertical and horizontal educational mismatch on self-assessed health (SAH) by performing a panel data analysis on a sample from the Russia Longitudinal Monitoring Survey (RLMS-HSE).

The labour market of post-soviet countries is characterized by a specific occupational composition which implies pronounced imbalances between the supply and demand for skills (Kupets, 2016). In the Russian case, the latter outcomes are determined by both past transition and current misalignment of the education system with labour market needs (Anikin, 2012).

The findings of this study may provide support for policy reforms focused on improving both the efficiency of the Russian educational system and the equity in the labour market. These reforms, consequently, may lead to highly beneficial spillovers on the health status of the Russian employees.

The bulk of research on educational mismatch - imbalance between education an individual obtained and that one which is required for the position he/she holds - has been principally focused on its labour market outcomes. This phenomenon has been extensively studied in the context of wages and returns to education (Iriondo and Pérez-Amaral, 2016; Pecoraro, 2016; Montt, 2017), occupational and career mobility (Kiersztyn, 2013; Baert, Cockx and Verhaest, 2013), job satisfaction (Verhaest and Omey, 2009; Badillo-Amador and Vila, 2013), and firm productivity (Kampelmann and Rycx, 2012).

However, some studies have shifted their focus from the labour market dimension to the area of health-related research. For instance, a few papers have reported the positive association between educational mismatch and depressive symptoms and diminishing mental health returns to education (Bracke, Pattyn and von dem Knesebeck, 2013; Bracke, van de Straat and Missinne, 2014).

Overall, the current state of research on educational mismatch has mainly taken into account its *vertical* domain - related to the level of educational attainment and defined as overeducation or undereducation – and left aside the *horizontal* domain - related either to the field of study or to the speciality obtained by an individual.

The available data on educational mismatch mainly regard developed economies. For instance, the International Labour Office (ILO) statistics provide evidence that the percentage of overeducation in total employment in the EU countries ranges from 10 to 30 per cent, while the share of undereducation, on average, equals to 20 per cent in the countries of analysis (ILO, 2014).

However, the recent World Bank report has revealed a stable pattern of educational mismatch on the labour markets of low- and middle-income countries. For instance, Ghana, Sri Lanka and Vietnam reported the individual-level overeducation rates of 39.5, 46.1 and 70.0 vs the mean value of 34.2 for 12 STEP Skills Survey countries¹, while Kenya and Bolivia revealed pronounced undereducation rates of 40.4 and 25.2 vs the mean value of 12.4 (Handel, Valerio and Sanchez Puerta, 2016). Nevertheless, most of papers tend to deal with developed economies, excluding developing world and post-soviet countries from the analysis.

This study contributes to the literature on work- and education-related determinants of health and advances over the previous studies by means of: i) including both vertical and horizontal domains of educational mismatch as explanatory variables in the estimated model; ii) using a middle-income post-soviet country as a testing ground for the analysis; iii) conducting a panel data analysis, while most of previous studies have built on the base of cross-sectional data, without addressing the issue of causality in a proper manner.

The results of this study indicate that educational mismatch is related to the health status of the Russian manpower. However, the impact has been observed only for the female sub-sample, indicating gender inequalities in the functioning of the Russian labor market, and differed with respect to the domain of educational mismatch.

¹ The World Bank's STEP (Skills Towards Employment and Productivity) Skills Survey covers Ghana, Kenya, Yunnan Province of China, Lao PDR, Sri Lanka, Vietnam, Armenia, Georgia, Macedonia (FYR), Ukraine, Bolivia and Colombia.

2. Research methodology

2.1. The data and sample

This paper uses data taken from the 19th-23rd waves (2010-2014) of the Russia Longitudinal Monitoring Survey (RLMS-HSE) due to the presence of variables of interest.

The RLMS-HSE is a nationally representative survey which provides information on Russian individuals and households and contains annual waves for the period of 1994-2016. This survey aims at answering a broad range of policy-related questions and evaluating effects of reforms on various social sector's outcomes, e.g. health and economic welfare of the population. Taken into account how the data are structured and represented, the longitudinal RLMS-HSE dataset is comparable to established European surveys, e.g. Socio-Economic Panel Data (GSOEP) in Germany and British Household Panel Survey (BHPS) in the UK.

The sample consists of currently working employees: individuals on paid, unpaid and maternity leave, unemployed, retired and self-employed were excluded from the analysis. Army forces were also not considered due to very specific features of this occupational category. Finally, respondents who either did not participate in the first wave or had missing values in the variables of interest were excluded from the sample. The final sample we use contains 10,826 observations.

2.2. Outcomes and covariates

The health outcome is represented by self-assessed health which is measured at a 5-category upward scale from a very bad to very good reported health status.

The “vertical mismatch” explanatory variable is represented by a set of dummy variables for overeducation and undereducation, keeping matched employees as a reference category. It was constructed with regard to the “realized matches” approach (or empirical method) by computing the mean value of the number of years of education for each occupational group from the International Standard Classification of Occupations (ISCO-08) and then assigning respondents to the over- or undereducated category if their achieved level of education was above or below the mean, respectively (Verdugo and Verdugo, 1989).

The “horizontal mismatch” explanatory variable was constructed by mapping the code of occupation the respondent holds with the code of his/her educational attainment. The relevant codes, which are defined in the RLMS-HSE with regard to the ISCO-08, were compared at a 3-digit level so that any divergence between them was classified as a mismatch.

The set of standard sociodemographic and work-related controls includes age, squared age, marital status dummies (i.e. single and divorced/widowed/separated, keeping married respondents as a reference category), log of total monthly income, log of working hours in average working week, dummy for a state-owned enterprise (private company is a reference category), dummy for a managerial position (subordinate is a reference category), dummy for a rural type of settlement (urban area is a reference category), and, finally, dummies for a sector of employment and year of interview.

Table 1 displays descriptive statistics for the outcome variable and regressors. As done in previous literature, both the descriptive statistics and the econometric analysis were stratified by the sub-samples of women and men (e.g. Cottini, 2012; Garcy, 2015).

Table 1 – Descriptive statistics for the female and male sub-samples.

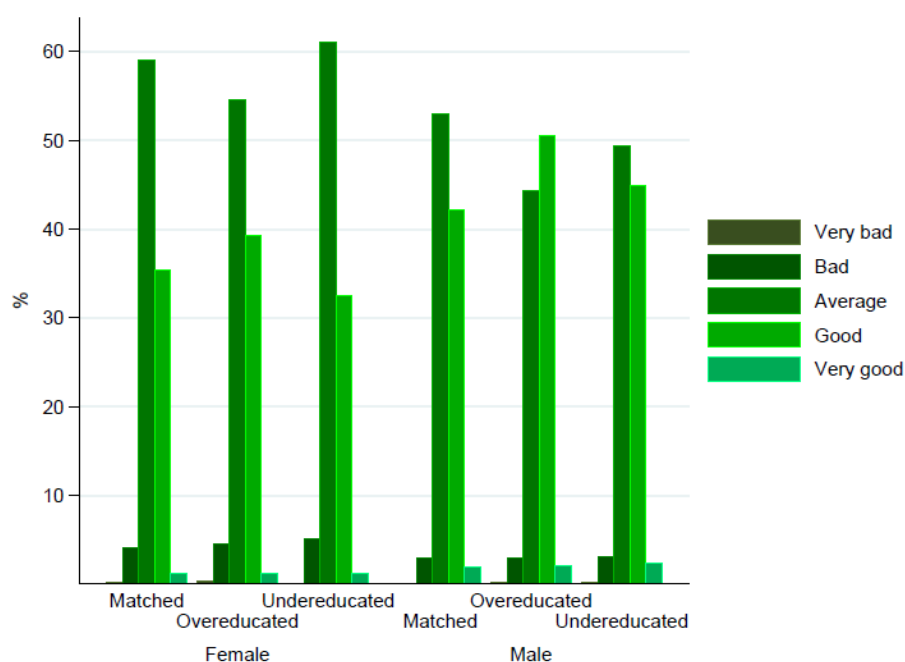
	Women (n=6,110)				Men (n=4,716)			
	Mean	SD	Min	Max	Mean	SD	Min	Max
Very bad SAH	0.002	0.048	0	1	0.001	0.036	0	1
Bad SAH	0.043	0.202	0	1	0.029	0.169	0	1
Average SAH	0.586	0.493	0	1	0.510	0.500	0	1
Good SAH	0.357	0.479	0	1	0.440	0.496	0	1
Very good SAH	0.013	0.112	0	1	0.020	0.139	0	1
Overeducated	0.154	0.361	0	1	0.196	0.397	0	1
Undereducated	0.114	0.318	0	1	0.082	0.274	0	1
Horizontal mismatch	0.705	0.456	0	1	0.751	0.432	0	1
Age	40.626	9.128	19	55	39.729	10.874	19	60
Single	0.163	0.369	0	1	0.175	0.380	0	1
Divorced/Widowed	0.293	0.455	0	1	0.109	0.312	0	1
Log income	9.612	0.627	6.397	11.252	9.891	0.591	6.908	11.265
Log working hours	3.685	0.231	2.303	4.431	3.787	0.223	2.303	4.431
Public company	0.598	0.490	0	1	0.410	0.492	0	1
Managerial position	0.205	0.404	0	1	0.211	0.408	0	1
Rural area	0.314	0.464	0	1	0.282	0.450	0	1

Mean, standard deviation, minimum and maximum for squared age, year and sectoral dummies are computed but not reported here.

Overall, the descriptive statistics for both sub-samples looks quite similar with some minor exceptions. A higher percentage of men than women are overeducated, while the opposite trend holds for undereducation. Moreover, a higher percentage of men are employed on horizontally mismatched positions than their female counterparts. In addition, men in the sample tend to report a “good health” category more frequently than women.

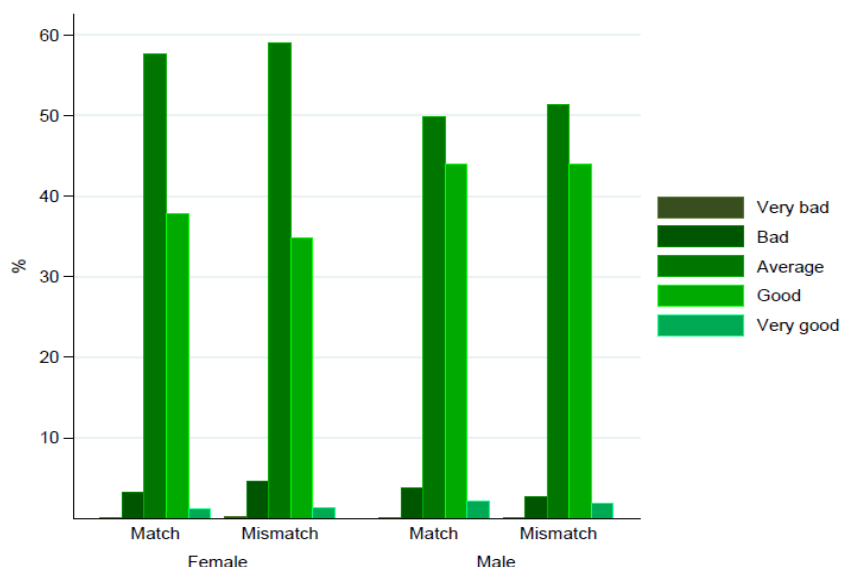
Figure 1 and 2 show how SAH is distributed over vertical and horizontal educational mismatch, respectively. Figure 1 reveals pronounced variation in the self-reported health status among different educational groups (i.e. matched, overeducated and undereducated employees) not only between female and male sub-samples but also within the same gender.

Figure 1 – *Distribution of SAH over vertical educational mismatch stratified by gender.*



Although women reported the “average health” status more frequently, regardless of the educational group, the “good health” response was more frequently observed for overeducated women in comparison with two other educational groups in the female sub-sample. The highest shares of the reported “average health” status were found among matched and undereducated men, while overeducated male respondents preferred the “good health” status to any other SAH category more frequently.

Figure 2 does not display the pronounced differences in the reported health status among horizontally matched and mismatched groups of employees within the same gender. However, the share of the “good health” responses for men is higher than for women in both matched and mismatched groups.

Figure 2 – Distribution of SAH over horizontal educational mismatch stratified by gender.

2.3. The empirical models and estimation strategy

Taken into account the panel type of data and the nature of outcome variable, the effect of different types of educational mismatch on SAH was estimated by dynamic random effects ordered probit model. The analysis also addressed the issue of unobserved heterogeneity (Mundlak, 1978) and the problem of the initial condition (Heckman, 1981). The analysis was stratified by gender.

The general specification of the models can be expressed as follows:

$$y_{it} = \beta x_{it} + \delta y_{it-1} + \alpha_i + \varepsilon_{it} \quad (1)$$

$i = 1, \dots, N$ (number of individuals in the sample)

$t = 2, \dots, T$ (number of waves of the survey)

where x_{it} is a set of observed explanatory variables which are assumed to be associated with the health indicator; α_i is an individual-specific and time-invariant random component; ε_{it} is a time and individual-specific error term which is assumed to be normally distributed, uncorrelated with α_i and uncorrelated across individuals and waves; y_{it-1} is the observed individual's health indicator of the previous period.

It is also likely that the sample of analysis may suffer from attrition bias – the situation such that the survival of respondents in the waves of survey is determined by their health status, educational mismatch and socioeconomic factors. To prevent misleading results, the diagnostic test on attrition was conducted in order to establish whether participants continued to respond or left the survey due to non-random reasons (Verbeek and Nijman, 1992).

3. Results

Table 3 displays the results of the test on attrition, following the procedure proposed by Verbeek and Nijman (1992). The coefficients on the diagnostic variables – dummy for presence of the respondent in the next wave, dummy for presence of the respondent in all waves used in the analysis, and the total number of waves the respondent participated in - were introduced in the model and estimated separately. Overall, the coefficients on these variables are not statistically significant at all significance levels, indicating that the respondents tend to leave the survey randomly and removing the problem of attrition from the agenda.

Table 3 – *The Verbeek and Nijman (1992) test on attrition*

	Outcome: SAH			
	Ordered probit with unobserved heterogeneity		Dynamic ordered probit with unobserved heterogeneity	
	Pooled model	Random effects model	Pooled model	Random effects model
Next wave	0.006 (0.025)	0.010 (0.036)	0.028 (0.039)	0.031 (0.044)
All waves	0.022 (0.035)	0.028 (0.052)	-0.014 (0.073)	-0.023 (0.040)
Number of waves	0.003 (0.013)	0.005 (0.018)	-0.007 (0.016)	-0.008 (0.020)

Robust standard errors are in parentheses.

p<0.10, **p<0.05, *p<0.01*

Table 4 aggregates results of estimation of dynamic random effects ordered probit model for SAH, which allows to control for unobserved heterogeneity and the issue of initial condition. Results provide evidence that neither type of educational mismatch is related to health of Russian male employees. The Russian women's SAH, in contrast, tends to respond to vertical and horizontal educational mismatch differently: while horizontal mismatch is associated with a worse self-assessed health status, no impact of vertical educational mismatch on health was revealed in the female sub-sample.

Table 4 - Dynamic random effects ordered probit model for SAH: results of estimation.

	Women (n=6,110)		Men (n=4,716)	
	Coef.	St.Err.	Coef.	St.Err.
Age	-0.048	0.096	-0.114	0.086
Age ²	0.000	0.001	0.001	0.001
Single	0.270*	0.156	0.053	0.175
Divorced/Widowed/Separated	0.015	0.122	-0.249	0.179
Log income	0.054	0.068	0.088	0.075
Rural area	-0.157	0.206	1.176***	0.167
Log of working hours	0.015	0.144	0.161	0.174
State-owned company	-0.112	0.096	-0.064	0.087
Managerial position	-0.069	0.086	-0.248***	0.094
Horizontal mismatch	-0.180**	0.072	0.061	0.094
Overeducation	-0.151	0.124	0.153	0.104
Undereducation	0.054	0.109	0.061	0.131
Log-like	-4208.007		-3337.191	

The coefficients were also estimated on the sectoral and year dummies, regressors of within-individual means, lagged and initial states of health outcome and constant term, but they are not reported here.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5 – Average marginal effects.

	Women (n=6,110)		Men (n=4,716)	
	Coef.	St.Err.	Coef.	St.Err.
Age	-0.012	0.024	-0.031	0.023
Age ²	0.000	0.000	0.000	0.000
Single	0.068*	0.039	0.014	0.048
Divorced/Widowed/Separated	0.004	0.031	-0.068	0.049
Log income	0.014	0.017	0.024	0.020
Rural area	-0.040	0.052	0.319***	0.046
Log of working hours	0.004	0.036	0.044	0.047
State-owned company	-0.028	0.024	-0.017	0.024
Managerial position	-0.017	0.022	-0.067***	0.026
Horizontal mismatch	-0.045**	0.018	0.017	0.026
Overeducation	-0.038	0.031	0.042	0.028
Undereducation	0.014	0.028	0.017	0.036

The average marginal effects for SAH were computed on probability of reporting good health.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5 contains results of post-estimation for SAH, indicating that horizontally mismatched female employees, on average, are 4.5 percentage points less likely to report a good health status than their matched counterparts. Single status also contributes to good health in the female sub-sample. As for men, those who hold managerial positions are 6.7 percentage points less likely to report good health, while settling in a rural area increases the probability to perceive good health approximately by 32 percentage points.

Overall, the findings of this study indicate that Russian women tend to be particularly sensitive in terms of health to the impact of horizontal educational mismatch, while no effect of vertical educational mismatch on SAH was observed for them. Men's health in Russia, meanwhile, remains indifferent to the impact of any type of educational mismatch.

The channels through which horizontal mismatch negatively affects health may be twofold: i) mismatched individuals may consider the position "too challenging" what is potentially associated with a higher level of stress and risk to be dismissed due to the lack of skills and competencies which are required for the position; ii) mismatched individuals may consider the position "too simple" what causes depreciation of knowledge and skills, reduces the speed of promotion and does not enable to compensate opportunity costs of achieved educational attainment. It is likely that further explanations may be found, for instance, in the field of occupational psychology and sociology. The disparities in results for men and women may be explained by *gender inequalities* in employment requirements, working conditions, and distribution of occupations which take place in the Russian labour market.

4. Conclusion

This paper aims at filling the existing gap in the literature on educational mismatch by estimating the impact of different domains of this phenomenon on self-reported health of the Russian employees. The analysis has been conducted on the panel data from the Russia Longitudinal Monitoring Survey (2010-2014) and stratified by gender. The findings suggest that educational mismatch is related to health of the Russian manpower. However, the impact has been observed only for horizontal educational mismatch in the female sub-sample, indicating inefficiency and gender inequalities in the functioning of the Russian labor market.

This study has some limitations though, e.g. the issue of reporting heterogeneity – the problem which occurs for subjective categorical responses, e.g. SAH, job and life satisfaction etc., due to the fact that individuals perceive response scales differently - has not been addressed properly, indicating that the direction and magnitude of the estimated effects should be considered with caution.

Nevertheless, this study may provide support for policy reforms focused on improving both the efficiency of the Russian educational system and the gender equity in the labour market and, consequently, may lead to highly beneficial spillovers on the health status of the Russian employees. However, more multidimensional research is required in order to shed light on the mechanisms

which stand behind the possible impact of educational mismatch on the health outcomes of the manpower.

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SUMMARY

Education-Job Mismatch as a Determinant of Health: Evidence from the Russian Federation

Educational mismatch has been extensively investigated in the context of labour market interactions. However, recent studies have shifted their focus to the area of health-related research, considering education mismatch as an explanatory variable for mental health and psychological wellbeing. This paper aims at contributing to this literature by investigating the impact of vertical and horizontal educational mismatch on the self-assessed health status of the Russian manpower. The analysis has been conducted on the sample of currently working employees taken from the Russia Longitudinal Monitoring Survey (RLMS-HSE) and stratified by gender. The findings provide evidence that horizontal mismatch is negatively related to self-assessed health, but the effect is significant only for the female sub-sample. The results of this analysis may provide support for policy reforms focused on improving both the efficiency of the Russian educational system and the gender equity in the labour market. These reforms, consequently, may lead to highly beneficial spillovers on the health status of the Russian employees.

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