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WHAT FORMS GENDER WAGE GAP IN BELARUS?

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Abstract

In this paper, we focus on estimating the gender difference in wages in Belarus using survey data from 2017. The results show that the unconditional gender wage differential equals 22.6 percent. Applying the Oaxaca-Blinder and Machado-Mata decomposition techniques we find that the conditional wage gap is mostly formed by the unexplained component primarily due to discrimination. The size of the wage gap is higher in the state sector than in the private sector. Additionally, in the state sector it increases throughout the wage distribution and accelerates at the top quantiles indicating presence of a strong glass ceiling effect.

INTRODUCTION

Despite high female labor force participation rates and anti-discriminatory legislation, the causes and consequences of the gender wage gap in the labor market, that is the difference between the wages earned by women and men, continue to attract increasing attention in empirical studies worldwide.

The gender wage gap can be explained, firstly, by differences in human capital, that arise from such factors as education, training, and work experience (Blau and Kahn 1997; Warren, Rowlingson, and Whyley 2001; Manning and Swaffield 2008; Lemieux, MacLeod, and Parent 2009); secondly, due to female job segregation related to such employment characteristics as occupation, industry, job level and firm size (Sorensen 1990; Fields and Wolff 1995; Reilly and Wirjanto 1999; Bayard et al. 2003; Jurajda and Harmgart 2007; Triventi 2013; Blau and Kahn 2017), and, thirdly, by gender discrimination that occurs when two male and female individuals with equal productivity get unequal earnings for equal work (Becker 1957; Bergmann 1974; Albrecht, Vuuren, and Vroman 2004; Śliwicki and Ryczkowski 2014).

Belarus labor market is not an exception and faces the problem of wage inequality like other neighboring and transition countries. According to official statistics, the average gender wage gap in terms of monthly wages was 19 percent in 2000, it increased up to 23.8percent in 2015, and reached 25.4 percent in 2017.[1]

Previous studies concerning the gender wage gap in Belarus (see Pastore and Verashchagina 2005; Verashchagina and Pastore 2011) also found that the gap increases and main reason for this is the job segregation of women into low-paid occupations in the public and social services sectors.[2]However, if we take into account paternalistic attitude to women in Belarus (Fakeyeva and Shpetnaya 2016), then the increasing gender wage gap may be not due to job segregation, but due to gender discrimination simply because paternalistic factor may hide the incorrect perception about the productivity of female workers. Firstly, this may occur due to the Soviet

legacy in defining job responsibilities (i.e. males are better managers) copied further for the job market during current transition period. Secondly, compared to developed countries and even other transition countries the gender wage gap should definitely decrease, but not to increase. Thirdly, personal characteristics (educational level) are higher among Belarusian women compared to men. Finally, if we really assume that Belarusian women are still "voluntarily" self-selected into low-paid occupations, then the gender wage gap in the private sector should not be less than gender wage gap in the public sector, otherwise it will contradict the main principles of a market economy.

In this regard, the aims of this paper are, first, to update the estimates of the gender wage gap using the Gender-Generation Survey conducted in Belarus in 2017.Second, to study to what extent human capital (personal characteristics), occupational segregation and discrimination contribute to the Belarusian gender wage gap, estimating wage regressions, and applying Oaxaca-Blinder (Oaxaca 1973; Blinder 1973) and Machado-Mata (Machado and Mata 2005) decomposition techniques. Finally, to evaluate the role of the state and private sectors in distribution of the wage differences (Becker 1957) in order to explain why gender discrimination is a real reason for growing gender wage gap in Belarus.

Our results show that the unconditional gender wage gap in terms of hourly wages equals 22.6 percent. The Oaxaca-Blinder decomposition identifies that gender differential in earnings is almost entirely (105.3 percent) due to the unexplained component, which is likely to be attributed to the discrimination. Distinction by occupational type shows presence of the wage gap both in male- and female-dominant occupations. However, its effect is small, which, suggest that Belarus is not a country where occupational segregation plays a major role in explaining a large part of the gender wage gap.[3]

Next, we find that the wage gap is growing while moving from the bottom and reaches the maximum at the top of the distribution (at the 75th and 90th percentiles). However, the

distinction by the organization type shows existence of the glass ceiling effect in the state sector without any evidence of its presence in the private sector. Finally, contrary to other countries in transition the average gender wage gap in Belarus in the private sector is slightly lower than in the public sector, which in general confirms our hypothesis that gender discrimination not job segregation is the key factor that determines the growing gender wage gap in Belarus.

THE BELARUSIAN LABOR MARKET

The labor market in Belarus is still in the process of liberalization. Although private firms have the right to define wages on their own, the Government still determines the structure of wages using special tariff system, which represents set of regulations, rules, and legislative acts determining the level of remuneration of employees.[4]

The system comprises of two main components. First one is a unified tariff grid that forms the basis of the tariff system allowing dividing a variety of independent professions into categories (from the 1st to the 28th) according to the degree of complexity.[5] Each category corresponds to a certain coefficient indicating how much payment per unit of working time (rate) for this category is higher than the rate of the first category. Second one represents the tariff rate of the first category and determines the starting point for calculating the amount of salaries of all categories of workers in the tariff system. The value of the tariff rate of the first category is established by law and periodically reviewed. In addition, there are bonuses for the work results and a large number of surcharges and allowances for the complexity of the work performed, difficult conditions, experience, level of education, etc.

The use of the tariff system in Belarus is mandatory for budgetary organizations and enterprises receiving subsidies from the state. Private companies use the rates as the minimum allowable values when setting salaries for the relevant positions.

Concerning structure of the Belarusian labor market, 54.9 percent of the economically active populations were women in 1995. Data for 2017 showed that 2.16 million women, or 49.2

percent of the total working population, were employed in the economy. The female labor force participation rate (for women aged 15+) was 52.6 percent in 1995 and increased up to 58.1 percent in 2017, while the same indicator for men changed from 66.8 percent up to 70.3 percent (World Bank).

Regarding education, 36.7 percent of Belarusian working women have bachelor's degree or higher, while among working men this figure is only 26.1 percent (Belstat 2018a). However, despite possessing a significantly higher level of education, women are increasingly employed in lower-paid industries.[6] Among female employees, the main share is categorized as professionals as well as among men. When defining the proportion of male and female heads in the total number of employees, the difference in the number of women and men is not substantial, that is the number of male managers totals 190.0 thousand people, while the number of women leaders – 185.9 thousand people (Belstat 2018a, 2018b).

Additionally, a socially accepted traditional pattern of gender roles preserves in the Belarusian labor market. Women are considered as the main childcare and household duty holders in the family. Such burden often affects their career path meaning that women might prefer flexibility and less workload to the level of remuneration. Furthermore, there is a specificity of the behavior of women that lost their jobs. They are characterized by greater inactivity and delegation of powers to find a job to public authorities, while men are concentrated on self-employment efforts (Fakeyeva and Shpetnaya 2016).

LITERATURE

The situation of women in the Belarusian labor market during post-Soviet period has been studied quite extensively by researchers at international organizations. For example, UNDP (2000) and the World Bank (2014) have published major surveys on this subject.

These reports define presence of gender discrimination in general, which has increased since the fall of the Soviet Union. UNDP (2000), for example, notes that the structure of female

employment and professional segregation are the result of prevalence of the traditional gender roles in the society. "Women's central role in raising children and health care providers translates health care providers is reflected in high rates of women's employment in education and health care, the sectors that have always been funded as a last priority". The report of the World Bank(2014) points out on minimum discrimination related to access to job (except for the list of occupations, where women cannot work due to dangerous working conditions) and serious structural segregation with female concentration in traditionally female dominated and less rewarded sectors. At the same time, it mentions ambiguity in explanation what are the real explanatory factors of the gender wage gap in the labor market.

In turn, the academic literature adds more precise investigation of the gender wage gap in the Belarusian labor market (Pastore and Verashchagina 2005; Verashchagina and Pastore 2011). Francesco Pastore and Alina Verashchagina (2005) using data from the Belarusian Household Surveys on Incomes and Expenditures for 1996 and 2001 found, first, that the conditional gender wage gap was equal 16.5 percent in 2001, second, a tendency for Belarusian women to shift towards lower-paid industries and their concentration in the state sector, and, third, they determined the presence of job segregation of women into low-paid sectors of the economy. In their subsequent work (Pastore and Verashchagina 2011) they estimated gender wage gap for 2006 and found that it increased up to 18.9percent due to decrease in observed prices for female skills caused by a process of segregation into low-wage occupations in the public and social services sectors and out of the material production sector.

Additionally, Alesya Tarasevich (2009) also determined that distribution of working women and men in Belarus is characterized by occupational segregation. Lyudmila Fakeyeva and Natalia Shpetnaya (2016) concluded, first, that a socially accepted traditional pattern of gender roles preserves in Belarus – women are considered as the main childcare and household duty holders

in the family, and, second, they defined a specificity of the behavior of women that lost their jobs, that is greater inactivity and delegation of powers to find a job to public authorities.

Finally, the problem of the gender wage inequality has been studied in application to other countries, and findings show a reasonably large difference between the wages earned by women and men (see Blau 1998; Gunderson 1989; Jarrell and Stanley 2004; Weichselbaumer and Winter-Ebmer 2005). Studies on post-Soviet countries show presence of the wage disparity of around 20–45percent subject to the country of interest. The gap is mostly due to differences in the remuneration. However, higher personal characteristics of women decreases the gap (Oshchepkov 2006; Ganguli and Terrell 2005; Khitarishvilli 2009).

METHODOLOGY

The current study is based on the typical Mincerian model that estimates individual return on various influencing factors using the OLS approach (Mincer 1974),

$$\ln w_{it} = \alpha + \beta_i X_i + u_i, \qquad u_i = N(0, \sigma^2), \tag{1}$$

where $\ln w_i$– natural logarithms of hourly earnings of person i; X_i– vector of explanatory factors that affect personal level of earnings. However, the presented above mean regression framework focuses on the average, which provides an incomplete account of the gender wage gap. In this light, we use the quantile regression approach, which allows estimating the gender wage gap at particular quantiles of conditional wage distribution. The assessment of the several conditional quantile functions gives a more comprehensive picture of the relationship between the conditional distribution of the wage and selected covariates in contrast to simply the mean of the OLS regression. Additionally, in comparison with the OLS approach, the quantile regression procedure, first, is less sensitive to outliers, second, provides a more robust estimator (Koenker 2005; Koenker and Bassett 1978), and, third, may also have better properties than OLS in the presence of heteroscedasticity (Deaton 1997).

Next, the decomposing procedure in our study consists of two techniques. First, using the Oaxaca-Blinder (OB) decomposition (Oaxaca 1973; Blinder 1973) the difference in wages between men and women assuming male wage structure is presented as follows,

$$\left(\overline{\ln W^m} - \overline{\ln W^f}\right) = \hat{\beta}^m\left(\overline{X}^m - \overline{X}^f\right) + \overline{X}^f\left(\hat{\beta}^m - \hat{\beta}^f\right), \tag{2}$$

where $\overline{\ln W^m}$ and $\overline{\ln W^f}$ are the average natural logarithms of hourly wages, $\hat{\beta}^m$ and $\hat{\beta}^f$ are vectors of the estimated regression coefficients, $\overline{X}^m$ and $\overline{X}^f$ are the matrices of the average values of male and female characteristics, correspondingly. The wage differential decomposition specified in Equation 2 assumes male wage structure and that in the absence of wage discrimination females will have the same rates of return to characteristics as males. The estimated gap is divided between the endowment effect that represent the difference in observable human capital, and the unexplained component that represent wage discrimination. However, the problem with the OB decomposition (Oaxaca 1973; Blinder 1973) is that it also performs decomposition only at the means and does not take into account the diversity of the gap amount depending on the income percentile.

Usage of Machado-Mata (MM) technique (Machado and Mata 2005) allows looking into the nature of the pay gap within along all deciles of the level of earnings in order to estimate counterfactual unconditional distribution of gender wage gap. Contrary to the Oaxaca-Blinder decomposition approach(Oaxaca 1973; Blinder 1973), MM technique(Machado and Mata 2005) simulates a female dataset with male characteristics and the rewards of females and the decomposition process here consists of four steps (Castagnetti 2015):

1) Generation of a random sample n from uniform distribution $U[0,1]$: $u_1, u_2, \ldots\ldots, u_n$;

2) Separately for men, it estimates a vector of n quantile regression coefficients $\{\hat{\beta}^m(u_i)\}_{i=1}^n$;

3) Makes n draws at random and replaces females with n vector $\{\tilde{X}_i^f\}_{i=1}^n$;

4) Estimates the counterfactual density as $\{\tilde{X}_i^f \hat{\beta}^m(u_i)\}_{i=1}^n$.

We obtain the counterfactual densities and estimate their standard errors by bootstrapping the results 100 times.

DATA

Data and sample selection

We use data from the Generations and Gender Survey (GGS) conducted in Belarus in 2017 by the United Nations Population Fund (UNFPA) and the United Nations Children's Fund (UNICEF) within the framework of the Generations and Gender Program of the United Nations Economic Commission for Europe. This survey is nationally representative dataset covering the whole of the country disaggregated by regions. In the course of the survey, about 10,000 permanent residents of Belarus aged 18–79 were interviewed. The GGS-2017 contains information on a range of individual (age, gender, marital status, educational attainment, employment status, hours worked, wages earned etc.) and household-level characteristics (household size and composition, religion, land holding, location, asset ownership etc.). However, the data lacks information on the distribution of respondents by sector of employment. This limitation is taken into account during the analysis of the results.

Correspondingly, the wage equation developed in this research (based on Equation 1) is augmented with variables for different occupations (Chzhen and Mumford 2011; Gupta, Oaxaca, and Smit 2006), educational attainments (Chzhen and Mumford 2011; Jolliffe and Campos 2005), marital status (Chzhen and Mumford 2011), number of young children in the household, potential work experience, type of the organization where respondent works, and region of residence.

Using the International Classification of Occupations (ISCO-08), we defined a set of binary indicators in order to capture occupational effect. Taking the one-digit ISCO categories, we include ten occupational category dummies: skilled agricultural, forestry and fishery workers,

elementary occupations, services and sales workers, plant and machine operators and assemblers, craft and related trade workers, clerical support workers, technicians and associate professionals, armed forces occupations, managers, and professionals. The reference category is first category – "skilled agricultural, forestry and fishery workers".

We use respondent's educational attainment as proxy for respondent's skills in order to take into account their potential productivity. According to the theory of human capital, the individual earnings can be defined as a positive function of educational attainment. Therefore, this explanatory variable is supposed to directly influence productivity and correspondingly the wage rate. In this regard, we define five dummy variables to capture the highest level of educational attainment of the respondent: primary education completed, lower secondary education completed, upper secondary education completed, post-secondary non-tertiary education completed, graduate (at least completed a Bachelor's degree). This approach was used by Andrew Newell and Barry Reilly (1999), who studied several selected transitional economies. The reference category is those respondents with only primary education. In addition to the educational variable, the measure of respondent's potential experience is also included as a complementary proxy for productivity.

The potential work experience is calculated as individual's age minus years of schooling and minus six. Following Daniel Munich, Jan Svejnar, and Katherine Terrell (2005) in case of women we also adjust it for the maternity leave period by subtracting a number of own children multiplied by 3 years.

The type of the organization, where respondent works is classified into private or public defined with the corresponding dummy variables. The region dummy variables control for region specific differences in labor markets in Belarus. The reference category is "Minsk city". A full list of variables and their definition is presented in Table A1.

The sample used in this study includes regular waged individuals between the age of 23 and 62 years inclusively to ensure that we do not include people who are likely to be child labor, just graduated students or retired. The average length of study at universities in Belarus equals 4 years. The official retirement age in Belarus in 2017 was 60.5 for males and 55.5 for females, however a large proportion of men and women continue to work beyond the retirement age at least for next several years.

Descriptive statistics

Descriptive statistics for the sample of wage employees are reported in Table A2, for women and men, respectively. Table A2 shows some important differences concerning male and female respondents. Belarusian men have higher work experience – by approximately 2.6 years. There are by 13percentage points more single women than single men.

Additionally, there are also significant differences in educational qualifications between Belarusian men and women. First, there is a higher share of women in the upper secondary education and Bachelor's degree education – 40.2percent and 40.3percent in comparison with 37.0percent and 32.4percent for men. Second, there is a higher share of men in the lower secondary education and post-secondary non-tertiary education – 18.3 percent and 10.6 percent in comparison with 11.8percent and 6.4percent for women.

Women and men are almost equally divided into low-paid (from the first to the sixth category) and high-paid (from the seventh to the tenth category) workers. For example, 48.5percent of the woman at work and 50.3 percent of male employees are low-paid workers. However, the share of women working in private organization is lower by approximately 6 percentage points in comparison with men.

RESULTS

Wage differentials

In our analysis, the earnings measure is represented by the (log) hourly wage rather than a monthly wage. Using hourly wages instead of monthly wages as a dependent variable helps to take into account differences in intensive margin, which eliminates the need to control for hours endogenously. Hourly wages are estimated by dividing monthly wages (in Belarusian rubles) of the respondents as the regular waged workers by the total hours of work (including overtime) per month. The GGS-2017 collected data on the usual hours worked per week, but not the number of weeks usually worked during month. Consequently, the monthly hours of work are estimated by multiplying the usual hours worked per week by 52/12 (weeks per year/12 months). The natural logarithms wage rates are used in the augmented Mincerian wage equations, which control for different personal characteristics of the studied respondents (see Table A1 and Table A2 for variable description and selected summary statistics).

To better describe the wage disparities between the two groups, we present the kernel density estimates of logarithmic hourly wages for each group in Figure 1, from which we can see the contrasted wage distributions between males and females in Belarus. Particularly, the results demonstrate, first, the *Male curve* is shifted to the left relative to the *Female curve*, and, second, the *Female curve* is more compressed in comparison with the *Male curve*, i.e. the female sample contain more workers with low wages. This once again means that the hourly wages of males in Belarus are overall higher than hourly wages of females.
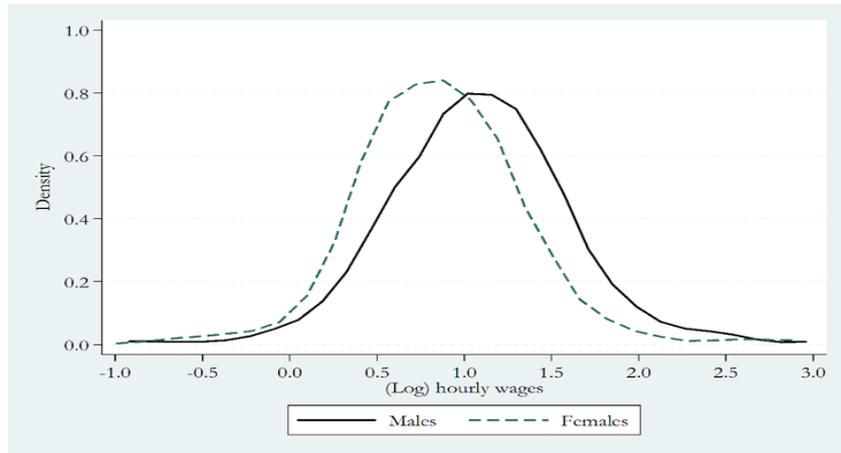
Figure 1. Distribution of (log) hourly wages by gender

Next, Figure 2 plots the difference in the distributions shown in Figure 1. This is the raw (unadjusted) gap in log hourly wages between male and female employees at each quantile of the distribution.
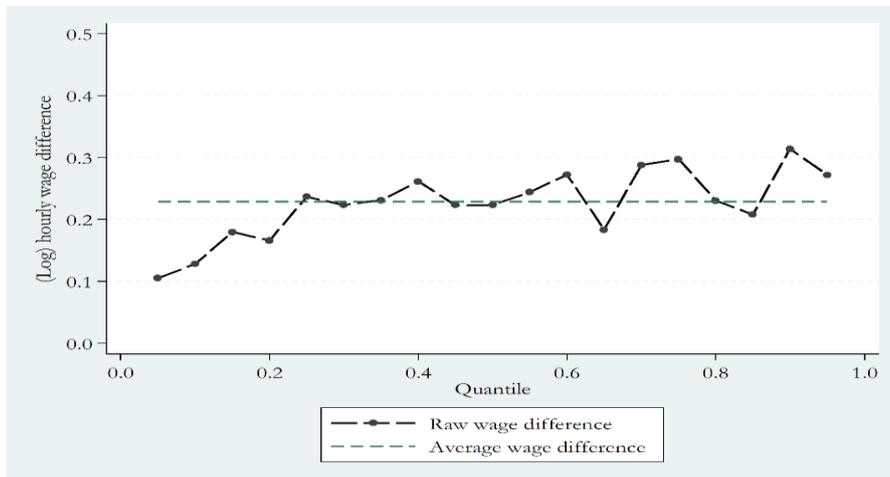
Figure 2. Gender differential by quantile

distribution. The underpayment of women is lower for low earnings workers, but increases up to the end of the wage distribution (see Figure 2).

Gender differences in characteristics

Next, we examine several factors that may cause the gender wage differences in Belarus. Such observable characteristics include occupation, organizational type, and educational attainment. The main results are summarized in Table 1.

Table 1. Shares and wages by gender across occupational types, organization type and age cohorts

	Occupational types						
	Occupational distribution (in %)			Average hourly wages (in BYN)			Gender log wage gap (in % at the mean)[a]
	Males	Females	All persons	Males	Females	All persons	
Skilled agricultural, forestry and fishery workers	5.13	2.12	3.68	2.69	2.68	2.68	31.24
Elementary occupations	11.86	11.53	11.66	2.44	2.62	2.53	12.17*
Services and sales workers	7.02	20.06	13.41	3.81	2.91	3.16	30.17***
Plant and machine operators and assemblers	6.38	1.71	4.04	3.45	2.42	3.24	21.09
Craft and related trade workers	18.19	5.06	11.69	3.45	2.91	3.34	11.08
Clerical support workers	1.71	7.99	4.72	3.14	2.99	3.02	20.49**
Technicians and associate professionals	15.48	8.98	12.22	3.34	3.19	3.28	26.85***
Armed forces occupations	2.33	0.26	1.69	4.04	3.73	3.98	18.61
Managers	7.10	6.38	6.66	5.77	4.27	5.08	33.36***
Professionals	24.80	35.91	30.24	3.95	3.32	3.58	27.19***
Total	100.00	100.00	100.00				
	Organizational type						
	Organization type distribution (in %)			Average hourly wages (in BYN)			Gender log wage gap (in % at the mean)[a]
	Males	Females	All persons	Males	Females	All persons	
Private	24.80	18.89	21.60	4.21	3.81	4.04	19.39***
Public	75.20	81.11	78.40	3.41	2.97	3.19	21.63***
Total	100.00	100.00	100.00				
	Educational levels						
	Educational distribution (in %)			Average hourly wages (in BYN)			Gender log wage gap (in % at the mean)[a]
	Males	Females	All persons	Males	Females	All persons	
Primary education	1.79	1.29	1.55	2.46	1.60	2.11	69.59**
Lower secondary education	18.37	11.63	15.08	2.72	2.58	2.67	13.83**
Upper secondary education	36.76	40.05	38.36	3.48	2.71	3.09	28.89***
Post-secondary non-tertiary education	10.64	6.37	8.49	3.08	2.72	2.95	21.70**
Bachelor's degree or higher	32.44	40.66	36.52	4.45	3.82	4.11	28.88***
Total	100.00	100.00	100.00				
Overall				3.60	3.13	3.37	22.59***

Source: authors estimates based on GGS-2017.

Note: Estimates reflect weighted data. Hourly wages are in BYN (1 USD = 1.93 BYN). Significance: ***: 1 percent; **: 5percent; *: 10percent.

[a] The raw (unconditional) hourly wage gap – the difference between the average (log) hourly wages for men and women.

First, Table 1 demonstrates clear gender wage differences in occupations. Women earn substantially less than men within four upper high-paid occupational categories – the statistically

significant difference ranges from 26.9percent for "Technicians and associate professionals" up to 33.4percent for "Managers". This evidence may indicate the presence of horizontal segregation within these four occupations.

The highest share of women is working in the professional positions, which include both high and low status jobs in such fields as teaching and health care. Moreover, Belarusian women substantially outnumber men among professionals. This phenomenon may be a legacy of women's long history of attaining advanced degrees under socialism.

Next, the gender wage gap is by 2.2 percentage points higher for respondents working in public organizations than in private companies. However, compared to men women are increasingly working in the public sector, rather than in the private sector.

Dividing the labor force into public and private sector employment also shows that the gender segregation should contribute to the wage gap in Belarus. Women have higher share of public sector employment in Belarus (81percent for women and 75percent for men) and lower share in public sector employment (19percent for women and 25percent for men). This is because public sector jobs are often more secure, provide more family friendly work environment for women, demand fewer hours and better regulated in comparison with jobs in the private sector, however they usually pay less. In turn, the jobs women hold in the private sector are generally lower quality and do not offer many benefits or long-term security.

Next, women surpass men in educational attainment, that is women have higher share of higher education (40.7percent for women and 32.4percent for men). However, the wage gap is also high for highly educated women, which may also suggest that the drop in wages reflects a combination of loss in human capital associated with interrupted careers caused by maternity leave (childbearing), and shifts towards less-intensive career tracks.

OLS and quantile regression results

Before proceeding with the decompositions, we examine whether (in the aggregate and at different quantiles) women experience any statistically significant wage inequality relative to men. First, we regress a pooled sample of male and female workers' personal and job characteristics (educational level, working experience, occupational type, organization type, family characteristics, and region) on log hourly wage. Second, we include quantile regressions in this analysis in order to see the impact of covariates on the conditional hourly wages on different deciles of the earnings distribution.

Examined regressions contain a female dummy, which defines the gender wage gap conditional on observable characteristics and taking into account the assumption that the returns to the characteristics are the same for men and women. The shortened results for different groups of observed factors are presented in Table 2, while extended results are provided in Table A3.

Table 2. Aggregate OLS and quantile regression estimates for gender wage gap

Gender wage gap	q10	q25	q50	q75	q90	OLS
Raw	-0.15***	-0.24***	-0.22***	-0.34***	-0.36***	-0.21***
With personal characteristics	-0.18***	-0.26***	-0.30***	-0.31***	-0.34***	-0.26***
With personal characteristics and organization type	-0.16***	-0.23***	-0.28***	-0.34***	-0.32***	-0.26***
With personal characteristics, organization type, and occupations	-0.13***	-0.20***	-0.25***	-0.27***	-0.27***	-0.22***

Source: authors estimates based on GGS-2017.
Note: Estimates reflect weighted data. Significance: ***: 1percent;**: 5percent;*: 10percent.

The results show that the average raw (unconditional) gender wage gap equals 22.6percent ((exp(0.21)-1)*100). It increases while going from the bottom to the top of earnings' distribution and reach maximum at the 90th quantile (see Line 1 of Table 2).

Next, we consecutively add personal and job characteristics to the regressions. The gender wage gap increases after controlling for personal characteristics (education, working experience and family characteristics) compared with the raw gender effect (see Line 2). This holds while moving from 10th to 50th quantile as well as for the OLS regression. The main explanation is an existing childbearing and motherhood penalty for Belarusian women falling into the lower

quantiles. On contrary, in the 75th and 90th quantiles the inclusion of personal characteristics declines the gender effect on wages. This result may be due to the fact that Belarusian women in the highest quantiles are more educated and qualified.

Control for the type of ownership (see Line 3) decreases the gender wage gap at almost all quantiles except for 75th quantile, while for the OLS regression the gender effect remains unchanged. Finally, controlling for various types of occupations (see Line 4) reduces the gender effect on wages from -0.26 log points to -0.22 log points. However, the major part of the conditional gender gap remains unexplained both in OLS and quintiles regressions. Therefore, these results may suggest that nor personal characteristic, nor sector (private/public) or occupational segregation is not the reason of the observed differences in the level of earnings between Belarusian men and women.

Moreover, similar to James Albrech, Aico van Vuuren, and Susan Vroman (2003), we see that the size of the remained wage gap is substantially larger at the top than at the bottom of earnings distribution that might suggest the presence of glass ceiling effect (the wage gap expands at the top of the wage distribution) in the Belarusian labor market, which is comparable to what is commonly observed in other transition countries (Reilly 1999; Newell and Reilly 1999).

The Oaxaca-Blinder gender wage gap decomposition

Next, we proceed with the decomposition of the wage gap and implement the twofold OB decomposition(Oaxaca 1973; Blinder 1973). We implement the twofold OB decomposition technique in order to distinguish the difference in remuneration due to different personal and job characteristics, and discrimination.

However, using the OB decomposition technique it is difficult to define the nondiscriminatory wage structure, since it is unclear on what basis the salary would be

determined if there was no discrimination. Male wage structure gives nepotism in which females earn less than they should.

As a first step, we present results of wage gap decomposition without characteristic effects (see Table 3).

The estimated gender wage gap equals 20.4 log points, which corresponds to a wage differential of 22.6percentor 0.54 BYN (approximately 0.22 USD) per working hour. The major share of the gender wage gap in Belarus is formed by the unexplained part (105.3percent). At that, due to some unobservable factors women with similar characteristics obtained 0.54 BYN per working hour less than they are supposed to gain according to their characteristics or vice versa men get 0.54 BYN more per working hour.

Table 3. Oaxaca-Blinder twofold decomposition results without characteristic effects (male wage structure)

Differential of a mean value of logarithm of earnings/hour	Coef.	Std. Err.	z-stat	P>z	Earnings/hour	% ofthe wagegap
Males	1.080***	0.017	62.790	0.000	2.946	
Females	0.877***	0.017	50.130	0.000	2.403	
Difference	0.204***	0.025	8.300	0.000	1.226	
Explained (characteristics)	-0.011	0.022	-0.450	0.620		-5.25%
Unexplained	0.214***	0.029	7.380	0.000		105.25%

Source: authors estimates based on GGS-2017.
Note: Estimates reflect weighted data. Significance: ***: 1percent; **: 5percent; *: 10percent.

More detailed evaluation of the characteristic effects is presented in Table 4. The factors were combined into different groups (regional, family, educational characteristics, working experience, occupations and organization type).

Table 4. Oaxaca-Blinder twofold earnings decomposition results of the characteristics effects

Factors	Coef.	Std. Err.	z-stat	P>z	% ofthe wage gap
Regional characteristics	0.001	0.006	0.17	0.866	-0.82%
Family characteristics	-0.008	0.005	-1.32	0.187	0.77%
Educational level	-0.026***	0.008	-3.21	0.001	-12.75%
Working experience	-0.021***	0.010	-2.07	0.038	-10.29%
Type of occupation	0.043***	0.017	2.51	0.210	21.08%
Total	-0.011	0.022	-0.50	0.620	-5.25%

Source: authors estimates based on GGS-2017.
Note: Estimates reflect weighted data. Significance: ***: 1percent; **: 5percent; *: 10percent.

The results show that the negative explained gap is heavily influenced by the educational and working experience factors. The increase in women educational attainment and job-related experience reduce the level of the wage gap in the market by 10.5percent and 6.0percent

respectively. On contrary, occupational choice is leading to the growth of the difference in earnings. Likely, presence of a number of jobs available for men only[7] in the labor market leading to certain occupational segregation is partly responsible for the existing gender wage gap.

The Machado and Mata gender wage gap decomposition

The results of MM decomposition are presented in Table 5. On contrary to Table 2, where it is assumed that men and women are remunerated equally, here we control for potential differences in rewards by constructing the counterfactual density and simulating male dataset with female characteristics and male rewards.

The decomposition does not provide any drastic difference in comparison to results presented in Table 2. The results show that level of female earnings is substantially lower going through all quantiles of earnings' distribution. Control for various basic personal characteristics (see Line 2) does not lead to the significant changes in the gender effect. The 90th quantile is the only, where the gender wage gap substantially decreases meaning that the personal endowments of wage-employed males located in this quantile are better off than the characteristics of their female counterparts. Control for the organization type as well as the occupational diversity (Lines 3 and 4) lead to just slight fluctuations in the size of the gender wage gap, while the gender wage gap is mostly caused by difference in rewards.

Table 5. Counterfactual gender wage gap (male wage structure)

Gender wage gap (MM decomposition)	q10	q25	q50	q75	q90
Raw	0.15***	0.24***	0.22***	0.34***	0.36***
With personal characteristics	0.15***	0.21***	0.25***	0.27***	0.26***
With personal characteristics and organization type	0.15***	0.21***	0.25***	0.27***	0.25***
With personal characteristics, organization type, and occupations	0.15***	0.21***	0.24***	0.26***	0.27***

Source: authors estimates based on GGS-2017.
Note: Estimates reflect weighted data. Significance: ***: 1percent;**: 5percent;*: 10percent.

Similar to Table 2 the size of the gender wage gap is substantially higher at the top of income distribution than at the bottom. So, that it equals to 0.16 log points at the 10th quantile, 0.24 log

points at 50thquantile and reaches maximum of 0.27 at the 90th quantile indicating presence of the glass ceiling effect in the market.

We follow terminology used in the relevant studies (see Arumpalam, Booth, and Bryan 2007; Javdani 2015) and define presence of the "glass ceiling/sticky floor" phenomenon in the labor market in case if the size of the gender wage gap at the higher/lower quantile exceeds the size of the gap at other reference points by at least 2 percentage points.

The results show evidence of glass ceiling in Belarus (the gender wage gap for all data accelerates at the 75th and 90th quantiles of earnings' distribution and is at least 2percent higher than at any lower quantiles), i.e. women at the upper part of the wage distribution are found to have been more disadvantaged, than those at the bottom.

Such result is consistent with the evidence found in the high-income and transition countries and goes in line with the empirical studies (Arumpalam, Booth, and Bryan 2007) that showed that the presence of the glass ceiling effect is more typical for the countries with the generous maternity policies, while sticky floor effect is more frequently observed in the lower income countries, where the female labor force participation rate is relatively low. In addition, the minimum wage policy implemented in Belarus is also negatively associated with the sticky floor effect (Dolado et al.1996) as it forces employers to pay the required minimum without any qualification assessment of the employees.

It should be noted that the presence of the glass ceiling effect is only observed if we analyze just respondents employed in the state sector and no evidence of either glass ceiling or sticky floor is found in the private sector (see Table 6).

Table 6. Decomposition of the observed gender wage gap by organization type

Decomposition	Total	Characteristics (%)	Unexplained (%)
Alldata			
p10	0.16	-0.047 (-29.38%)	0.207 (129.38%)
p25	0.211	-0.003 (-1.90%)	0.215 (101.90%)
p50	0.243	0.013 (94.24%)	0.229 (94.24%)
p75	0.266	0.032 (87.97%)	0.234 (87.97%)
p90	0.269	0.044 (83.27%)	0.224 (83.27%)
Privatesector			
p10	0.110	-0.041 (-37.27%)	0.151 (137.27%)
p25	0.220	-0.028 (-12.73%)	0.248 (112.73%)
p50	0.230	-0.036 (-15.65%)	0.27 (115.65%)
p75	0.180	-0.078 (-43.33%)	0.258 (143.33%)
p90	0.155	-0.089 (-57.42%)	0.244 (157.42%)
Statesector			
p10	0.146	-0.05 (-34.25%)	0.196 (13.25%)
p25	0.198	0.003 (1.01%)	0.196 (98.99%)
p50	0.233	0.017 (7.30%)	0.213 (92.70%)
p75	0.264	0.042 (15.91%)	0.222 (84.09%)
p90	0.265	0.067 (25.66%)	0.197 (74.34%)

Source: authors estimates based on GGS-2017.
Note: Estimates reflect weighted data.

There are few papers with similar estimations(see Ganguli and Terell 2005; Jolliffe and Campos 2005). However, the results are mostly opposite, i.e. the size of the gender wage gap at the top of the earnings distribution is larger in the private sector compared with the state sector of the economy (Lucifora and Meurs 2006; Arumpalam, Booth, and Bryan 2007; Booth 2006).

That distinguishes our results from the majority of studies on that issue in other countries. In our case, the potential explanation of such results is the endowments' effect that diminishes the size of the gap in case of women employed in the private sector and doing opposite in the state segment.

Women occupied at the 75th and 90th quantiles of the private sector have better characteristics than men allowing them to slightly lower the size of the wage gap. In contrast, female employees occupied at the top quantiles of wage distribution in the state sector are worse than their male colleagues, which leads to the growth of the gender pay gap at the top tail and presence of the glass ceiling effect.

Likely, this could be the evidence of the outflow of qualified female human capital towards the corporate segment that favors personal characteristics and knowledge that can lead to additional profits of the company unconditional to gender. At the same time females in general

and without any outstanding characteristics in particular are less mobile in the labor market (Takahashi and Takahashi 2011) and that might provide an opportunity to their employers to pay them less compared to men (Ransom 1993).

CONCLUSIONS

In this paper, we look at the situation with gender wage gap along the wage distribution using the data from the Generations and Gender Survey conducted in Belarus in 2017. The analysis reveal certain major findings.

First, the results show that women wages are lower than men wages all over the wage distribution and the unconditionalgender wage gap equals 22.6percent and it increased compared to previous study conducted by Francesco Pastore and Alina Verashchagina (2011).The level of female earnings is lower than male regardless of occupational type, educational background, working experience and organizational type.

Second, we decomposed the gender wage gap into endowment and unexplained part using OLS estimates and OB technique. Our results show that a large part of the wage gap cannot be explained by available characteristics and, indeed, the unexplained gap is larger than the total, suggesting that female characteristics are superior to the male ones. The OB decomposition results of the characteristics effects also show that the educational attainment together with working experience reduce the level of the wage gap, but their overall effect is minor. The occupational choice influences in opposite direction and increases the wage gap. However, its effect is also small. Altogether, these results, first, suggest that occupational segregation plays a minor role in explaining the gender wage gap, second, the Belarusian gender differential in earningsis likely to be attributed to the discrimination, and, third, contradict conclusion of the Francesco Pastore and Alina Verashchagina (2011) for segregation as a main reason for wage differences in Belarus.

Third, the MM decomposition of the gender wage gap also defines that the difference in earnings is fully due to price component and not to the endowment part. The results indicate the insignificance of the endowments' component in explaining the wage gap. On contrary, Francesco Pastore and Alina Verashchagina (2011) showed that not only difference in rewards, but also deterioration of female personal characteristics explained the conditional gender wage gap and its' growth over time.

Fourth, the level of remuneration is larger among the private employees. At the same time, the level of the wage gap is larger in the state sector than in the private companies. Moreover, the MM decomposition estimates demonstrate that the gender wage gap in the state sector shows evidence of the glass ceiling effect, while no evidence of either glass ceiling or sticky floor in the private sector. The results also suggest that females are better of being in the private sector at the lowest and the highest quantiles (i.e. is the size of the gender wage gap is lower compared to the 25th and 50th quantiles). These results expand the findings by Francesco Pastore and Alina Verashchagina (2011), who did not perform decomposition of the wage gap by organizational type.

Additionally, the above findings also indicate that gender discrimination not job segregation is the key factor that determines the growing gender wage gap in Belarus. The possible explanation is that ownership institutional differences seem to play a crucial role here. Particularly, Belarusian private firms work under stronger competition trying to identify individual productivity more correctly, which leads to narrowing the gender difference in pay. In contrast, the paternalistic attitude to women in the public sector shadowed by the Soviet legacy increases furtherthe gender wage gap.

NOTES

[1] The wage gap exists in all sectors of the economy. For example, the gap in agriculture equals 11.3 percent, in manufacturing – 23.1 percent, in construction – 14.4 percent, in wholesale and retail trade – 23.7 percent, in transport activity – 6.4 percent, in information and communication industry – 41.1 percent, in financial and insurance activities – 25.3 percent, in public administration – 15.9 percent, in education – 15.8 percent, in health and social services – 16.7 percent (Belstat 2012, 2018a, 2018b).

[2] According to Francesco Pastore and Alina Verashchagina (2011), the unconditional hourly gender wagegap in Belarus (in terms of hourly wages) was equal to 18.9 percent in 2006.

[3] The data lacks information on industrial distribution and we should keep in mind potential industrial segregation into male- female-dominated industries that may also be partly responsible for the existing gender wage gap.

[4] The Belarusian tariff system originates from the Soviet period. Its modern form was formalized in March 2001 and operates with revisions to this day.

[5] In this case, the complexity of the work is interpreted very widely including the direct physical and intellectual loads during the working period, the accompanying nervous tension, the measure of possible responsibility and external working conditions, the efforts made to obtain appropriate qualifications, that is the level and focus of the obtained education. In other words, all current and past labor costs.

[6] Generally, Belarusian women dominate in the non-manufacturing sectors (except for science) and in the service sectors (except for transport). Women are mostly represented in education (81.2 percent of the total number of employees are women), retail trade (74.8 percent), health and social services (84.9 percent).Any affiliation of the labor force to the social sectors is characterized by lower wages compared to the manufacturing sectors (Belstat 2018a, 2018b).

[7] There are 181 positions in the current list of arduous work and jobs entailing harmful and (or) dangerous working conditions, that are not allowed for women: http://newsby.org/documents/sovetm/pos05/sovmin05706.htm.

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Table A1. Definition of variables

Variable	Variable description
Wage	Hourly wage of the respondent.
Gender	Gender of the respondent.
Coresident children	Dummy variable indicating the presence of coresident children in the household with the respondent.
Married	Dummy variable indicating that the respondent is officially married.
Experience	Potential work experience of the respondent calculated as the respondent's age minus his years of education and minus six years. It is also corrected for the maternity leave: number of own children multiplied by 3 years (only for women).
Education	Categorical variable defining highest level of the respondent's education: 1 – respondent completed primary education, 2 – respondent completed lower secondary education, 3 – respondent completed upper secondary education, 4 – respondent completed post-secondary non-tertiary education, and 5 – respondent completed at least a Bachelor's degree.
Occupation	Categorical variable defining respondent's occupation category (ISCO-08)[a] ordered according to ISEI[b] (from low to high): 1 – skilled agricultural, forestry and fishery workers, 2 – elementary occupations, 3 – services and sales workers, 4 – plant and machine operators and assemblers, 5 – craft and related trade workers, 6 – clerical support workers, 7 – technicians and associate professionals, 8 – armed forces occupations, 9 – managers, and 10 – professionals.
Private	Dummy variable indicating that the respondent works at the private organization.
Public	Dummy variable indicating that the respondent works at the public organization.
Minsk city	Dummy variable indicating respondent residing in Minsk city.
Brest region	Dummy variable indicating respondent residing in the Brest region.
Gomel region	Dummy variable indicating respondent residing in the Gomel region.
Grodno region	Dummy variable indicating respondent residing in the Grodno region.
Minsk region	Dummy variable indicating respondent residing in the Gomel region.
Mogilev region	Dummy variable indicating respondent residing in the Mogilev region.
Vitebsk region	Dummy variable indicating respondent residing in the Vitebsk region.

Source: GGS-2017.

Note: [a]ISCO-08 – International Standard Classification of Occupations. [b]ISEI – International Socio-Economic Index of Occupational Status.

Table A2. Descriptive statistics for wage employees by gender

Variable	Males		Females	
	Mean	Std. Dev.	Mean	Std. Dev.
Wage	3.609	3.724	3.132	4.295
Experience	22.410	11.924	19.811	10.080
Family:				
Coresident children	0.525	0.500	0.562	0.496
Married	0.710	0.454	0.569	0.495
Education:				
Primary education	0.017	0.131	0.013	0.114
Lower secondary education	0.183	0.387	0.118	0.322
Upper secondary education	0.370	0.483	0.402	0.490
Post-secondary non-tertiary education	0.106	0.308	0.064	0.245
Bachelor's degree or higher	0.324	0.468	0.403	0.491
Occupation:				
Skilled agricultural, forestry and fishery workers	0.051	0.221	0.021	0.144
Elementary occupations	0.119	0.323	0.115	0.320
Services and sales workers	0.070	0.256	0.201	0.401
Plant and machine operators and assemblers	0.064	0.244	0.017	0.130
Craft and related trade workers	0.182	0.386	0.051	0.219
Clerical support workers	0.017	0.130	0.080	0.271
Technicians and associate professionals	0.155	0.362	0.090	0.286
Armed forces occupations	0.023	0.151	0.003	0.051
Managers	0.071	0.257	0.064	0.244
Professionals	0.248	0.432	0.359	0.480
Organization type:				
Private	0.248	0.432	0.189	0.392
Public	0.752	0.432	0.811	0.392
Region:				
Minsk city	0.197	0.398	0.207	0.405
Brest region	0.132	0.339	0.122	0.327
Gomel region	0.084	0.278	0.117	0.322
Grodno region	0.132	0.338	0.143	0.350
Minsk region	0.212	0.409	0.184	0.388
Mogilev region	0.104	0.305	0.097	0.296
Vitebsk region	0.140	0.347	0.130	0.337
Observations	1260		1316	

Source: authors estimates based on GGS-2017.

Note: Estimates reflect weighted data. Hourly wages are in BYN (1 USD = 1.93 BYN).

Table A3. OLS and quantile regression estimates

Variables	q10		q25		q50		q75		q90		OLS	
Constant	-0.350	[0.345]	0.371**	[0.152]	0.856***	[0.110]	1.153***	[0.088]	1.267***	[0.195]	0.561***	[0.124]
Female	-0.133***	[0.021]	-0.199***	[0.021]	-0.254***	[0.018]	-0.270***	[0.020]	-0.270***	[0.035]	-0.217***	[0.025]
Experience	0.020***	[0.005]	0.014***	[0.004]	0.009***	[0.003]	0.010***	[0.003]	0.024***	[0.005]	0.026***	[0.000]
Experience squared * 10³	-0.385***	[0.100]	-0.318***	[0.100]	-0.220***	[0.100]	-0.233***	[0.100]	-0.491***	[0.100]	-0.500***	[0.100]
Family:												
Coresident children	0.086***	[0.019]	0.036*	[0.019]	0.056***	[0.019]	-0.071***	[0.019]	0.050	[0.033]	0.074***	[0.024]
Married	0.041***	[0.019]	0.024	[0.017]	0.027	[0.019]	-0.014	[0.020]	-0.059*	[0.032]	-0.004	[0.025]
Education:												
Lower secondary education (OV: Primary education)	0.326	[0.337]	0.118	[0.133]	0.006	[0.087]	0.000	[0.077]	0.044	[0.163]	0.153*	[0.089]
Upper secondary education	0.369	[0.336]	0.167	[0.134]	0.119	[0.086]	0.060	[0.076]	0.088	[0.160]	0.200**	[0.088]
Post-secondary non-tertiary education	0.242	[0.340]	0.119	[0.137]	0.081	[0.091]	0.077	[0.081]	0.154	[0.170]	0.144	[0.095]
Bachelor's degree or higher	0.582*	[0.337	0.351***	[0.134]	0.296***	[0.088]	0.274***	[0.079]	0.397**	[0.164]	0.433***	[0.093]
Occupation:												
Elementary occupations (OV: Skilled agricultural, forestry and fishery workers)	0.096	[0.061]	0.005	[0.065]	-0.085	[0.065]	-0.147***	[0.043]	-0.095	[0.126]	-0.033	[0.081]
Services and sales workers	0.304***	[0.048]	0.148**	[0.061]	0.029	[0.067]	0.029	[0.043]	0.080	[0.111]	0.142*	[0.082]
Plant and machine operators and assemblers	0.214	[0.147]	0.159*	[0.095]	0.171*	[0.089]	0.147**	[0.058]	0.262***	[0.125]	0.157	[0.104]
Craft and related trade workers	0.432***	[0.050]	0.297***	[0.062]	0.169**	[0.069]	0.208***	[0.047]	0.234***	[0.098]	0.268***	[0.079]
Clerical support workers	0.421***	[0.060]	0.291***	[0.070]	0.140**	[0.070]	0.055	[0.038]	-0.036	[0.143]	0.133	[0.095]
Technicians and associate professionals	0.457***	[0.047]	0.309***	[0.064]	0.160**	[0.066]	0.093**	[0.040]	0.148	[0.097]	0.256***	[0.078]
Armed forces occupations	0.428***	[0.060]	0.474**	[0.219]	0.275***	[0.100]	0.316***	[0.061]	0.333***	[0.103]	0.335***	[0.116]
Managers	0.593***	[0.050]	0.513***	[0.078]	0.443**	[0.071]	0.394***	[0.057]	0.437***	[0.134]	0.469***	[0.090]
Professionals	0.336***	[0.057]	0.292***	[0.064]	0.194***	[0.064]	0.168***	[0.039]	0.146***	[0.093]	0.198**	[0.083]
Organization type:												
Private company	0.095***	[0.019]	0.155***	[0.026]	0.144***	[0.020]	0.165***	[0.021]	0.184***	[0.050]	0.139***	[0.028]
Region:												
Brest region (OV: Minsk city)	-0.172***	[0.023]	-0.236***	[0.038]	-0.263***	[0.029]	-0.251**	[0.027]	-0.285***	[0.089]	-0.323***	[0.040]
Gomel region	-0.232***	[0.046]	-0.248***	[0.032]	-0.288***	[0.034]	-0.258**	[0.041]	-0.317***	[0.089]	-0.291***	[0.047]
Grodno region	-0.254***	[0.027]	-0.302***	[0.028]	-0.341***	[0.032]	-0.346**	[0.031]	-0.434***	[0.071]	-0.410***	[0.040]
Minsk region	-0.211***	[0.028]	-0.153***	[0.033]	-0.172***	[0.027]	-0.135**	[0.028]	-0.207***	[0.077]	-0.205***	[0.038]
Mogilev region	-0.267***	[0.027]	-0.272***	[0.047]	-0.289***	[0.034]	-0.315**	[0.032]	-0.358***	[0.086]	-0.379***	[0.044]
Vitebsk region	-0.155***	[0.035]	-0.190***	[0.033]	-0.257***	[0.031]	-0.226**	[0.037]	-0.252***	[0.099]	-0.249**	[0.045]
Pseudo R²	0.119		0.158		0.185		0.180		0.153		0.153	
Observations	2,576		2,576		2,576		2,576		2,576		2,576	

Source: authors estimates based on GGS-2017.

Note: Estimates reflect weighted data. Robust standard errors in square brackets. Significance: ***: 1 percent; **: 5 percent; *: 10 percent.