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THE IMPACT OF SECTORAL SEGREGATION ON THE EARNING DIFFERENTIAL BETWEEN NATIVES AND IMMIGRANTS IN RUSSIA

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THE IMPACT OF SECTORAL SEGREGATION ON THE EARNING DIFFERENTIAL BETWEEN NATIVES AND IMMIGRANTS IN RUSSIA[3]

Using nationally representative data (RMLS-NRU HSE) from 2004-2012, this paper examines sectoral segregation between immigrant (persons with an immigration background) and native workers and its impact on the earning differential in Russia. This is the first micro-level study in Russia about sectoral segregation and the earning gap between natives and immigrants under its influence.

In this study we analyze the determinants of the choice of sector, estimate earning differences between natives and immigrants, define the Duncan index of dissimilarity and measure the impact of sectoral segregation on the earning differential between natives and immigrants using Oaxaca-Blinder decomposition.

Our results show that sectoral segregation in the Russian labor market gradually increased from 2004 to 2012. We find there are significant earning differences between immigrants and natives. Most of this difference cannot be explained by productivity-related differences between the two groups. This implies that immigrants can experience labor market discrimination. After partly assessing the self-selection of worker's using the extended decomposition method (Brown et al., 1980) our empirical results demonstrate that the sectoral segregation (or voluntary distribution across sectors) plays a considerable role in the earning differential between natives and migrants in Russia.

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INTRODUCTION

With a breakup of the Soviet Union in 1991, Russia became a net recipient of immigrants from all the post-Soviet space[4] and one of the largest immigration countries worldwide. By the end of 2014, according to The Federal Migration Service, there are around 10 million foreign citizens residing in the territory of Russia. Moreover, it is becoming increasingly difficult to ignore the fact that nowadays Russia is in the middle of a demographic crisis. There are several scenarios for demographic dynamics in the Russian Federation. Some of the scenarios predict that the population of the country will linger around 140 million by 2030 (Vishnevsky et al., 2012). However, the pessimistic scenarios forecast that the population of the Russian Federation may drop down below 140 million by 2030 (Vishnevsky et al., 2012). At the same time Russia suffers from a shortage of labor force and, therefore, immigrants are needed in the internal job market. According to the estimation of experts, the share of immigrants from CIS countries at working age is approximately 80% (Vishnevsky et al., 2012). Given the current trends, immigrants have been becoming an integral part of the Russian labor market occupying specific job places, e.g. where the shortage of native labor force can be observed.

Several research projects based on Swedish, French or Norwegian data notice that the immigration background of a person may have a negative influence on the labor market performance, e.g. poor educational attainment, lower employment perspectives (potential labor market mismatch or over-qualification) and lower annual wages (Behtoui, 2004; Akgüc and Ferrer, 2015; Støren and Wiers-Jenssen, 2010).

In this study we analyze the earning differential between immigrants (persons with an immigration background) and natives in Russia. More specifically, we determine the contribution of sectoral segregation in this wage gap. We aim to answer several questions. Does the sectoral segregation between immigrants and native workers in Russia exist? What is the role of sectoral segregation in the earning inequality between immigrants and native workers?

We use Russian Longitudinal Monitoring Survey (RLMS) household sample survey data sets for 2004-2012, and use the methodology applied in similar studies by other authors (Wei and Lu, 2007; Meng and Zhang, 2001; Neuman and Silber, 1996; Arcand and D'Hombres, 2004; Liu et al. 2004).

Accordingly, our analysis includes several steps. At first we implemented the Duncan index of dissimilarity in order to examine the basic level of segregation. Then, we examine the role of segregation in natives/immigrants earning differential and assess the problem of worker's self-selection using the extended decomposition method (Brown et al., 1980). It involves two-stage

[4] Uzbekistan, the Ukraine, the Kyrgyz Republic, Kazakhstan, Tajikistan, Armenia, Azerbaijan, Georgia, Moldova, Belarus, Turkmenistan

selectivity model, where the first stage deals with the probability of sector (occupation) selection considering socio-demographic characteristics of the respondent.

Generally, sectoral (occupational) segregation reflects a process of allocation of people to positions, and this process contains both voluntary and involuntary elements. On the one hand, there can be a positive self-selection of persons with an immigration background. Positive self-selection may occur when an immigrant's skills are transferable from the home country to the host country (Borjas, 1994). This assumption seems to be relevant for the neighboring countries in post-Soviet space, because most of which share a similar economic and social background (Andrienko and Guriev, 2005). On the other hand, the findings of studies show that there can be unequal access to jobs in sectors and occupations for immigrants. In other words, there can be a discrimination process in the labor market (Müller and Ramirez, 2005; Catanzarite, 2000).

It should be noted that voluntary or involuntary clustering into sectors or occupations is closely linked to the distribution of earning among different groups of workers, since earnings partly depend on sectoral attainments. The wage differential may partly be caused by the selection of immigrants in and out of the labor market. However, if the distribution across sectors or occupations is not due to self-selection, but due to unequal access to jobs (segregation effect), it can adversely affect the earnings of workers of the discriminated group. Thus, in this case, sectoral segregation can explain a substantial part of the earning differential.

The empirical literature has emphasized that there are different impacts of sectoral (occupational) segregation on the earning differential between natives and migrants by countries. Thus, the 80% of the total wage gap between Swiss and foreign unskilled workers is a result of occupational segregation (Müller and Ramirez, 2005) compared to 6% of the total earning differential between urban residents and rural migrants in China (Meng and Zhang, 2001).

However, despite the sufficient amount of research on European countries and USA, evidence about sectoral segregation by ethnicity and migrant status in Russia is limited. The published studies on the analysis of foreign workers in the Russian labor market (Lazareva, 2015; Chernina and Lokshin, 2014; Andrienko and Guriev, 2005; Kuznetsov and Mukomel, 2007) analyze the specific aspects of labor immigration in Russia. Andrienko and Guriev (2005) discuss a basic overview of the immigration process in Russia. Other authors provide empirical case studies. For instance, Lazareva (2015) examines labor market assimilation of ethnically Russian migrants to Russia and their effect on the employment and wages of the local population. She finds a negative impact of the inflows of international immigrants on the local population's employment but not on earnings. Chernina and Lokshin (2014) concentrate on discussing human capital characteristics of Tajik work migrants in the Russian labor market. Kuznetsov and Mukomel (2007) consider the ethnic niches in the Russian labor market, when immigrants from particular ethnic groups enter

only specific occupations. Russian scientists mostly concentrate on gender segregation and gender wage inequality in the Russian labor market (Maltseva and Roshchin, 2007; Oshchepkov, 2006), and analyze the impact of occupations on wage inequality (Oshchepkov, 2011). But neither of these studies assesses the extent to which the earning differential between immigrants (persons with an immigration background) and natives in Russia was due to the segregation effect. Moreover, our paper is concentrated on the analysis of the heterogeneous group that includes persons with an immigration background as well as international immigrants.

The structure of the paper is as follows. The next section describes the theoretical basis for sectoral segregation of immigrants and its impact on the earning differential between natives and immigrants. Then, we describe the basic methodology and the used data. After that we provide the results of the analysis and conduct robustness checks of the findings. Concluding remarks and policy implication are presented in the final section.

LITERATURE REVIEW

The wage and employment outcomes of immigrants are the result of many factors such as the distribution of job opportunities, difference in human capital level and also discrimination. Existing research literature gives a basic intuition of the causes of segregation and its possible impact on the wage difference.

Recent studies document strong patterns of ethnic and immigrant segregation across workplaces in the USA (Hellerstein and Neumark, 2008), Sweden (Aslund and Skans, 2009) and Germany (Dustmann et al., 2009) suggesting that there are important differences in hiring patterns between observationally equivalent firms.

There are a number of theories that provide an explanation for ethnic and immigrant segregation, most discussing those related to networks (Montgomer, 1991; Arrow and Borzekowski, 2004; Calvo-Armengol and Jackson, 2004, 2007; Fontaine, 2008; Bramoulle and Saint-Paul, 2006; Ioannides and Soutevent, 2006), consumption and productivity spillover (Lazear, 1999), demand mechanism in the labor market and discrimination (Becker, 1975).

Most of the studies focus on non-random selection of immigrants into areas, sectors and occupations (Edin et al., 2003; Damm, 2009; McPherson et al., 2001). The clustering of immigrants in certain sectors (occupations) may arise from the tendency to concentrate in selected geographical areas due to social and family networks. In addition, immigrants from specific ethnic groups may enter only certain sectors or occupations creating so-called “ethnic niches”. For instance, migrant workers from Azerbaijan and Armenia to Russia were involved in some retail sectors (retail of greengrocery) where the concentration of native workers is rather low (Kuznetsov and Mukomel, 2007).

Other mechanisms that may have an impact on segregation are consumption externalities

and productivity spillovers. Individuals with a common cultural background can experience lower communication costs in the workplace and, in turn, be more productive at their jobs (Lazear, 1999). As a result, individuals with a common language and culture (immigrants from a specific ethnic group) will concentrate in same economic sectors or occupations. In turn, employers may have preferences to hire the workers holding the same ethnicity in order to decrease transaction costs in the workplace (Becker, 1975).

Other studies investigate the mechanism of supply and demand in the labor market that leads to the sectoral segregation of minorities. If there is a demand for immigrants only in specific industries (occupations), then they are concentrated in such industries (Catanzarite, 2000; Cutler et al., 2008). This process is the result of labor force shortage in a country or reluctance of natives to be employed in certain industries due to the lower quality of jobs and high level of reservation wage. In other words, even if a person with an immigration background is highly skilled, he/she may not find a job in high-paid industries or occupations due to labor market peculiarities (Yudina, 2005). As a result, immigrants may tend to concentrate in the low skilled sectors, which assume lower wages (Tyuryukanova, 2007).

The fourth mechanism that could lead to sectoral segregation is discrimination practices. The existence of a positive native/immigrant earning differential may not be a result of the low skill level of immigrants but that this earning differential may appear if there is a systematic labor market discrimination against migrant workers (Borjas, 1990). According to Becker (1971), the source of discrimination may be preferences and expectations of employers. Therefore, employers may prefer to employ a certain type of workers due to their tastes. If employers exclude some type of workers from better-paid job places, then these groups could shift to low-paid occupations despite their human capital level. This leads to the situation when immigrants are paid a lower earning than their marginal product of labor (MPL). Thus, the earning differential, in this case, is a consequence of occupational segregation due discrimination practices.

Most papers that have been devoted to labor market native/immigrant segregation do not analyze the role of sectoral (occupational) segregation on the earning differential (Culter and Glaeser, 1997; Chiswik and Miller, 1995).

Other research shows that the occupational allocation of workers plays a little role in pay inequality. Meng and Zhang (2001) provide evidence for a negligible effect of segregation on the earning differential, i.e. contribution of segregation to the wage gap is 4.85% (Meng and Zhang, 2001). Authors exploit the industrial segregation and earning differential between residents and rural migrants in China. Arcand and D'Hombres (2004) show similar results as Meng and Zhang (2001). They consider occupational segregation and the earning differential between white, brown and black workers in Brazil. Their findings show that the impact of occupational segregation on the

earning differential is negligible, i.e. segregation accounts for 5.26% for browns and 7.19% for blacks.

Some analysts have argued that the occupations or sectors to which immigrants employed have a substantive effect on earning differential. Neuman and Silber (1996) find that segregation plays a major role in native/immigrant earning differential in Israel[5]. According to their findings, 70% of this earning differential is a result of segregation, 26% of wage discrimination, and 4% of human capital differences. In support of the segregation argument, Wei and Lu demonstrate that segregation explains 37% of the total earning difference in China (Wei and Lu, 2007). Other studies estimate firm-level segregation considering the skill level of workers in Switzerland (Müller and Ramirez, 2005). They show that segregation catches almost 80% of the total earning differential between Swiss and foreign unskilled workers.

In previous studies we cannot predict the role of sectoral segregation on earning differential at the Russian labor market. Thus, the examination of the role of sectoral segregation on the earning differential is a fully empirical question.

DATA AND METHODOLOGY

The data set used is from the "The Russian Longitudinal Monitoring Survey" (RLMS)[6]. The sampling design of the survey ensures the representativeness of the Russian population at the country level and allows us to create a long time-series cross section sample.

The bulk of the data in this study comes from the 2004 to the 2012 waves of RLMS. We limit the analysis to employed males aged 16 to 60 and employed females aged 16 to 55[7]. Employed people include four main groups of persons if they: have a job; are on a paid leave, excluding maternity leave; are on unpaid leave; in the last 30 days engaged in some additional kind of work for which they were paid or will be paid.

The questions "What nationality do you consider yourself?" and "Please, tell the modern name of the country you were born in" are applied for construction of the main variable of interest "immigrant". We define a person who is not born in Russia and not ethnically Russian as a person with an immigration background or immigrant[8]. We do not consider the year when respondents moved to Russia. Therefore, we include in our sample of immigrants all employed non-ethnically Russian respondents who were not born in Russia aged 16 to 60.

[5] Authors analyze two main ethnic groups in Israel: Jews originating from Asia and Africa (excluding South Africa and those from America, Europe, South Africa and Australia).

[6] The survey is conducted by the Carolina Population Center at the University of North Carolina at Chapel Hill, the National Research University Higher School of Economics, ZAO "Demoscope" and the Institute of Sociology RAS.

[7] We limit our analysis according to age of detainment in Russia: 55 for females and 60 for males in order to exclude the effect of unearned income.

[8] Authors of other studies have possibility to isolate the group of immigrants for a particular questions about immigration background or citizenship in applying data sets (Meng and Zhang, 2001; Glitz, 2012; Catanzarite, 2000). Unfortunately, RLMS do not have such questions.

Data for Russia have their own characteristics. In particular, the RLMS data set does not include information about illegal international immigrants or temporary labor immigrants (Lazareva, 2015). In addition, we do not examine the issue of citizenship. Therefore, we need to mention that the group of ethnically non-Russian respondents who were not born in Russia can include not only current international immigrants, but also persons with an immigration background who have obtained Russian citizenship (e.g. persons who moved to Russia before 1991). We suppose that this assumption is quite acceptable. Several studies notice that the immigration background of a person may have a negative influence on their labor market performance (employment perspectives, wage level, etc.) (Behtoui, 2004; Akgüc and Ferrer, 2015; Støren and Wiers-Jenssen , 2010; Aldashev et al. 2007).

We realize that citizenship can be important for divisions between informal and formal occupations. Researchers argue that in a noticeable number of cases, the relationship between immigrant and employer may be non-official and existing under the conditions of "shadow economy" (Tyuryukanova, 2004, Catanzarite, 2000). The legal barriers for entering the labor market such as the complicated procedure of legalization or getting a work permit constitute the possible cause of the earning differential and sectoral segregation.

In the 2009 RLMS survey, the respondents were asked when they started living in the Russian Federation and what their current location is within Russia. According to the Russian legislation, a person who permanently lives in Russia more than five years can be naturalized. Consequently, people who live in Russia less than five years can be considered immigrants. But, the number of respondents who lived in Russia less than 5 years is quite small for the robust analysis due to missing values in the RLMS data set. Thus, we cannot apply the citizenship variable in our study.

It should be also mentioned that our sample of immigrants includes approximately 70% of immigrants that moved to Russia before 1991 (lived in Russia more than 18 years) and therefore have a higher probability of having Russian citizenship (Figure 1, APPENDIX). There was a breakup of the Soviet Union in 1991 and the first version of the law on citizenship and entry into Russia was adopted in November 1991. Therefore, all respondents who moved to Russia before 1991, we present as persons with an immigration background. All immigrants who moved to Russia from post-Soviet space after 1991 are considered international immigrants.

Consequently, the group of immigrants in this study is quite heterogeneous. However, existing research shows it is not so much citizenship as ethnicity that creates grounds for discrimination in the labor market (Glitz, 2014; Catanzarite, 2000). We assume the application of only the residence period without an ethnic category as a measure for migrant status does not allow tracing the labor market segregation and wage discrimination. However, if we combine the period

of residence less than five years and non-Russian ethnicity as a measure of migrant status, the migrant cells will contain only a few observations. So, this means that it is impossible to conduct the analysis involving the category of citizenship along with ethnicity using the RLMS data set.

Therefore, in this study we concentrate on ethnicity and the country of birth of respondents as grounds for discrimination, but not on the formal category of citizenship as measure for a migrant's status. As was mentioned above, the group of immigrants in this study may include not only real international immigrants (30% of the sample), but also respondents who moved to Russia in the Soviet period (70% of sample) (Figure 1, APPENDIX).

In addition, according to RLMS, approximately 70% of respondents, with the term of residence less than five years, are ethnically Russian.

The ethnic Russian immigrants differ from typical international immigrants in several aspects. Firstly, typical international immigrants have a different ethnicity and language compared to the native population (Lazareva, 2015; Glitz, 2014). Secondly, based on RLMS data, most of the ethnically Russian immigrants use Russian as their native language, and have received their education in Russian (Lazareva, 2015). This produces the situation where ethnically Russian immigrants to Russia can be treated as natives in labor market. This group with the higher probability does not experience any labor market discrimination and possesses a very similar level of human capital as natives.

As a result, this study considers ethnicity and country of birth as a water line for the labor market discrimination. Our definition excludes the ethnic Russian immigrants or compatriots and Russian indigenous peoples that possess Russian citizenship. The overall composition of respondents shows that the ethnically non-Russian respondent who was not born in Russia is defined as a person with an immigration background.

After the selections, the total sample in 2004-2012 consists of 45,136 observations (Table 1, APPENDIX). The number of natives account for 94.78% (42,780 residents respondents) of the total sample. The majority of them are ethnically Russian and born in Russia (70.13%, 31653 respondents). About 11.18% (5,045 respondents) of the total sample belong to the titular nations or indigenous people of Russia and 13.47% (6082 respondents) represents a group of Russian immigrants to Russia.

The number of immigrants in the total sample is 5.22% (2,356 respondents) (Table 1, APPENDIX). The stock of Russian immigrants to Russia exceeds the number of respondents who were not born in Russia and are ethnically non-Russian. We attribute this to the features of the RLMS data set, when the majority of immigrants are ethnically Russian (Lazareva, 2015).

The dependent variable "sector" is constructed based on the question "To what industry does this job belong?" We exclude the following categories: "government and public

administration", "army, Ministry of Internal Affairs, security services", "agriculture" and "other" due to the small number of observations. All other industries are divided into three bigger groups. The first group (*real product sector*) includes industry sectors and the construction sector. The second group (*service sector*) consists of trade and consumer services, finance, housing and communal services, transport and communications sector. The third group (*public sector*) includes education, science and culture, and public health services. This broad definition of sector groups is used because of the sample size consideration, as it is unacceptable to end up with industry cells that contain only a small number of observations.

We include in the analysis socio-demographic characteristics of respondents. These variables are three level of education, age and squared age, sex (1 = male), family status (1 = married[9]), children (1 = have child or children)[10], region (1 = Moscow, Moscow region, St. Petersburg) and dummies for professional groups and times periods.

Specifically, we use a question for earning definition "Try to remember, please: 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, including foreign currency, but convert the currency into rubles". To obtain hourly earnings rate, the monthly earning is divided by monthly working hours. In addition, we delete outliers in each year in order to get rid of respondents with the lowest and the highest earning and to attain the lognormal distribution of earning. Also, all observations with more than 270 monthly working hours have been set to 270 monthly working hours. Logarithm of hourly earnings is used in the regressions and equations. In addition, all earnings are in 2004 prices.

Education is considered as a main indicator of human capital level. The three levels of education include: School and lower; Professional and (or) technical education (secondary); University and higher education. Education level is defined as the highest level of education which a person obtained.

Professional groups exclude army and include others nine categories: 1) legislators, senior managers, officials; 2) professionals; 3) technicians and associate professionals; 4) clerks; 5) service workers and market workers; 6) skilled agricultural and fishery workers; 7) craft and related trades; 8) plant and machine operators and assemblers; 9) elementary (unskilled) occupations. Legislators, senior managers and officials are used as a reference group in regressions.

In addition, we include in the analysis three aggregated time periods: 2004-2007, 2008-2009 and 2010-2012. On the one hand this time division helps to catch the time trend and partly assess the time effects. On the other hand, cells in each year contain a small number of observations that

[9] Family status presupposes the marriage and civil marriage.
[10] The variable "child" is defined as having child or children.

may have influenced the estimation. Therefore, in our analysis we used aggregated time periods.

For the estimation of sectoral segregation and earning differential we conducted a two-step analysis. In the first step, we analyzed the Duncan index of dissimilarity in order to assess the overall segregation level of immigrants in Russia. The Duncan index was applied for estimation of different segregation types such as sectorial (occupational, income, education, etc.) segregation (Simkus, 1978; Dustmann and Frattini, 2012).

Basically, it compares two group's distribution across sectors. The value of the index is defined as the proportion of immigrants that would have to move to a sector that the natives dominate for the group's proportional distribution to be identical.

The index was calculated by the following formula:

$$D = 1/2 \sum \frac{group_i}{group_{total}} - \frac{non - group_i}{non - group_{total}}, \quad (1)$$

where $group_i$ and $non - group_i$ are the number of immigrants and native workers employed in specific sectors, respectively, $group_{total}$ and $non - group_{total}$ are the total number of employed immigrants and native workers, respectively.

Dissimilation equals 0 if there is no segregation in the labor market, and equals 1 if there is total segregation. For the Duncan index estimation we aggregate the time into three main periods (2004-2007 – "before the crisis", 2008-2009 – "the crisis time", 2010-2012 – "after the crisis") and use three sectors (real product sector, service sector and public sector).

In the second step, following to Wei and Lu (2007), Meng and Zhang (2001), and Neuman and Silber (1996) we calculate sectoral segregation and its impact on the earning differential using Blinder-Oaxaca decomposition (Neuman and Oaxaca, 2004) and extended decomposition introduced by Brown et al. (1980).

Blinder-Oaxaca decomposition is the most popular method for estimating of earning differential between two groups (Neuman and Oaxaca, 2004). The theoretical framework of this approach presupposes that an earning differential can be decomposed into two parts. One part is explained by socio-demographic characteristics of individuals and the second is the earning differential due to unobserved individual characteristics and can be interpreted as discrimination. Nonetheless, the classical form of the Oaxaca-Blinder decomposition does not consider the effect of unequal access to job places and sector attainment. Therefore, we use the extended earning decomposition introduced by Brown et al. (1980), that allows us to partly assess the problem of selection bias (Brown et. al., 1980).

The Brown decomposition method assumes a two-stage model. First stage is the estimation of a multinomial logit model that determines of the individual sector choice. This part assesses the

unequal distribution of workers across sectors due to their socio-demographic characteristics or self-selection.

We assume that the following multinomial logit model determines the individual sector choice:

$$p_{nj}^{k} = prob(y_n^k = j) = \frac{\exp(Z_n^k \gamma_j^k)}{\sum^{J} \exp(Z_n^k \gamma_n^k)}\ , \qquad (2)$$

where k=r, m; *r* and *m* denote native and immigrant workers, respectively; *j* is a sector indicator; p_{nj}^{k} is the probability that individual *n* is working in the *j*-th sector; N is the sample size; J is the total number of sectors by n=1,…, N and j=1,…, J; Z is the vector of socio-demographic characteristics (level of education, age and squared age, sex (1 = male), family status (1 = married), child (1 = have child), type of settlement (1 = urban dwellers), ownership (1 = public), region (1 = Moscow, St. Petersburg)), hourly earnings and γ is its coefficient. Each individual can choose only one sector.

At this stage, we also applied the bootstrap resampling method in order to approximate the distribution of the standard errors (Lesik and Fallahi, 2011).

The second stage includes the extended Mincerian earning equation, where λ_j^k is the Inverse Mills Ratio from the first stage of the estimation. This stage requires estimation of an earning determination equation:

$$\ln w_j^k = X_j^k \beta_j^k + \alpha_j^k \lambda_j^k + e_j^k\ , \qquad (3)$$

where k=r, m; *r* and *m* denote native and migrant workers, respectively; J is the total number of sectors, j=1,…, J; X is the vector of socio-demographic characteristics (three level of education, age and squared age, sex (1 = male), tenure and tenure squared, family status (1 = married), child (1 = have child), professional groups, years and region (1 = Moscow, St. Petersburg)).

Then, following the wage differential of native and migrants workers can be decomposed as (Brown et al. 1980):

$$\overline{\ln w^r} - \overline{\ln w^m} = \sum^{J} p_j^m \hat{\beta}_j^r (\overline{X_j^r} - \overline{X_j^m}) + j = \sum^{J} p_j^m \overline{X_j^m} (\hat{\beta}_j^r - \hat{\beta}_j^m) + \sum^{J} \ln w^r (p_j^r - \hat{p}_j^m) + \sum^{J} \overline{\ln w^r} (\hat{p}_j^m - p_j^m) \qquad (4)$$

i ii iii iv

The upper bars can be defined as the average, and the upper hats imply the predicted values. The first part of the earning differential equation (i) is the explained part that caused by differences in socio-demographic characteristics; the second term (ii) means the unexplained earning differential due to differences in unobservable characteristics or discrimination effect; the third term (iii) is the explained inter-sectoral earning differential as the results of differences in sectoral

attainment; the fourth part of the equation (iv) is the unexplained earning differential due to segregation effect of self-selection of immigrants.

EMPIRICAL RESULTS

Our results demonstrate that the average share of immigrants/persons with immigration background is 4.94%, as the share of immigrants among the natives over the years 2004-2012 changed slightly (Figure 2, APPENDIX). It fluctuates from 6.21% (2004) to 4.02% (2010) and again up to the level 4.76% (2012).

The composition of our sample (Table 1, APPENDIX) exhibits that the group of immigrants in this study can include not only international immigrants, but also non-ethnically Russian respondents with Russian citizenship. Therefore, the comparison of this group with the share of international labor immigrants according to the official statistical data (Russian Federal State Statistics Service, Rosstat) expectedly display that the percentage of employed immigrants in our sample is higher than according to Rosstat data (Figure 2, APPENDIX). However, similar dynamics in changing of immigrants' share can be observed for 2008-2011 period for both data sets.

The results of our analysis show that immigrants and natives in general possess similar social demographic characteristics.

However, the two groups demonstrate different and statistically significant difference in their distribution across territories (F-test =18.57***) and across industries (F-test=31.03***), in the share of respondents holding higher education (F-test =12.32***) and holding only school education (F-test =40.72***) as well as difference in average monthly working hours (F-test =21.06***) (Table 2, APPENDIX).

In addition, on average the hourly earnings of immigrants are less than the native workers despite them working 179.47 hours per month on average in contrast to 174.24 average working hours per month for natives. However, the dynamics of log of hourly earnings for immigrants is similar compared to this for natives (Figure 3, APPENDIX).

Overall, we can observe a different distribution of the two groups across sectors over time periods (Figure 1).

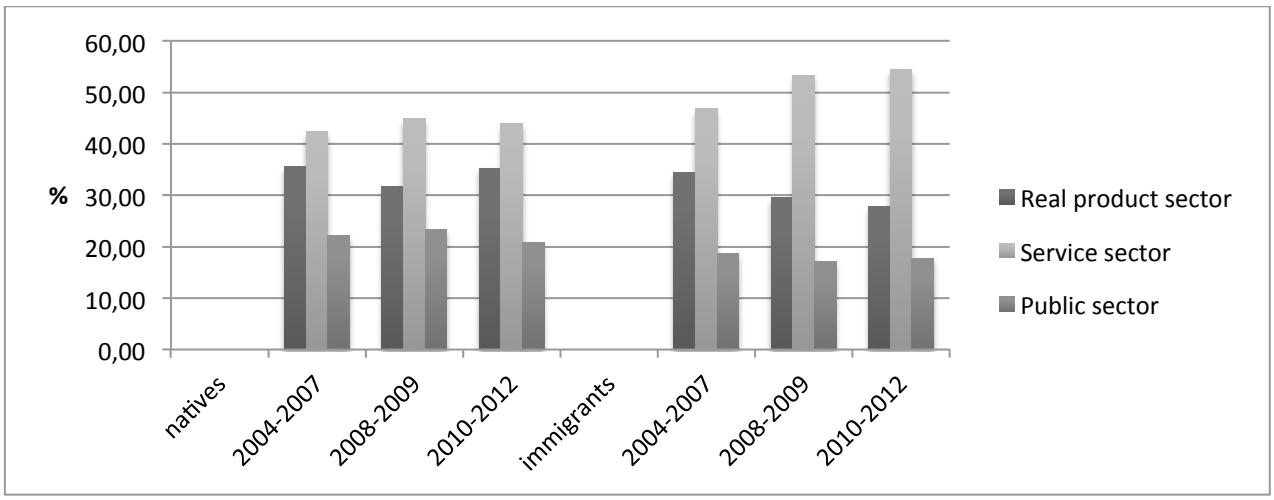

Fig. 1. Sectoral distribution of natives and immigrants: time periods, %

Immigrants are more likely to be employed in service sector than natives. Additionally, immigrants became more prevalent in the service sector over time. However, the share of natives in the real product sector and in the public is higher than the share of immigrants over all time periods.

As the percentage distribution of native and migrant workers cannot display the general level of segregation, we use the Duncan index of dissimilation for these purposes[11]. Our results show that that level of sectoral segregation of immigrants in the Russian labor market is relatively high (11.20% from 2010-2012) (Figure 2). With a relatively constant level of migration from 2004-2012 (5.7-4.3%), there was a steep increase. The index varies from a minimum of 3.70% (2004-2007) to a maximum of 11.20% (2010-2012).

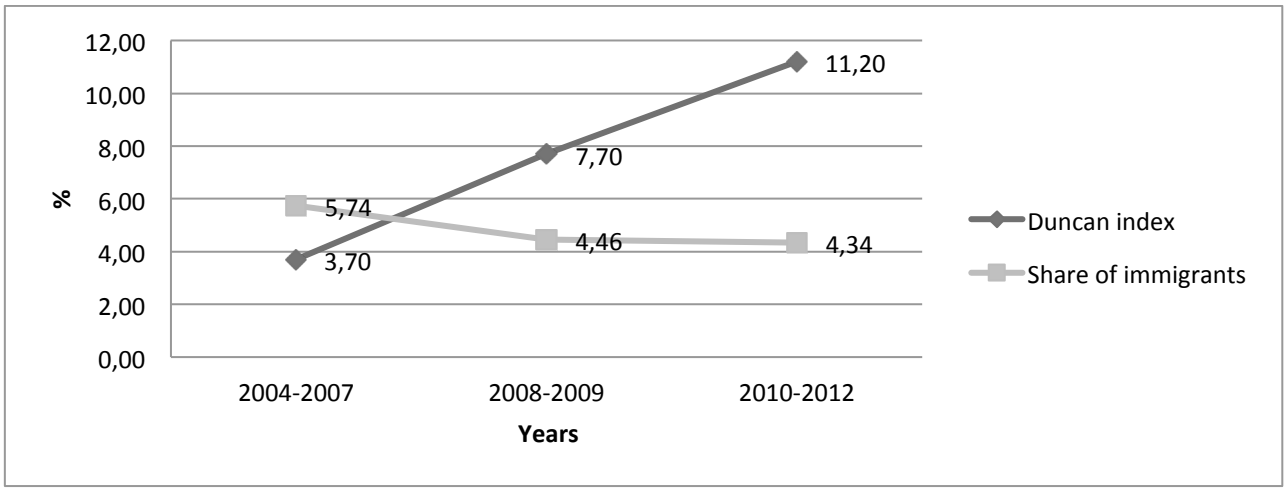

Fig. 2. The Duncan index of sectoral segregation, %

Differences in the sector distribution between immigrants and natives may be the result of self-selection of migrants by sectors or the result of segregation (discrimination). Meanwhile, we are not able to determine the nature of this segregation (discrimination or self-selection) based only on the descriptive statistics. Therefore, for further self-selection control, we expected a multinomial

[11] The index can be interpreted as the percentage of immigrants that would be required to change sector to have the same sectoral distribution as natives.

logit model of sector attainment (Table 3, APPENDIX). The findings demonstrate that the main difference in the results of multinomial regression for immigrants and natives is the significance of coefficients (Table 3, APPENDIX). Coefficients of regression for immigrants are mostly statistically insignificant. However, the significant coefficients of multinomial logit regressions demonstrate quite similar effects on the probability of immigrants and natives to be employed in the public or service sectors.

The results of the F-test and t-test with respect to the logarithm of hourly earnings demonstrate significant values (Table 4-5, APPENDIX). They show that earning of natives is higher than the earning of immigrants and the difference in means of earning between immigrants and natives is significant. In addition, the effects of human capital variables in OLS regressions coincide with the standard economic theory for both groups (Table 5, APPENDIX).

Our results show that in average natives earn 14.56% more than immigrants (Table 6, APPENDIX). Of this, -8.72% is attributable to the total explained portion of the earning differential (Table 6, APPENDIX).

However, inter-sectoral and intra-sectoral observable differences have a multidirectional effect on the total earning differential. The inter-sectoral explained part has a positive influence on the total earning differential (0.96%). In turn, the intra-sectoral explained portion demonstrates a negative effect on the total earning differential (-9.68%). Thus, the contribution of personal characteristics, including in the model, is -0.0141 or -9.68%. Here the negative sign means that immigrants within sectors may hold very similar observed personal characteristic (i.e. characteristics that are considered in the econometric model) compared to natives, but in turn, the similar social demographic characteristics of the two groups lead to the decrease of the wage gap between immigrants and natives..

In other words, this means that the native/immigrant earning differential is reduced by differences within sectors in observable characteristics of individuals (-9.68%).

The unobserved heterogeneity of immigrants and natives as well as sectoral segregation are the major contributing factors to the total earning differential (108.72%). The unexplained portion measures the log earning differential due to unobserved differences between the two groups and includes two parts of inter-sectoral and intra-sectoral (Table 6, APPENDIX). It therefore can be interpreted as an effect of discrimination. In other words, immigrants may have lower earnings partly due do discrimination process despite the fact that immigrant may have the same socio-demographic characteristics on average as natives. This type of discrimination (within sectors) undoubtedly can have a positive impact on the native/immigrant earning differential. However, our results show that the coefficient on unexplained intra-sectoral difference is statistically insignificant, and so we cannot take it into account.

It should be mentioned that the inter-sectoral unexplained portion may be attributed to segregation, which, in turn, can be due to the positive self-selection of immigrants into specific sectors or unequal access to job places. In our paper, we partly assess the problem of self-selection.

However, we cannot undoubtedly claim that the inter-sectoral unexplained portion can be purely considered as a consequence of sectoral segregation in the labor market. The unexplained inter-sectoral earning differences can be caused not only by unequal access to job places, but also by positive self-selection of immigrants into specific occupations. Nevertheless, according to our results, the unexplained inter-sectoral portion contributes a substantial part to the total earning differential between the two groups (29.46%).

Robustness Check

The effect of segregation on the wage gap can be sensitive to the ethnical structure of immigrants. The number of international immigrants may belong to the same ethnicity as Russia's ethnic minorities. We assume that ethnic minorities in Russia can be discriminated against in the labor market, but the level of discrimination will be lower compared to typical international immigrants. Immigrants that possess the same ethnicity as Russian ethnic minorities in turn may also experience the lower level of discrimination in the labor market by analogy from ethnically Russian immigrants to Russia.

Thus, our new specification excludes from the sample of immigrants 129 respondents of ethnicity coinciding with the ethnicity of the largest ethnic minorities in Russia: the ethnic minorities (titular nations) that live in titular-national Republics (Bashkiria, Tatarstan, Ingush, Komi, MariEl, Chechen, Udmurt, Chuvash) in Russia such as Tatars, Bashkirs, Ingush, Komi, Mari, Chechens, Udmurt, Chuvash.

Our findings display that immigrants (excluding Russia’s ethnic minorities) earn 14.46% less than natives. The two values of earning differential for immigrants including Russia’s ethnic minorities and for immigrants excluding Russia’s ethnic minorities are not different. The results show also that for the same earning differential between immigrants and natives, the total unexplained part jumps from 108.72% to 111.34% in the earning decomposition (Table 7, APPENDIX). However, as can be seen from the estimation (excluding the constant), the role of sectoral segregation became more pronounced compared with the previous specification (34.72% of the total earning differential excluding the constant in comparison with 73.87%).

Our results show that the native/immigrant earning differential is sensitive to the ethnical structure of immigrants, i.e. excluding group of immigrants that possess the same ethnicity as Russian ethnic minorities (titular nations). The contribution of inter-sectoral unexplained difference became more pronounced using the new specification of immigrant group. It demonstrates that immigrants which possess the same ethnicity as Russian titular nation groups may not experience

unequal access to the job market or experience lower level of segregation compared to immigrants from other ethnic groups.

CONCLUSION

This paper attempts to quantify the scale of labor market segregation of immigrants in Russia. The unequal distribution of immigrants and natives across the economic sector is important for employment policy, i.e. effective allocation of labor force.

On the one hand, immigrants may be concentrated in sectors where no native workers want to work. On the other hand, immigrants cannot get to all the jobs in sectors which principally employs natives. In the first case, it is not discrimination; while in the second case, we are talking about segregation, as one of the types of discrimination.

In this study, we define the dimensions of sectoral segregation and expect its effect on the earning differential between immigrants and natives. We use the RLMS NRU HSE data set (from 2004-2012 to assess this issue.

Firstly, we estimated the Duncan index of dissimilarity. The Duncan index demonstrated the gradual increase of sectoral segregation in the Russian labor market since 2004. This growth of sectoral segregation occurred at a relatively constant level of migration (5-6%) on the Russian labor market from 2004-2012. It can be assumed that there was a decrease of inter-sectoral mobility and an increase of Russian labor market segmentation.

As a next step, we analyzed the value of earning differential and the impact of sectoral segregation on the earning differential using the Brown decomposition method (Brown et al., 1980). Our results show that on average, immigrants have lower hourly earnings than natives, while at the same time they work more. Thus, the total native/immigrant earning differential accounts for 14.56% more for native workers. A large proportion of the earning differential is due to the unexplained portion. Statistically significant component of the unexplained earning differential between the two groups is likely to be due to discrimination based on unequal access to sectors for immigrants. The measured impact of sectoral segregation on earning differential accounts for 29.46%.

In addition, it should be noted that our results are sensitive to the ethnic structure of immigrants. The exclusion of respondents who were not born in Russia, but are ethnicity coinciding with the ethnicity of Russia's largest ethnic minorities from the immigrant's sample, leads to the decrease of the total earning differential and increase of the contribution of inter-sectoral unexplained portion. It indicates that unequal access to job places can highly depend on the ethnic structure of immigrants. Thus, group of immigrants that possess the same ethnicity as Russian ethnic minorities (titular nations) may experience a lower level of segregation than other immigrants or, even, do not experience segregation at all.

Moreover, our findings fit into the picture of previous studies. The research of Wei and Lu (2007) and Neuman and Silber (1996) also show a significant role of segregation in the earning differential. Our results (29.46%) are lower than shown for Israel (70%) (Neuman and Silber, 1996), but are similar to the findings for China (37%) (Wei and Lu, 2007),

Finally, our findings are important for the Russian labor market. In addition to finding that immigrants do not have possibilities to obtain high-paid work places and occupation, our results document the reality of ethnic sectoral segregation in Russia workplaces. The results of this paper confirm this statement, because immigrants earn lower wages not only due the difference in human capital level, but also due to ethnic sectoral segregation and unequal employment chances compared to native workers.

In addition, the low labor mobility between groups leads to sectoral segregation and segmentation in the Russian labor market. For this reason the labor market cannot be considered as a homogeneous. Market forces do not eliminate the differences between the two groups of workers, as it involves the equilibrium model of the labor market. As a result, the growth of sectoral segregation increases the social and economic distance between immigrant and native segments. Moreover, sectoral segregation is evidence of limited competition and job mismatch in the Russian labor market.

Further research must be conducted to uncover the sources of sectoral segregation in the workplace, and this research should examine the following areas: discrimination, residential segregation, and labor market networks.

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APPENDIX

FIGURES

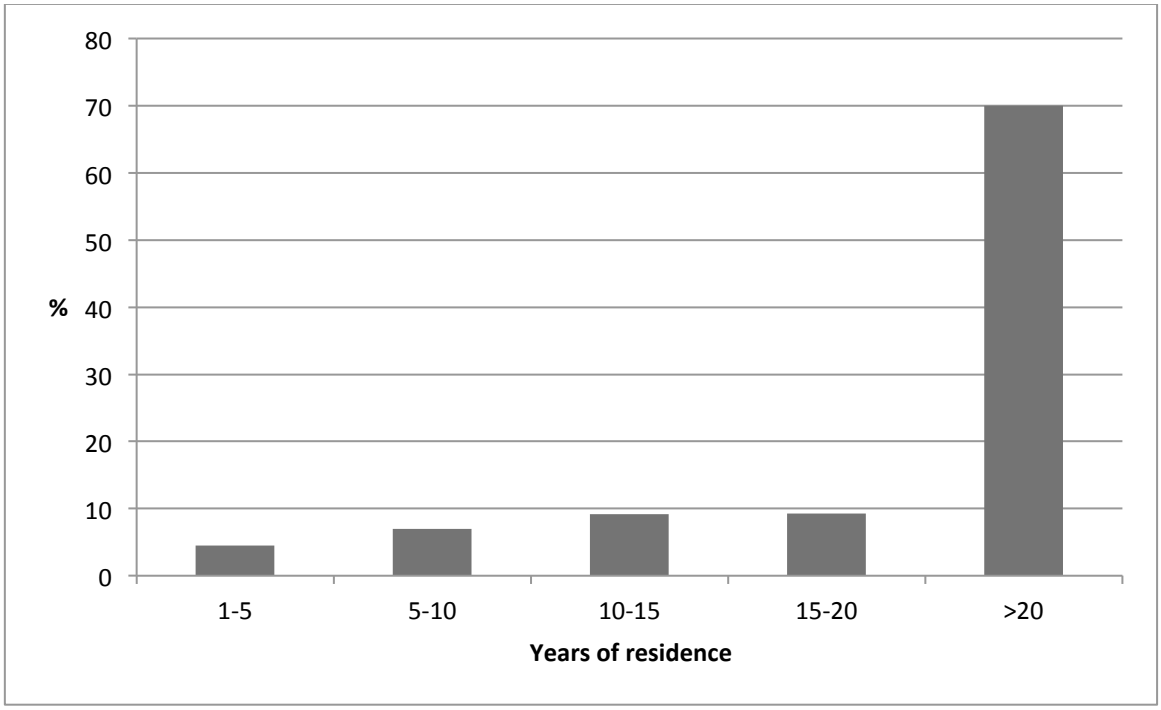

Fig. 1. Share of employed immigrants by the year of residence in Russia: 2009-2012, %

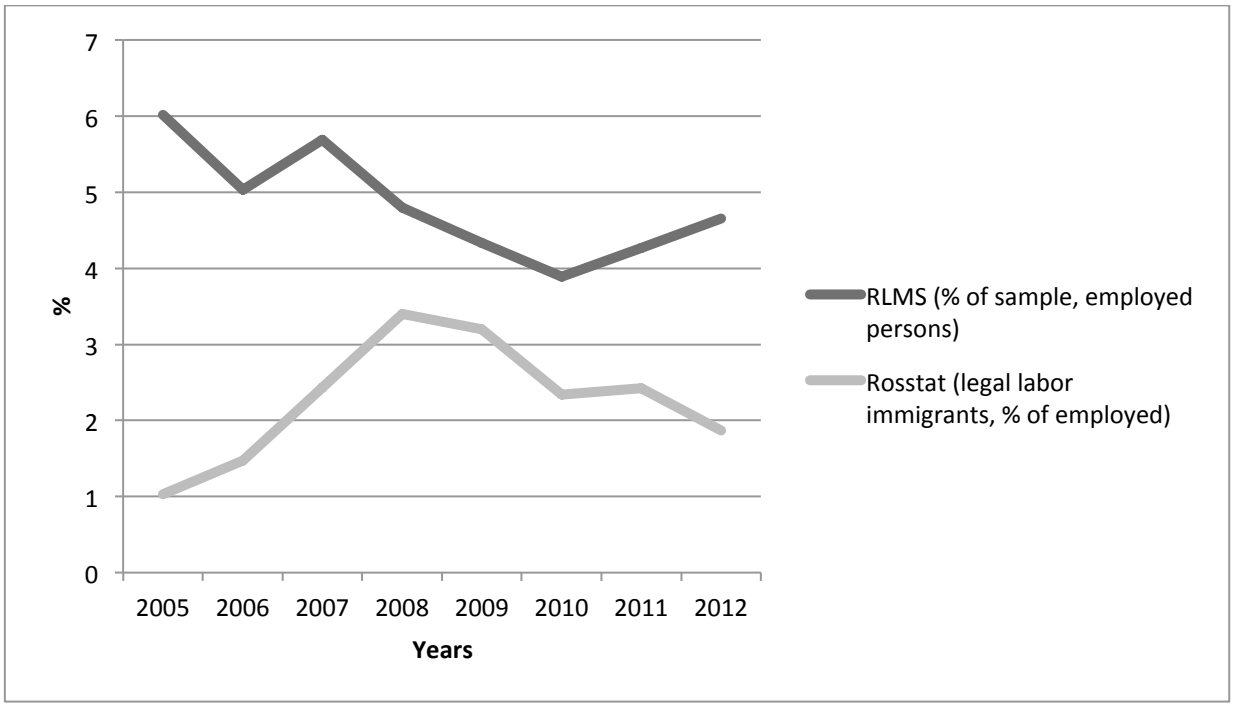

Fig. 2. Share of labor immigrants over the years, employed respondents, %

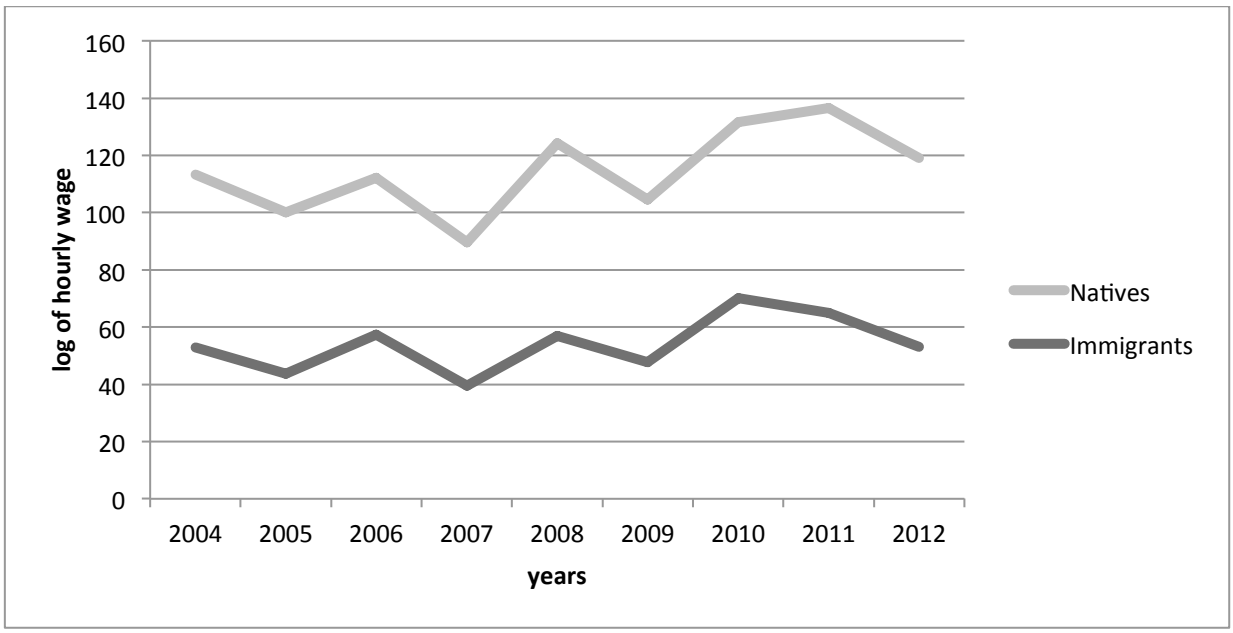

Fig 3. Log of hourly wage over years: natives and immigrants

Tab. 1. Composition of analyzed groups (number of observations in parenthesis)		
	Ethnically	
	non-Russian	**Russian**
Born in Russia	11.18% (5045) *indigenous people (titular nations) of Russia*	70.13% (31653) *Russians*
Was not Born in Russia	5.22 % (2356) *immigrants/persons with an immigration background* 4.95% (2232) *immigrants/persons with an immigration background excluding the Russia's ethnic minorities*	13.47% (6082) *Ethnically Russian immigrants to Russia*

Tab. 2. Summary statistics for used sample			
Variables	**Means (Std. Dev.)**		
	Total	Natives	Immigrants
Month wage, thousand rub.	8840.71 (4322)	8907.97 (4341)	7619.46 (3761)
Monthly working hours	174.49 (44.98)	174.24 (45.16)	179.47 (48.81)
School and lower education (dummy)	0.10 (0.30)	0.10 (0.30)	0.14 (0.35)
Professional and (or) technical education (dummy)	0.61 (0.48)	0.61 (0.48)	0.60 (0.48)
University and higher education (dummy)	0.28 (0.45)	0.28 (0.45)	0.25 (0.43)
Age, years	38.16 (10.63)	38.12 (10.61)	38.91 (10.95)
Tenure, years	7.54 (9.15)	7.57 (9.18)	6.79 (8.54)
Sex (1=male)	0.48 (0.49)	0.48 (0.49)	0.50 (0.50)
Children (1= have child)	0.77 (0.41)	0.77 (0.41)	0.78 (0.41)
Family status (1= married)	0.79 (0.40)	0.79 (0.40)	0.78 (0.41)
Region (1 = Moscow, Moscow region, St.Petersburg)	0.21 (0.41)	0.21 (0.40)	0.25 (0.43)
Real product sector (industry, construction, transport and communications)	0.45 (0.49)	0.46 (0.49)	0.42 (0.49)
Service sector (agriculture industry, trade and consumer services, finance, housing and communal services)	0.32 (0.46)	0.31 (0.46)	0.39 (0.48)
Public sector (education, science and culture, and public health services)	0.21 (0.41)	0.21 (0.41)	0.18 (0.38)
N	45136	42780	2356

Tab. 3. Multinomial Logit Regression

Variables	Natives		Immigrants	
	Base outcome (1) = Real Product Sector			
	Service Sector (2=yes)	Public Sector (3=yes)	Service Sector (2=yes)	Public Sector (3=yes)
Education level (School and lover = ref.)				
Professional and (or) technical education	0.04	0.19**	-0.12	1.01
	(0.05)	(0.09)	(0.21)	(0.77)
University and higher education	-0.04	-0.08	-0.28	0.69
	(0.06)	(0.10)	(0.26)	(0.78)
Sex (1=male)	-0.09***	-1.01***	-0.24	-1.65***
	(0.03)	(0.04)	(0.15)	(0.28)
Age	-0.02*	-0.02	-0.07	-0.03
	(0.01)	(0.01)	(0.04)	(0.08)
Age2	0.00**	0.00*	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Tenure	-0.01***	0.07***	0.06**	0.16***
	(0.00)	(0.00)	(0.02)	(0.04)
Tenure2	-0.00	-0.00***	-0.00**	-0.00***
	(0.00)	(0.00)	(0.00)	(0.00)
Family status (1=married)	-0.10**	-0.22***	-0.45**	-0.29
	(0.04)	(0.05)	(0174)	(0.35)
Children (1=have child)	-0.03	0.10**	-0.29	-0.32
	(0.04)	(0.05)	(0.20)	(0.32)
Region (1=Moscow, St.Petersburg)	0.34***	0.44***	0.06	0.33
	(0.03)	(0.04)	(0.15)	(0.32)
Years	yes	yes	yes	yes
Professional groups	yes	yes	yes	yes
Log likelihood	- 21818.49		-1001.28	
chi2	11830.38		8696.41	
Pseudo R2	0.21		0.28	
N	42780		2356	

Notes: Significance level: * – p<10%; ** – p<5%; *** – p<1%. Bootstrapped standard errors are used in regression.

Tab. 4. F-test: logarithm of hourly wage

Variables	Mean (Std. Dev.)		F-test	t-test
	Natives	Immigrants		
Logarithm of hourly wage	3.92	3.79	112.30***	10.59***
	(0.00)	(0.01)		

Notes: Significance level: * – p<10%; ** – p<5%; *** – p<1%.

Tab. 5. OLS Estimation of Hourly Earnings Equations

Variables	Total	Natives	Immigrants
Education level (School and lover = ref.)			
Professional and (or) technical education	0.058***	0.057***	0.054
	(0.010)	(0.011)	(0.043)
University and higher education	0.244***	0.240***	0.265***
	(0.011)	(0.012)	(0.047)
Sex (1=male)	0.094***	0.096***	0.048*
	(0.005)	(0.006)	(0.027)
Age	0.007***	0.007***	-0.002
	(0.002)	(0.002)	(0.010)
Age2	-0.000***	-0.000***	-0.000
	(0.000)	(0.000)	(0.000)
Tenure	0.003***	0.003***	0.002
	(0.001)	(0.001)	(0.005)
Tenure2	-0.000*	-0.000	-0.000
	(0.000)	(0.000)	(0.000)
Family status (1=married)	-0.002	-0.003	0.022
	(0.008)	(0.008)	(0.038)
Children (1=have child)	0.051***	0.049***	0.105**
	(0.007)	(0.008)	(0.039)
Region (1=Moscow, St. Petersburg)	0.338***	0.339***	0.290***
	(0.006)	(0.007)	(0.030)
R2	0.15	0.14	0.17
N	45136	42780	2356

Notes: Significance level: * – p<10%; ** – p<5%; *** – p<1%.

Tab. 6. Decomposition of Earnings Differentials

	Log(earning)	**%**
Total earning differential	0.1456***	100
Total explained	-0.0127**	-8.72
Inter-sectoral	0.0014**	0.96
Intra-sectoral	-0.0141***	-9.68
Total unexplained	0.1583***	108.72
Inter-sectoral	0.0429**	29.46
Intra-sectoral	0.0805	55.29
Constant	0.0349	23.97

Notes: Significance level: * – p<10%; ** – p<5%; *** – p<1%.

Tab. 7. Decomposition of Earnings Differentials: robust checking

	Including Russia's ethnic minorities in the sample of immigrants			**Excluding Russia's ethnic minorities in the sample of immigrants**		
	Log(wage)	%	%	Log(wage)	%	%
Total earning differential	0.1456	100	Excluding constant	0.1446	100	Excluding constant
Total unexplained	0.1583***	108.72	100	0.1610	111.34	100
Inter-sectoral	0.0429***	29.46	34.76	0.0427**	29.53	73.87
Intra-sectoral (individual characteristics)	0.0805	55.29	65.32	0.0151	10..44	26.13
Constant	0.0349	23.97	-	0.1032	71.37	-

Notes: Significance level: * – p<10%; ** – p<5%; *** – p<1%.

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