Does location affect employment? Evidence from the high north of Russia

Giltman, Marina

DOES LOCATION AFFECT EMPLOYMENT?
EVIDENCE FROM THE HIGH NORTH OF RUSSIA

Marina GILTMAN
Tyumen State University, Russia

Abstract: Local labour markets within one country can be characterized by different outcomes because of their geographical and economic peculiarities. The unique features of the labour markets of the High North regions of Russia include compensative differentials and specific labour protection legislation together with the specific geographical characteristics. The aim of the paper is to investigate what peculiarities arise in employment as a result of location in the areas of the High North of Russia. Using aggregate regional data for the northern regions of Russia from 2005 to 2014 we estimated the dynamic fixed effects models for the number of employees and net migration. It was discovered that geographical characteristics affect employment in the High North of Russia more than wages. Labour supply exceeds labour demand in the northern regions of Russia because of strong positive wage elasticity of net migration. We can surmise that regulation of wages and migration should be a part of common economic policy in the High North regions of Russia.

Key Words: *regional labour markets, employment, labour demand, labour supply, the High North of Russia.*

Introduction

The impact of location on labour market outcomes is a relatively modern research problem of current interest. Evidence from Europe and the USA showed that the location of labour markets within one country should be taken into account in carrying out research into local labour market outcomes and when designing economic policy (David et al. 2010, Moretti 2011, Manning and Petrongolo 2011, Combes et al. 2012, Bratti and Leombruni 2014, Mocanu and Şerban 2015). In general, the development of economic activity is highly dependent on geographical position (Fujita et al. 1999). This is especially true for the large countries, which occupy large territories. The geography of the Russian Federation is such that climate, natural resources and other territorial characteristics vary significantly among the regions and determine the structure and development of the regional economy (Moe and Kryukov 2010, Zubarevich and Safronov 2011, Tatarkin and Loginov 2015). The regional economy is the basis for regional market outcomes, so we can assume that the location of the labour market affects employment, unemployment and wage distribution in the particular region. The aim of this paper is to investigate what peculiarities the location of the High North regions of Russia creates in employment in these areas.

There are no empirical studies on employment in the High North of Russia so far, but a number of works highlight the specific features of the labour markets of the northern territories of Russia or suggest their existence. We can distinguish the following main areas: theoretical models and empirical studies that describe the equilibrium level of the regional labour markets and the reasons for migration of employees between regions (Rosen 1979, Roback 1982, Blanchard and Katz 1992, Moretti 2011). Also, there are studies that identify certain areas of the country as the objects of analysis concerning certain characteristics (e.g., one-company towns): Berger et al. 2003, Bignebat 2006, World Bank 2010, Ammermueller et al. 2007, Caponi 2008, Commander et al. 2011, Giltman 2014, Semerikova and Demidova 2015. The

body of literature that contains the results of the research into the inter-regional differences in wages, including the compensative differentials, comprises the works of: Coelho and Ghali 1971, Greenwood et al. 1991, Bignebat 2003, Lukiyanova and Oshchepkov 2007, Oshchepkov 2010, Lukiyanova 2011, Oshchepkov 2015. A number of studies were devoted to the estimation of the impact of labour market institutions on labour market outcomes in Russian regions: Gimpelson et al. 2009, Mironenko 2012, Lehmann and Zaiceva 2013, Gimpelson and Kapeliushnikov 2014, Muravyev and Oshchepkov 2016.
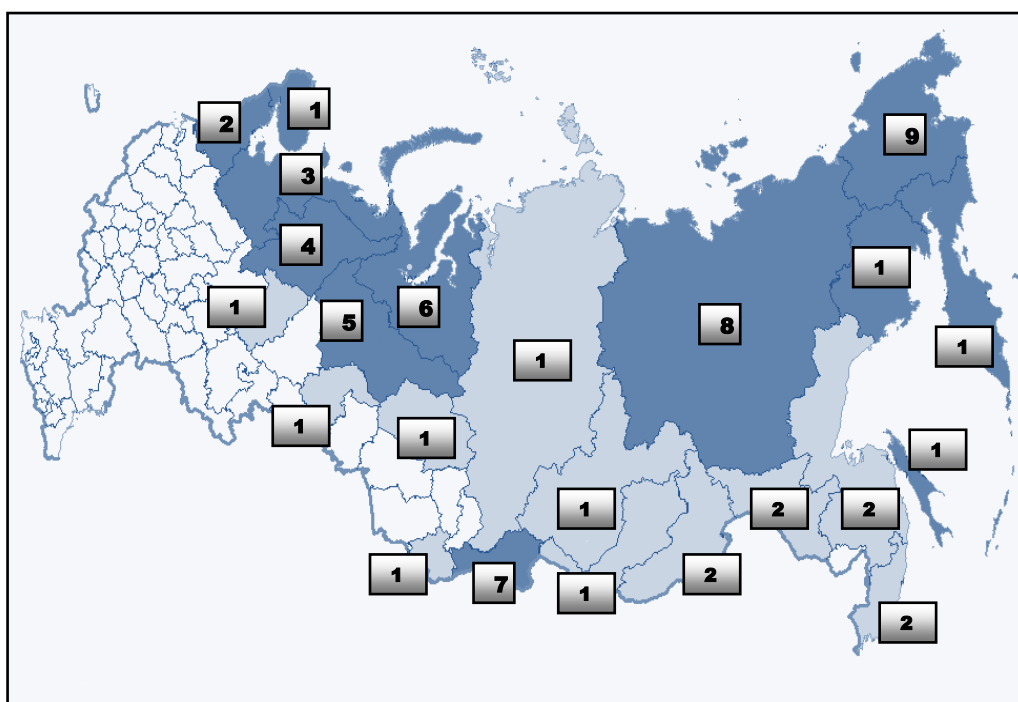

Fig. 1 **– High North Regions of Russia**

Regions that are totally recognized as the High North of Russia: Republic of Karelia (2),Komi Republic (4), Sakha (Yakutia) Republic (8), Tuva Republic (7), Kamchatka Krai (11), Arkhangelsk Oblast (3), Magadan Oblast (10), Murmansk Oblast (1), Sakhalin Oblast (12), Yamalo-Nenets Autonomous Okrug (6), Khanty–Mansi Autonomous Okrug – Yugra (5), Chukotka Autonomous Okrug (9).

Regions that are partly recognized as the High North of Russia, so-called „equivalent areas". Population of the Northern part of these regions is usually statistically insignificant compared with the rest of the population of the region: Altai Republic (16), Republic of Buryatia (19), Zabaykalsky Krai (20), Krasnoyarsk Krai (17), Perm Krai (13), Primorsky Krai (23), Khabarovsk Krai (22), Amur Oblast (21), Irkutsk Oblast (18), Tomsk Oblast (15), Tyumen Oblast (14).

Source: http://www.gks.ru/bgd/regl/b08_22/IssWWW.exe/Stg/kart.htm, with corrections made by the author as of January the 1st 2014

The High North of Russia is traditionally associated with an unfavourable climate, remoteness from the European part of the country and high wages, which should compensate for the uncomfortable living conditions. The High North regions of Russia occupy a huge area of the

country (Fig. 1) and they can be characterized by a 7% share of the population of Russia and about 16% of the Gross Domestic Product (Tatarkin and Loginov 2015). Most areas of the High

North have a strictly oriented economic specialization. Situated here are about 80% of the explored natural resources of Russia, of more than 60 types (Tatarkin and Loginov 2015). In value terms, the High North regions of Russia produce more than 50% of the product of the extractive industry of Russia. The High North regions of Russia are statutory defined. There are regions that are totally and regions that are partly recognized as the High North. This definition is necessary for the application of the system of benefits for employees in these areas. The mentioned system has remained in force since 1960.

One of the most important issues for the state regulation of employment conditions in the High North are the additional tools which were designed in order to increase wages in the North compared with the other regions of the country. At the same time, in spite of the multiple growth of the wages in the High North, the number of employees in the majority of cases has demonstrated a negative trend (Fig. 2). The wages in 2000-2014 in the High North were 1.6-2.3 times higher than the average national wage. Higher wages should compensate unfavorable living conditions in the High North. Thus, health and medical care are one of the most important issues in the northern regions of Russia (Hasnulin et al. 2016). These regions were in the lead in terms of morbidity per 1000 citizens – over the same period this indicator was about 1.2 times higher compared to the average value in Russia. Probably this is the reason of negative net migration from most of these areas (Fig. 3). The resident population in the High North and equivalent areas in 2000-2014 has decreased by more than 1 million people i.e. more than 9%. There is an impression that the harsh climatic conditions affect individual decisions about employment in the High North more than the ability to earn higher wages and receive other benefits for the employees in these areas such as earlier retirement and higher pensions provided for by the legislation.
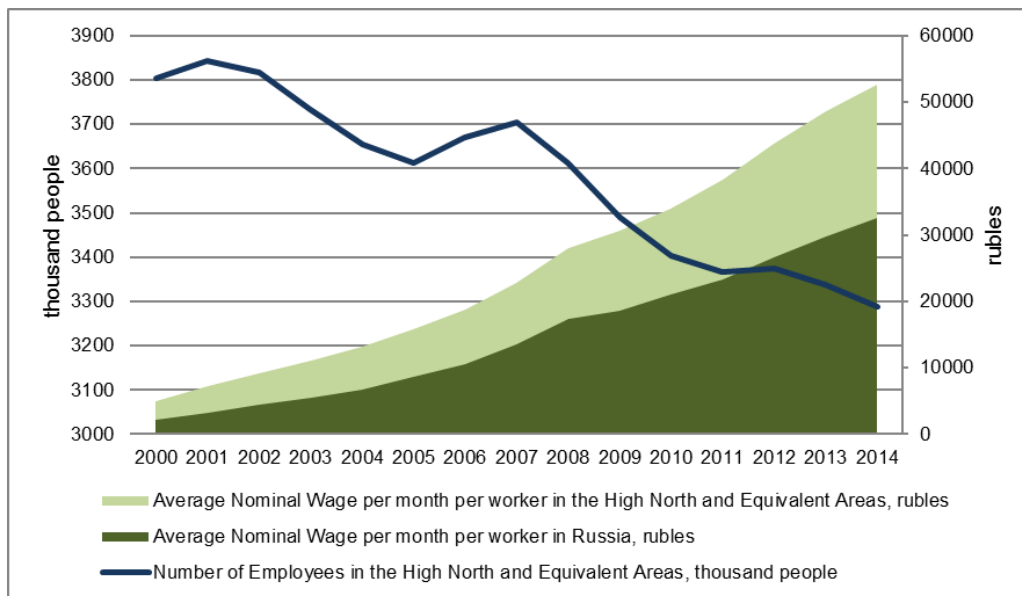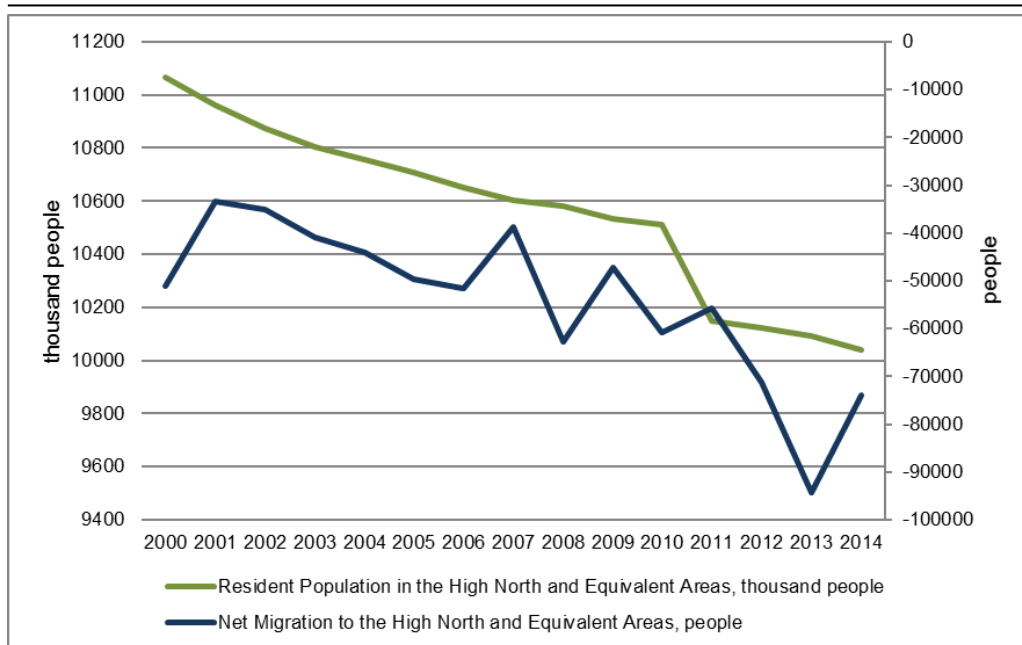

Fig. 2 – **Dynamics of Wages and Employment in the High North of Russia**
Source: Federal State Statistics Service of the Russian Federation (Rosstat)

Fig. 3 – **Dynamics of the Resident Population and Net Migration
in the High North of Russia**
Source: Federal State Statistics Service of the Russian Federation (Rosstat)

The declining of the number of employees in the High North is on contrast with the rest of the country. According to the Russian Labour Market Model (RLMM), employment in Russia has remained consistently high from 1990 until now, which is greatly different from the labour market outcomes during the transition in Central and Eastern Europe (Kapelyushnikov et al. 2011). Kapelyushnikov et al. (2011) explain this phenomenon by the flexible wages and flexible working time that became widespread in labour relations in Russia during the transition because of weak enforcement of the Russian employment protection legislation. The flexible wage was based on the absence of compulsory indexation, significant share of bonuses in the structure of individual wages, wage arrears and "grey" salaries and non-monetary payments (payments in kind). Working time became flexible because of nonstandard work arrangements, shortened working hours and administrative unpaid leaves, secondary employment or multiple jobs, goods and services production in households (during the peak of the farming season about 40 per cent of the adult population is involved in work on private allotments) (Kapelyushnikov et al. 2011).

In general, the permanency of RLMM was based on the labour market institutions. Although there are five common groups of labour market institutions normally shared by all countries (active labour market policies; passive labour market policies; wage setting arrangements, in particular those of trade unions and statutory minimum wages; employment protection legislation and taxation of labour), all of them have national peculiarities and they have a different impact on labour market outcomes. Kapelyushnikov et al. (2011) emphasizes the role of institutions saying that labour market institutions have an essential influence on individual decisions about employment and labour supply and on the employer's decisions about hiring and firing thus they determine the labour demand. So labour market equilibrium depends on the labour market institutions. Lehmann and Muravyev (2012) in their empirical research estimated that in the transition economies institutions matter for labour market outcomes, and that

deregulation of the labour markets improves their performance. It means that strong regulation of the labour market has a negative impact on labour market outcomes.

The case of the High North regions of Russia is interesting because it has the strongest employment protection legislation among all of the regions of the country. On the other hand, all the other institutions in the High North are identical to the rest of the country. Employment protection legislation in the High North regions of Russia is based on the Labour Code of the Russian Federation, Chapter 50 and it also implies special consequences for retirement. The labour code of the Russian Federation provides the following main benefits for employees in the High North regions:
- regional coefficient from 1.15 to 2 points from the individual wage;
- bonuses as a part of wages (in % of wages) with additional bonuses for young people;
- in the case of layoffs, the employer can be obligated to pay the average wage of up to six months instead of the two months' standard in the rest of the country;
- special terms for women e.g. 36 working hours per week instead of 40 for all the other employees with the same wage;
- additional annual paid leave.

Special consequences allowances for retirement provide a younger retirement age (50 y.o. for women and 55 y.o. for men instead of 55 y.o. and 60 y.o.) and regional coefficients to the retirement benefits. All that can have an impact on individual's retirement decisions and employment behaviour and together with the benefits from the labour code seems to lead to the higher protection and better conditions of employment in the High North regions of Russia, especially for women and young people.

In reality, the additional guarantees and compensations significantly increase the costs to the employer in official hiring, wages and layoffs. It can also lead to a more complicated structuring of the wage due to decreases in the base (constant) part of it (for more details about the impact of the labour legislation of the Russian Federation on the wage structure, see Gimpelson and Kapeliushnikov 2008). In other words, while the labour protection legislation for the northern regions is getting tougher, the enforcement of the contrary is getting weaker. Gimpelson et al. (2009) have noted that despite the fact that the labour protection legislation in Russia was adopted at the national level, its practical implementation (enforcement) always appears at the regional level. These interregional differences in the enforcement of the labour protection legislation have shown a statistically significant influence on the development of the regional labour markets. In areas where the strictness of the labour protection legislation is really enforced in practice, the labour market outcomes demonstrate a reduction of employment and an increase of unemployment. This is particularly true for women and young people, i.e. the most vulnerable groups of workers which were supposed to be more protected by the additional norms of the labour protection legislation including those in the northern regions. Empirical estimations have shown that the rigidity of the labour protection legislation of the Russian Federation leads to a narrowing of the demand for labour by the employers. The authors have also found that in the northern regions the violations of the labour protection legislation were more frequently identified. Vishnevskaya and Kapelyushnikov (2008) have showed that most of the northern regions are the leaders in the number of labour disputes compared to the other subjects of the Russian Federation. There are some other studies showing the negative impact of excessive institutional regulation on the regional labour market outcomes. For example, Caponi (2008) analyses the impact of the state program of containment of migration from the southern to the northern regions of Italy and the trade unions actions aimed at supporting this program, on the Italian regions labour market outcomes. He comes to the conclusion that such a policy increases unemployment in the South regions and it reduces salaries in the North, which has a negative impact on the regional labour market outcomes. According to the estimations of Commander et al. (2011) the government policy of artificially maintaining the concentration of employment in the Russian one-company towns

leads to a reduction in productivity. Ammermueller et al. (2007) have compared the groups of regions in Italy (North-South) and Germany (East-West). They show that the strength of the relationship between regional wages and regional unemployment is affected by the institutions in the local labour market. In Italy the impact of institutions on the regional labour market outcomes was more significant because of the informal employment which is widespread and highly affects the enforcement in various regions. This is very similar to the situation in Russia. Therefore, we can assume that the additional norms of the labour protection legislation designed for the High North of Russia increase the strictness of that legislation, which can lead to finding ways and forms to weaken its enforcement in those regions, which often manifests itself in more flexible wages and working time (Kapelyushnikov et al. 2011). It can also cause the constriction of employment compared to the level potentially possible with less stringent regulations. Thus the impact of location on employment in the High North regions of Russia is not obvious and it can be an interesting research question.

Materials and Methods

According to the general model of the local labour markets' equilibrium by Rosen (1979) and Roback (1982), labour inside a country is much more mobile than between countries, which makes domestic labour supply perfectly elastic (Moretti 2011). The model of local labour markets' equilibrium implies that employees select the areas for employment based on nominal and real wages, as well as the productivity of a local (in our case – regional) economy. The possibilities included in individual labour supply decisions are wider for employees with higher qualifications. The simplest pattern of the model of local labour markets' equilibrium is based on the indirect utility function of the individual *i* in a location *c* and it can be presented as follows (1):

$$U_{ic} = w_c - r_c + A_c + e_{ic} \qquad (1),$$

w_c – nominal wage in location *c*,
r_c – housing costs in location *c*,
A_c – amenities of location *c*,
e_{ic} – worker *i* idiosyncratic preferences for location *c*.

The model predicts that the employee makes a decision regarding his choice of local labour market taking into consideration economic factors i.e. the advantages of this area for living and his subjective attitude to living in the particular area. Moretti (2011) has supplemented this model with the fact that individual preferences for place of residence and the opportunities available for using local amenities reduces the elasticity of labour supply between the local markets, but high labour mobility between different areas of the country still remains one of the key preconditions for this model. Therefore, according to this model individual decisions about mobility between regions are based on the local (regional) amenities of a particular territory and they have to increase individual utility to the potential employee and wages, which in some cases can compensate for the loss of the regional amenities when moving to a less desirable location.

As a rule, those kinds of conclusions are based on the theory of compensative differentials (Coelho and Ghali 1971, Greenwood et al. 1991, Bignebat 2003, Lukyanova and Oschepkov 2007, Oschepkov 2010, Lukyanov 2011, Oshchepkov 2015). The theory of compensative differentials suggests that employers are forced to pay higher wages to employees in order to compensate them for the negative utility resulting from the movement to a location with less local amenities. Greenwood et al. (1991) assume that the majority of regional labour markets never reach equilibrium due to migration, wages, and regional price changes. They come to the conclusion that incorrect (over- or under-evaluated) estimations of regional amenities by employees lead to a disequilibrium in regional labour markets because the level of wages is

based on under- or over-evaluated compensative differentials. It can be assumed that the disequilibrium in regional labour markets tells us about the variability of the real size of compensative differentials due to changes in living conditions (e.g. changes in infrastructure) and regional prices for goods and services that affect the dynamics of employment. At the same time, according to the research by Greenwood et al. (1991), the labour supply will be more elastic in regions with the highest proportion of compensative differences in the structure of wages. In Russia, those areas are situated in the High North (Lukyanova and Oschepkov 2007). Empirical evidence of compensative differentials' existence in the regions of the Russian Federation can be found in the works of Bignebat (2003), Lukyanova and Oschepkov (2007), Oshchepkov (2015). An indirect confirmation of the compensative differentials' existence can be the different returns on human capital in the different regions of Russia (Bignebat 2003, Oschepkov 2015). At the same time, in some studies (Lukyanov and Oschepkov 2007, Oshchepkov 2015) it was noted that compensating differences play a greater role if companies do not only have to, but also on the basis of their financial situation can, pay higher wages. The largest concentration of such companies is observed in the northern extractive regions, above all, Khanty-Mansiysk and Yamalo-Nenets Autonomous Okrug. Berger et al. (2003) discovered that in Russia regional amenities have a substantial sufficient impact on interregional migration and compensative differentials exist even if the regional coefficients are excluded. Net migration is positively related with the quality of life (regional amenities) and it reaches the highest level in the South and the European parts of the country.

Lukyanova and Oschepkov (2007) and Oshchepkov (2015) empirically confirmed another important fact –the prices of goods and services make a greater impact on the differences in wages between regions than any other regional labuor market outcomes. The importance of regional prices in the analysis of wages was shown by Coelho and Ghali (1971). They proved that differences in wages between the North and South of the USA disappear if regional prices are taken into account. In spite of the low interregional mobility of employees in the Russian Federation (Bignebat 2003), empirical estimates made by Bignebat (2006) showed a significant impact of regional wages of goods and services on interregional migration in Russia. We can assume that increasing prices for goods and services in the High North of Russia, including those for vital goods such as food or housing, is due to the influx of migrant employees which is a consequence of higher wages in these regions with respect to the other regions of the country. Prices don't usually tend to decrease, consequently, decreasing not only nominal, but real wages can be very significant in terms of outflows from the High North regions.

Based on the analysis of the results of the empirical studies described above, I can try to describe theoretically the dynamics of employment in the High North of Russia. Employees employed in the High North practically do not increase their utility from living in those regions, i.e. there are no regional amenities and wage level is the main motivating factor for employment and residence in these areas. Rising wages attracts employees from other regions of the country and this leads to an increase in the prices of goods and services and it reduces real wages. Additional norms of the labour protection legislation in the High North of Russia rise the cost of hiring and firing employees in those areas and they lead to more moderate decisions of employers regarding the hiring of new employees. As the flexibility of employment is based on flexible working hours and wages, the demand for labour in the northern regions seems to be even more stable than in the rest of Russia. The reaction of employees in the High North to changes in wages may be, on the contrary, closer to the competitive model of the labour market than in other regions of the country because their decisions on labour supply are supposed to be taken more rationally. Mobility of employees from the High North to other regions of the country is usually based on the size of wages and not limited by regional amenities due to their absence. Initially, individuals who came for employment in the High North can be characterized by a greater tendency to risk and mobility, and greater rationality in decision-making. As for companies, they should have strong economic reasons for moving to the North as well, because producing goods in these areas is inherently more expensive due to high

transport costs, poor industrial infrastructure, remoteness from the centre, etc. Empirically, this hypothesis is confirmed by the Bignebat (2006). Based on the results of the World Bank (2010) for restructuring the economy of the Northern regions of Russia (2001-2010), she concluded that for many cities in the High North of Russia a narrowing in the size of a company actually leads to a decrease in the number of residents in this city because of the large number of one-company towns in these areas. It can be explained by the lowest diversity in economic activities in the northern territories among all the Russian regions (Moe and Kryukov 2010, Tatarkin and Loginov 2015). Thus according to our theoretical assumptions, the peculiarities of the labour markets in the High North of Russia are based on a labour force which is highly variable because of migration, on the one hand, and, on the other hand, a quite stable labour demand resulting from a preference for layoffs over the expansion of recruitment. For these reasons, we tested two hypotheses: (1) higher wages and local amenities increase the number of employees and net migration in the High North regions of Russia; (2) lower wages decrease the number of employees due to the migration to the other regions of the country.

To test the hypotheses, I used the regional data of Rosstat (Federal State Statistics Service of the Russian Federation) from the surveys: "Russia's Regions. Socio-economic Indicators" and "Economic and social indicators in the High North and equivalent areas" from 2005 to 2014. The objects of observation were only taken from those regions whose territories are entirely included into the High North, such as the Republic of Karelia, the Komi Republic, the Republic of Sakha (Yakutia), the Tuva Republic, Kamchatka Krai, Arkhangelsk Oblast, Magadan Oblast, Murmansk Oblast, Sakhalin Oblast, Yamalo-Nenets Autonomous Okrug, Khanty-Mansi Autonomous Okrug - Yugra, Chukotka Autonomous Okrug.

As for the methodology, empirical analyses of regional labour markets are usually based on regional panel data and fixed effects models with different specifications (Lukyanova and Oschepkov 2007, Gimpelson et al. 2009, Muravyev and Oshchepkov 2016). Fixed effects models are relevant for the analysis of the panel data with a limited number of observations. Those observations should have their own sustainable peculiarities which are difficult to measure. All this makes fixed effects models a relevant methodology for regional-level research in Labour Economics. In some cases, if it's assumed that the variables can only have a significant impact on the basic fixed effects models over some period of time, lags can be added (Greenwood et al. 1991, Muravyev and Oshchepkov 2016). We assume that changes in wages also affects the number of employees in the High North with some lags, because workers need time to perceive the reduction in real wages, to take a decision about leaving and migrating to another region, to organize the move, etc. Employers also don't respond immediately to a change in their needs concerning the number of employees. They need time to understand the dynamics of wages and labour force population in the region. Vakulenko (2016) calculated a dynamic panel data fixed effects model with spatial effects to estimate net migration among Russian regions. Dynamics in that case means a lag in (t-1)-period, because migration can affect many of the variables in the model (e.g. wages, unemployment rate etc.) thus, using t-period can create an endogeneity problem. According to that logic we come up with two fixed effects models with similar specifications – for net migration and for the number of employees in the regions using (t-1)-period for all the independent variables for the net migration model and the t-period for the number of employees' model. By and large, we assume that rising wages and the number of employees over the same period of time reflects an increase in labour demand, and rising wages in (t-1)-period of time and net migration in t-period of time reflects an increase in labour supply in the High North labour markets from other regions of the country which were affected by the higher wages of the previous year. We also suppose that estimating the direct impact of net migration on employment in the High North regions of Russia wouldn't be effective, because official statistical data includes shift employed workers in employment (in the case of full-time jobs), but doesn't include them in migration. At the same time shift employment is a wide-spread practice in the High North and it means that migration is underestimated and it may lead to its insignificance as an independent variable for

the number of employees' model. We assume that official statistics is positively correlated with the real number of migrants even if it reflects only the "tip of the iceberg". Calculation of the two different equations for migration and number of employees with similar independent variables allows us to describe the interrelation between net migration and employment.

Results and Discussion

Based on all the assumptions made above, the estimated equations are as follows (2-3):

$$lnEmp_{it} = \alpha + \beta_1 lnW_{it} + \beta_2 lnW_{it-1} + \beta_3 lnW_{it-2} + \beta_4 lnW_{it-3} + \beta_5 lnW_{it-4} + \beta_6 lnW_{it-5} + \beta_7 lnW_{it-6}$$
$$+ \beta_8 lnW_{it-7} + \gamma Controls_{it} + \theta_t + \varepsilon_{it} \quad (2)$$

$$Migr_{it} = \alpha + \beta_1 lnW_{it-1} + \beta_2 lnW_{it-2} + \beta_3 lnW_{it-3} + \beta_4 lnW_{it-4} + \beta_5 lnW_{it-5} + \beta_6 lnW_{it-6}$$
$$+ \beta_7 lnW_{it-7} + \gamma Controls_{it-1} + \theta_t + \varepsilon_{it} \quad (3)$$

where it – region i in time t; *Emp* (logarithm) – number of employees (thousand people); *Migr* – net migration (thousand people); *W* (logarithm) – average wage per month in a particular region (rubles) deflated by consumer price indexes (CPI) for the particular region in the respective years; θt is the time vector that reflects the tendencies in the dynamics of employment and migration common for all regions of the High North of Russia; e – normally distributed error term.

Control variables include regional amenities, structure of regional economy, development of regional economy, intensity of search across regional labour markets, and education of employees as a quality of labour. Regional amenities we describe with climate characteristics (average temperature of January and July), density of roads with hard coating (at the end of the year; km of roads per 1000 km^2, Road) as a proxy for exploration in the territory of the region, incidence per 1000 population of registered disease in patients where the diagnosis is made for the first time (Disease). Estimating migration, we use January and July temperature without lags (t-period), because migration can't affect these variables. As a proxy for the structure of the regional economy the share of employees in trade (Trade) and manufacturing (Manuf) with respect to all of the employees in the region (%) was used. Trade and manufacturing industries are present in all of the regions, and the share of employees involved in these industries isn't correlated with wages and Gross Regional Product (GRP), but correlated with the total number of employees in the region. GRP (thousand rubles, logarithm) was added as a variable that describes development of the regional economy (productivity in the model of local labour markets' equilibrium) and it was included in the model of employment as we suppose that growth of the regional economy leads to the increasing of labour demand, i.e. number of employees. GRP wasn't included in the migration model, because, as written above, migration reflects increasing labour supply to the particular region from the other regions of the country and wages are enough to indicate the level of regional development for employees. Intensity of search across regional labour markets was measured using the size of the economically inactive population (Inactive, thousand people, logarithm) and number of unemployed (Unempl, thousand people, logarithm) for the employment model and by the unemployment rate (Un_R, %) for the migration model. Economically inactive population and unemployed are basic resources required for employment (Gimpelson and Sharunina 2015). The unemployment rate is more relevant for migration because it is strongly correlated with intensity of search in regional labour markets.

The number of lags was determined on the basis of the formal criteria of Akaike and Schwarz. Calculation was carried out in the Gretl econometric package, all the main formal tests (joint

test on named regressors, Hausman test, test for the normal distribution of the error term and Durbin–Watson statistic) were met successfully, and the results of the estimation are shown in Table 1.

<div align="right">Table 1</div>

Estimated results of the regressions

Regressor	Regress and	
	Coefficient (standard error)	
	Emp (log)	**Migr**
const	-1.72 (1.79)	-1.29E+06***
W (log)t	0.12 (0.05)*	-
W (log)t-1	0.20 (0.08)**	1797.82 (34440.7)
W (log)t-2	0.13 (0.11)	1948.15 (19769.9)
W (log)t-3	-0.01 (0.11)	50315.6 (17242.7)**
W (log)t-4	-0.21 (0.07)**	43122.5 (11833.3)***
W (log)t-5	-0.11 (0.02)***	2333.23 (12763.5)
W (log)t-6	-0.02 (0.07)	25402.2 (18151.1)
W (log)t-7	0.13 (0.09)	8099 (25691.9)
January	0.004 (0.0006)***	75.5 (61.81)
July	-0.001 (0.0007)	-417.23 (139.34)**
Disease	-0.0001 (4.06E-05)**	-
Disease t-1	-	9.39 (10.79)
Road	-0.008 (0.003)*	-
Road t-1	-	189.1 (216.2)
Trade	0.02 (0.003)***	-
Trade t-1	-	2977.52 (745.62)***
Manuf	-0.002 (0.003)	-
Manuf t-1	-	-64.39 (806.19)
Inactive (log)	0.13 (0.02)***	-
Unempl	0.0001 (0.0002)	-
Un_R t-1	-	-400.46 (579.54)
Edu	0.001 (0.001)	-
Edu t-1	-	-153.61 (196.8)
GRP (log)	0.39 (0.05)***	-
time	-0.035 (0.01)**	-6366.48 (2984.64)*
	Number of observations 120	*Number of observations 120*
	Standard regression error 0.008	*Standard regression error 1652.008*
	R^2(within) 0.941	*R^2(within) 0.783*
Joint test on named regressors	*$F(19, 5) = 4,17157$* *p-value = $P(F(19, 5) > 4,17157) = 0,0601059$*	*$F(16, 8) = 1,80272$* *p-value = $P(F(16, 8) > 1,80272) = 0,201026$*
Hausman test	*$F(11, 5) = 157,95$* *p-value = $P(F(11, 5) > 157,95) = 1,26624e-005$*	*$F(11, 8) = 8,16534$* *p-value = $P(F(11, 8) > 8,16534) = 0,00313821$*
Normality of error distribution test	*Chi-squared (2) = 3,42951* *p-value = 0,180008*	*Chi-squared (2) = 2,67266* *p-value = 0,262809*
Durbin–Watson statistic	*1.158<1.84<1.977* *$\alpha=0.01$*	*1.203<1.77<1.922* *$\alpha=0.01$*
*** 1% significance level, ** 5% significance level, * 10% significance level		

Source: author's estimates.

The results showed that wage level is a significant factor that positively affects the involvement of migrants in the workforce in the northern regions. Migration always reacts to the growth of

wages positively. It proves the findings of previous research (Vakulenko 2016) that income factors affect migration between Russian regions more than regional amenities. Wages have a positive impact on employment as well but only in the first three years. A rise in wages and number of the employed over the same period of time means an increase in labour demand in the region. As we can see from Table 1 employers hire new workers during the first two years after a wage growth. Net migration becomes significant after four years of increasing labour demand in the region (t-3 period) and after that wages have a negative impact on the number of employees. This negative impact becomes significant in the (t-4) and (t-5) periods. At the same time, we can see that net migration is still positively affected by wages, but it becomes insignificant after the (t-4) period. In other words, if wages were increased 5 years ago (t-4 period) this almost doesn't affect employment in t-period, but it still positively affects migration. In my opinion, it confirms the findings of previous empirical research and our theoretical assumptions about the greater flexibility of labour supply to the northern territories. It also tells us that an increase in wage levels attracts new employees from other regions and this growth of the labour force population leads to the satisfaction of labour demand and wages declining. More concretely, the estimated coefficients reflect the following picture. Growth of wages by 1% increases the number of employed in the same year by 0.12% and in a year by 0.32%. In four years (t-3)-period growth of wages increases net migration by 503 people and a year after to 934 people. At the same time in (t-4) period growth of wages increases number of employment to 0.11% and in the next (t-5) period its impact is 0. It demonstrates that labour demand increased in period t is satisfied and in a long-term perspective the increasing of wages is not enough for the employment growth. That is why we can see the negative impact of time on employment (the number of employees reduces with time) and net migration (there aren't any other reasons to live in the High North except work and earnings). Also, the need of the employers for new workers can be satisfied by the economically inactive population (e.g. the younger generation which becomes economically active) – the impact of the inactive population is positive and a 1% growth of it increases employment by 0.13%. Thus, the results of my research reflect a surplus of labour supply with respect to labour demand in the High North of Russia. The reaction of the individuals who seek a job in the High North is too strong, and the reaction of the labour demand is on the contrary moderate or at least not so flexible. Lack of flexibility of Russian employers (firms) in the hiring and firing process was also empirically proven by Gimpelson et al. (2010). By and large it can be assumed that the artificial suppression of migration from the High North to the other regions of Russia or strengthening employer's obligations to provide higher levels of wages will worsen these negative consequences.

In addition to wages, some control variables also appeared to be significant. Almost all the factors of regional amenities have a significant impact on employment, but do not affect net migration. Thus, a rise in the average temperature of January by $1°C$ increases employment in the particular region by 0.4%. In my opinion, it tells us more about the effect of climatic conditions on seasonal work in the mining and extractive industries, construction etc., because the number of employees reflects labour demand more than labour supply. The negative impact of the July temperature on net migration can hardly be logically explained. The main assumption here can be that slightly increasing temperatures is a common tendency for the northern territories. The average temperature of July only depends on time and as we can see from Table 1, time gives a negative trend to net migration. Density of roads with hard coating (Roads) has a negative impact on employment. Most likely it means that the wider exploration of regional territory reduces the need for new workers. More concretely an increase in the density of roads with a hard coating to 1 km of roads per 1000 km^2 of territory decreases the number of employees in the region by 0.8%. It can be noted that the January temperature and the density of roads have a numerically greater impact on employment than wages. It means that in the High North regions of Russia location affects employment more than wages and its regulation by the government (including the regional coefficients to wages).

The sign and significance of the variable of disease also appears revealing. Its growth over a year reduces employment by 0.01%. It reflects the positive impact of health in a particular region on the dynamics of employment in the High North. Numerically, the impact of disease is not high, but still it demonstrates that a good health of the employees increases not only their productivity at work, but also the level of regional amenities and employees can agree to work for lower wages without leaving the northern areas.

The structure of the regional economy also appears to be significant – a growth in the share of people employed in trade by 1% leads to an increase in net migration of 2977 people and employment by 2% and these are the most significant impacts from all the regional variables (except time, but time isn't unique for the particular region). This result can be interpreted within the model of local labour markets equilibrium (Moretti 2011). Since employment in the main industries wasn't included in the independent variables because of its high correlation with GRP it wasn't possible to estimate its impact on the dependent variables (number of employees and net migration). However, according to the model of Moretti (2011), employment in trade, which refers to the industries that produce the so-called "non-tradable goods", is secondary to the main industries in a region. In other words, the main industries of a regional economy are the first to develop. They attract more employees and it affects the development of the service sector, including trade, in order to serve the needs of employees in the other industries. Consequently, the significance and the sign of the structure of the regional economy can be explained as a reaction of immigrants to the development not only of the trade itself, but also to the growth of employment in the basic industries of the regional economy. The main industries in the studied regions of the High North of Russia are:
   - the Republic of Karelia – forest and wood processing sector, extraction of metal ores;
   - the Komi Republic – wood processing sector, extraction of oil and gas;
   - the Republic of Sakha (Yakutia) – diamond, gold and tin ore mining industries;
   - the Tuva Republic – coal, cobalt, gold mining industries and timber;
   - Kamchatka Krai – fishing, forestry, extraction of nickel and coal;
   - Arkhangelsk Oblast – fishery, forestry, paper industry extraction of oil and metal ores;
   - Magadan Oblast – mining of gold and silver;
   - Murmansk Oblast – extraction of metal ores, fishing;
   - Sakhalin Oblast – extraction of oil, gas and coal;
   - Yamalo-Nenets Autonomous Okrug – extraction of gas;
   - Khanty-Mansi Autonomous Okrug - Yugra – extraction of oil;
   - Chukotka Autonomous Okrug – mining of gold.

The positive sign and significance of the GRP highlight the assumptions about trade and the main industries. Developing the regional economy increases employment in the region – 1% of GRP growth leads to a 0.39% increase in the number of employees. As development of the main regional industries depends mostly on the geographic position of the region, it can be concluded that territorial factors significantly affect employment in the High North of Russia. Moreover, factors which are determined by the locality such as climate, exploration in the territory of the region, and development of the main industries of the regional economy, have a greater impact on employment in the northern regions than just the increasing of wages.

The results of the presented research have some implications for economic policy in the High North regions of Russia. There are lots of unexplored resources in the studied territories especially in Kamchatka Krai, Yamalo-Nenets Autonomous Okrug and Chukotka Autonomous Okrug. The provided research shows that exploration and further development of extractive and mining industries of the studied regions is the main factor leading to increasing employment in these territories. The most important restrictive factor for the further exploration of the High North regions is the extreme winter climate (significance of January variable). We can suppose that there is no particular need to attract new employees to the High North regions as migration by itself positively reacts to increasing wages and the development of the

main industries of the regional economy. It can be assumed that extending the possibilities for regional economic and industrial development and improvement (probably with special conditions in taxation) of investment and the entrepreneurial climate together with the government support of investments in hard to explore territories can attract migrants from other regions of the country, including those with the high rate of unemployment. On the contrary, the artificial suppression of migration from the High North to the other regions of Russia or strengthening employer's obligations to provide higher levels of wages without stimulation of the main industries of the regional economy may cause at surplus of labour supply over labour demand, which most likely will increase out-migration from the High North.

Conclusions

The peculiarities of employment in the High North of Russia are based on the specifics of labour supply and labour demand in those regions. Individual decisions about labour supply are affected by regional amenities, which are able to increase the indirect utility to an employee in the High North as long as the wages are also high enough to compensate for the unfavourable conditions of life. Labour supply responds to the dynamics of wages through interregional migration. The specifics of the Russian Labour Market Model are explained by the combination of officially strong employment protection regulations, weak enforcement and low labour market institution performance in general. All that leads to a combination of a sustainably high level of employment and a low real protection of employees in the Russian economy. The additional institutional regulation of labour demand in the High North of Russia, such as wage arrangements and employment protection legislation, is established by Chapter 50 of the Labour Code of Russia and it assumes more stringent labour protection legislation in the High North compared with the rest of the country. This leads to higher costs in the hiring and firing of workers and it has a significant impact on the labour market outcomes.

A number of empirical studies carried out on the Russian data have shown that differences in wages between regions had a significant impact on interregional mobility. Compensative differentials do present themselves in the structure of wages of the individuals employed in unfavourable living conditions. The real value of the compensative differentials varies considerably under the influence of regional prices. All this makes the labour supply in the High North of Russia more flexible and labour demand more constrained compared with the rest of the country.

The fixed effects models estimated using the panel data for the High North regions of Russia from 2005 to 2014 demonstrated that wage is a significant factor that positively affects interregional migration to the northern regions. On the other hand, local amenities and geographical characteristics (e.g. climate and exploration in the territory of the region) of the High North regions of Russia have a greater impact on employment than wages. The development of the main industries of a regional economy has the most significant impact on employment and migration in the studied areas. Our findings show that the economic development of the main industries of a regional economy in the High North leads to an increasing number of employees rather than growth of wages only. Moreover, according to economic logic, a growth in wages should be the result of a regional economy's growth. The increasing of wages positively affects the net migration to the High North from the other regions of Russia and it demonstrates the reaction of labour supply reinforced by the immigration to the High North regions. Longer positive affect of wages on net migration than on employment results in the surplus of labour supply with respect to labour demand in the High North regions of Russia. It can be assumed that the separate regulation of migration or wages seems to have a weaker impact on employment in the High North regions of Russia than supporting the development of the main industries of the regional economies.

Acknowledgments

References

AMMERMUELLER A., LUCIFORA C., ORIGO F., ZWICK T. (2007), *Still searching for the wage curve: evidence from Germany and Italy*, IZA Discussion Paper 2674, Bonn.

BERGER M., BLOMQUIST G. C., SABIRIANOVA PETER K. (2003), *Compensating differentials in emerging labour and housing markets: estimates of quality of life in Russian cities*, IZA Discussion Paper 900, Bonn.

BIGNEBAT C. (2003), *Spatial dispersion of wages in Russia: does transition reduce inequality on regional labour markets?,* TEAM, University of Paris 1 & CNRS, Paris.

BIGNEBAT C. (2006), *Labor market concentration and migration patterns in Russia*, MOISA Working Paper 4, Montpellier.

BLANCHARD O. J., KATZ L. F. (1992), *Regional evolutions*, Brookings Papers on Economic Activity 1, 1-75.

BRATTI M., LEOMBRUNI R. (2014), *Local human capital externalities and wages at the firm level: Evidence from Italian manufacturing*, Economics of Education Review 41, 161-175.

CAPONI V. (2008), *Centralized wage determination and regional unemployment differences: the case of Italy*, IZA Discussion Paper 3592, Bonn.

COELHO P. R. P., GHALI M. A. (1971), *The end of the North-South wage differential*, The American Economic Review 61 (5), 932-937.

COMBES P.-P., DURANTON G., GOBILLON L., ROUX S. (2012), *Sorting and local wage and skill distributions in France*, Regional Science and Urban Economics 42 (6), 913-930.

COMMANDER S., NIKOLOSKI Z., PLEKHANOV A. (2011), *Employment concentration and resource allocation: one-company towns in Russia*, IZA Discussion Paper 6034, Bonn.

DAVID Q., JANIAK A., WASMER E. (2010), *Local social capital and geographical mobility*, Journal of Urban Economics 68 (2), 191-204.

FUJITA M., KRUGMAN P., VENABLES A. J. (1999), *The spatial economy: cities, regions and international trade*, The MIT Press, Massachusetts.

GILTMAN M. A. (2014), *Estimations of the impact of some variables on the labor demand and labour supply in the subjects of the Russian Federation*, Economy 4 (23), 73-77.

GIMPELSON V., KAPELIUSHNIKOV R., LUKIYANOVA A. (2009), *Employment protection legislation in Russia: regional enforcement and labour market outcomes*, IZA Discussion Paper 4484, Bonn.

GIMPELSON V., KAPELIUSHNIKOV R., LUKIYANOVA A. (2010), *Stuck between surplus and shortage: demand for skills in the Russian industry*, Labour 24 (3), 311-332.

GIMPELSON V., SHARUNINA A. (2015), *Flows in the Russian labor market: 2000–2012*, HSE Economic Journal 19 (3), 313-348.

GIMPELSON V. E., KAPELIUSHNIKOV R. I. (eds.) (2008), *Labor wages in Russia: evolution and differentiation*, Higher School of Economics Publishing House, Moscow.

GIMPELSON V. E., KAPELIUSHNIKOV R. I. (eds.) (2014), *Between light and shadow: informality in the Russian labour market*, Higher School of Economics Publishing House, Moscow.

GREENWOOD M. J., HUNT G. L., RICKMAN D. S., TREYZ G. I. (1991), *Migration, regional equilibrium, and the estimation of compensating differentials*, American Economic Review 81 (5), 1382-1390.

HASNULIN V. I., VOEVODA M. I., HASNULIN P. V., ARTAMONOVA O. G. (2016), *Modern approach to arterial hypertension in the Circumpolar and Arctic regions. Literature Review*, Human Ecology 3, 43-51.

KAPELYUSHNIKOV R., KUZNETSOV A., KUZNETSOVA O. (2011), *Diversity within capitalism: the Russian labour market model,* Employee Relations 33 (4), 395-412.

LEHMANN H., MURAVYEV A. (2012), *Labour market institutions and labour market*

performance: What can we learn from transition countries?, Economics of Transition 20 (2), 235-269.

LEHMANN H., ZAICEVA A. (2013), *Re-defining Informal Employment and Measuring its Determinants: Evidence from Russia*, IZA Discussion Paper 7844, Bonn.

LUKIYANOVA A. (2011), *Wage inequality in Russian economic transition (1991–2008): stylized facts and explanations*, The Journal of the New Economic Association 12, 124-147.

LUKIYANOVA A., OSHCHEPKOV A. (2007), *Regional labor markets functioning: wages and unemployment*, in: Social policy: the realities of the XXI century 3, Independent Institute for Social Policy, Moscow, pp. 32-71.

MANNING A., PETRONGOLO B. (2011), *How local are labor markets? Evidence from a spatial job search model*, IZA Discussion Paper 6178, Bonn.

MIRONENKO O. N. (2012), *Employers' adjustment to the requirements of employment protection legislation in Russia*, Russian Management Journal 10 (3), 31-54.

MOCANU I., ŞERBAN P.-R. (2015), *Exploring the quality of employment in Romania at different territorial levels*, Journal of Urban and Regional Analysis 7 (2), 177-191.

MOE A., KRYUKOV V. (2010), *Oil exploration in Russia: Prospects for reforming a crucial sector*, Eurasian Geography and Economics 51 (3), 312-329.

MORETTI E. (2011), *Local Labor Markets*, in: Card D., Ashenfelter O. (eds.), Handbook of Labour Economics 4 (B), Elsevier, Amsterdam, pp.1237-1313.

MURAVYEV A., OSHCHEPKOV A. Y. (2016), *The effect of doubling the minimum wage on employment: evidence from Russia*, IZA Journal of Labor & Development 5 (6), 1-20.

OSHCHEPKOV A. (2010), *Return to higher education in Russian regions*, HSE Economic Journal 14 (4), 468-491.

OSHCHEPKOV A. (2015), *Compensating wage differentials across Russian regions*, in: Mussida C., Pastore F. (eds.), Geographical Labor Market Imbalances. Recent Explanations and Cures, Springer, Berlin, pp. 65-105.

ROBACK J. (1982), *Wages, rents and the quality of life*, The Journal of Political Economy 90 (6), 1257-1278.

ROSEN S. (1979), *Wage based indexes of urban quality of life*, in: Mieszkowski P., Straszheim M. (eds.), Current Issues in Urban Economics, Johns Hopkins University Press, Baltimore, pp. 74-104.

SEMERIKOVA E. V., DEMIDOVA O. A. (2015), *Analysis of regional unemployment in Russia and Germany: spatial-econometric approach*, Spatial Economics 2, 64-85.

TATARKIN A. I., LOGINOV V. G. (2015), *Estimation of potential for natural resources and production in northern and Arctic areas: conditions and prospects for use*, Studies on Russian Economic Development 26 (1), 22-31.

VAKULENKO E. (2016), *Does migration lead to regional convergence in Russia?*, International Journal of Economic Policy in Emerging Economies (IJEPEE) 9 (1), 1-25.

VISHNEVSKAYA N., KAPELYUSHNIKOV R. (2008), *Enforcement of labor legislation in Russia: coverage, dynamics, regional differentiation*, Economic Policy 1, 170-195.

WORLD BANK (2010), *Implementation completion and results report (IBRD-46110) on a loan in the amount of US$ 80 million to the Russian Federation for a northern restructuring project*, The World Bank, Washington, DC.

ZUBAREVICH N. V., SAFRONOV S. G. (2011), *Regional inequality in large post-Soviet countries*, Regional Research of Russia 1 (1), 15-26.

Correspondence: Tyumen State University, 6 Volodarskogo St., 625003 Tyumen, Russia.

E-mail: giltman@rambler.ru