



# Evaluation and Projection of Interdependence Between the Social and Economic Situation in the Region and the Structure and Dynamics of Labor Migration

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## Abstract

The article analyzes the existing approaches to assessing the impact of labor migration on the state and functioning of the labor market. The authors developed a methodology for assessing the dependence of the scale of labor migration on the social and economic factors of the region, such as the level of economic development, the level of accessibility of medical and social services, the level of material well-being, and the level of spiritual development. These factors are determined by the statistical indicators for the Volga Federal District (VFD) and ranked by an expert survey. This methodology allows predicting the extent and direction of migration flows based on the data of a specific region.

**Keywords:** Labor Migration, Migration Flows, Expert Survey, Regional Factors of Labor Migration, Socio-Economic Indicators, Economic and Mathematical Modeling.

## 1. Introduction

Migration processes in modern Russian society have been a subject of study over the last 30 years. Several scientific works tried to analyze different aspects of this complex socio-economic and political phenomenon [1, 2, 3]. Despite a significant number of publications, factors of mobility and migration of population in the regional labor market require further investigation.

## 2. Evaluation of dynamics and structure of the labor migration in the VFD regions

Economic development and demographic situation in the VFD regions influence the volume of migration flows and the qualitative composition of migrants. The analysis of the statistical data for the last two decades in the VFD and the Nizhny Novgorod Region (NNR) proves the positive dynamics of migration growth. For a long time, till the 1990s, the Nizhny Novgorod Region had been one of the regions with steady negative population migration with a continuing population decline (Table 1) [4, 5, 6].

Republic of Tatarstan	4	30	22	9
Udmurt Republic	-21	-12	-12	-19
Chuvash Republic	-37	-1	-44	-19
Perm Region	-45	-6	-49	-15
Kirov region	-23	-23	-86	-28
Nizhny Novgorod Region	-6	11	13	2
Orenburg Region	-16	12	-87	-33
Penza Region	7	-13	21	-10
Samara Region	23	38	65	-6
Saratov Region	11	41	-16	5
Ulyanovsk Region	45	-23	-23	-9

Based on the data analysis presented in Table 1, it is possible to identify the following stages of migration:

First stage dates to the 1990s. Migration growth rates indicate positive dynamics associated with migration from the former Soviet republics, which have become sovereign states, as well as from the depressed regions of Russia (mainly the regions of the North, Western and Eastern Siberia, the Far East, etc.). The growth peaked in 1994: 76,000 people per 10,000 of the population in the VFD and 84 people in the NNR.

The second stage of migration increase is related to the economic growth since the mid-2000s, due to the rapid economic development. The largest increase in migration was recorded in 2009 in the VFD and amounted to 5 people per 10,000 of the population, and in 2007 in the NNR – 21 people per 10,000 of the population.

The third stage refers to the period after 2010, with the decrease in migration in the VFD and the NNR strengthening by 2015. However, the values of migration loss in the VFD regions are

**Table 1:** Coefficients of migration increase (decrease)

Region	1990	2000	2005	2015
VFD	-7	11	-8	-8
Republic of Bashkortostan	-12	18	-3	-15
Mari El Republic	-33	-6	-1	-30
Republic of Mordovia	-34	-28	3	26



unequal, which shows different attractiveness of the regions for migrants. Therefore, the question of why migrants prefer one region to another requires a special case study [7, 8]. However, it is also necessary to pay attention to another trend: some regions remain stable in terms of population, while others practically die out.

Evaluation of the real situation allows estimating problems of contemporary migration at the regional level. The data analysis confirms the regions' need in the influx of migrants due to the shortage of workforce in the labor market. At the same time, it is necessary to comply with the selectivity of migration policy [9], which should correspond to the national and economic interests of the regions of Russia, while also providing clear criteria for selection, assessment and settlement of immigrants and ensuring their social guarantees (housing, insurance and health).

The authors have performed a statistical study of migration flows to the territory of the VFD and the NNR [4, 5, 6], which shows the following:

1. In 2000-2005, the number of migrants in the VFD decreased by 41,135 people, in the NNR – by 3,237 people. These changes are due to the fact that the decline in the number of migrants is largely concentrated in the former Soviet republics, such as Kazakhstan and Uzbekistan. Earlier, ethnic Russians returned mainly from those countries, due to unbearable conditions of existence.

2. In 2005-2010, there was an increase in the migrant flow to the VFD by 3,459 people, and to the NNR – by 2,520 people. This is due to the economic growth in Russia amid high energy prices and favorable intraregional environment, which enabled migrants to earn.

3. In 2010-2015, the flow of migrants has grown significantly in the VFD – by 39,019 people, and in the NNR – by 4,162 people, apparently due to the rapid construction of residential buildings and neighborhoods, along with the construction of new industrial zones of the automotive industry in the NNR and Samara Regions, the Republic of Tatarstan and Udmurtia, and due to arrival of migrants from Ukraine, Uzbekistan and Armenia.

4. In 2015, compared to 2010, the number of migrants in the VFD has increased by 39,019 people, in the NNR – by 4,162 people, mainly due to citizens from Ukraine, Uzbekistan, and Armenia. This trend is quite explainable by those geopolitical processes that are currently taking place in the world;

5. The migration flow from the developed countries in the total volume is rather small, which requires a more detailed study. Most likely, the regions of the VFD do not attract citizens from the developed countries, neither by income levels, nor by business opportunities, nor by the freedom of entrepreneurship.

In the study of migration, special attention should be paid to the issues of emigration from the territory of the VFD and the NNR [6, 17, 20], to identify the preferred places of relocation and the causes and motives for migration for different categories of population in the regions of the Russian Federation.

The results of the study lead to the following conclusions:

1. The emigration of the population from the VFD and the NNR in 2015 compared to 2000 shows a contradictory trend: whereas fewer people left the VFD – on average 13,417 people per year, the number of migrants from the NNR increased on average by 1,491 people per year or 11% of migrants from the VFD;

2. When it comes to the direction of resettlement, it can be noted that the main outflow from the VFD in the early 21st century has been observed to the former Soviet republics: Ukraine – 1,192 people per year, Kazakhstan – 983 people per year, Belarus – 601 people per year, and Tajikistan – 445 people per year. This structure of population displacement can be justified by the fact that this is due to the improvement in the economic situation of these countries and an opportunity to move to the more developed European countries. Another reason might be that the purpose of migration was fulfilled, for example, a certain amount of money was accumulated, professional experience obtained, etc. This part of the migrants resided on the territory of the Russian Federation as labor migrants. On termination of their contracts or the

residence permit, they return to their homeland for a permanent or temporary stay, most commonly, during severe Russian winters, since within this period their earnings normally fall (roads, construction and market trading).

3. Migration to the non-CIS countries from the VFD and the NNR shows a slight but steady decrease. In 2000, 98 people left the VFD for Europe, in 2005 – 3,069 people, in 2010 – 879 people, and in 2015 – 475 people.

In statistics, the migration mobility of the population is determined by the indicator of migration increase (decrease), that is, the amount of retired and arrived population (Table 2) [10].

The analysis of the data shown in Table 2 leads to the following conclusions:

1. Migration occurs both within the Russian Federation and to the foreign countries, depending on the economic and political situation in Russia.

2. According to the data for 1998, migration from the VFD was mainly due to exchange with the foreign countries (72,929 people from the total increase of 93,390 people), while in the NNR the increase was due to interregional movement (7,849 people from the total number of 14,742 people).

**Table 2:** Migration increase (decrease) in the VFD and the NNR [4, 11, 12]

Period	Region	Migration increase (decrease) – total	Of which due to	
			movements within Russia	migratory population exchange with foreign countries
1995	VFD			
	NNR	22,169	9,480	12,338
2000	VFD	50,598	-2,307	52,905
	NNR	7,095	2,785	4,310
2002	VFD	2,754	-14,077	16,831
	NNR	2,764	1,457	1,307
2004	VFD	-15,556	-23,578	8,022
	NNR	2,480	1,741	739
2006	VFD	-1,301	-26,579	25,278
	NNR	3,892	1,909	1,983
2008	VFD	16,221	-31,997	48,218
	NNR	6,508	217	6,291
2009	VFD	26,658	-29,066	55,724
	NNR	4,889	-813	5,702
2010	VFD	-8,203	-37,669	29,466
	NNR	3,723	-824	4,547
2011	VFD	-12,385	-60,991	48,606
	NNR	6,979	2,890	4,089
2012	VFD	-18,025	-63,522	45,497
	NNR	6,981	3,193	3,788
2013	VFD	-14,559	-64,901	50,342
	NNR	4,981	-54	5,035
2015	VFD	-5,855	-9,107	3,252
	NNR	702	-1,550	5,552
2016	VFD	-14,357	-46,774	32,417
	NNR	-1,134	-1,829	695
<b>Total</b>	<b>VFD</b>	<b>5,990</b>	<b>-410,568</b>	<b>416,558</b>
	<b>NNR</b>	<b>67,308</b>	<b>20,152</b>	<b>56,376</b>
<b>Average for the year</b>	<b>VFD</b>	<b>285</b>	<b>-19,551</b>	<b>19,836</b>
	<b>NNR</b>	<b>3,205</b>	<b>960</b>	<b>2,685</b>

3. Since 2000, significantly more people leave the VFD to other regions, than arrive. The largest decline in the interregional exchange of population in the VFD was observed in 2013 and amounted to 64,901 people. The migratory exchange of population with the foreign countries is intermittent, and in certain periods cannot cover the decrease in the population [8, 13, 14].

4. Interregional migration in the NNR is most vulnerable to changes. It had positive balance in 1995-2008, while in 2009-2010 there was an outflow of population to other regions of the country due to the changed economic conditions and the consequences of the 2008 economic crisis. In terms of the total volume of migratory increase, this decline was covered by the influx of migrants from other countries.

To define the age category of the migrants, the authors decided to conduct an analysis of the VFD and the NNR [4, 11, 12].

The data show that most migrants arriving in the VFD and the NNR are people of working age (about 72% of the total number of migrants). This proportion is observed both among migrants arriving from other regions of Russia and from other countries. The share of other age categories in the total volume of migratory flows is small; therefore, it can be assumed that the bulk of those arriving in the VFD and the NNR are labor migrants.

Let us analyze what types of activities were more in demand for the migrants (Table 3).

The analysis of the data shown in Table 3 leads to the following conclusions:

1) The main most attractive activity for the migrants having arrived in the VFD is construction; the number of employed in this sector increased in 2002-2010 by 57,836 people. It is inappropriate to compare the data for 2014, since they had been obtained in selected studies, which made it possible to assess the structure of employment by the types of activity of the migrant workers, which only confirmed the trend that had been established over many years;

2) In the NNR, trade was initially an attractive sphere of activity for the migrants; its share amounted to 25.19% in 2002 and 40.10% in 2004. In subsequent years, the number of migrants in this sphere decreased; this became even more visible after the introduction of migrant quotas in retail on January 1, 2007. Construction became the most attractive sphere of activity; its share had increased by 59.84% for the period under study.

Unfortunately, further research in this area is not possible, since there is no necessary statistics for subsequent periods.

**Table 3:** Number of the foreign citizens working in the VFD and the NNR by the type of activity, people [11, 12]

Region	Total	Including				
		Productio n	Agricultur e and forestry	Constructio n	Wholesal e and retail trade	Other
<b>2002</b>						
VFD	26,344	1,778	4,774	6,391	4,704	8,697
	100	6.75	18.12	24.26	17.86	33.01
NNR	3,537	434	762	195	891	1,255
	100	12.27	21.54	5.51	25.19	35.48
	100	21.29	2.12	27.76	40.10	8.72
<b>2006</b>						
VFD	71,023	2,661	2,962	37,272	21,506	6,622
	100	3.75	4.17	52.48	30.28	9.32
NNR	4,693	211	183	2,509	1,114	676
	100	4.50	3.90	53.46	23.74	14.40
<b>2008</b>						
VFD	223,735	18,436	17,215	123,572	26,576	37,936
	100	8.24	7.69	55.23	11.88	16.96
NNR	29,846	3,325	759	20,929	1,891	2,942
	100	11.14	2.54	70.12	6.34	9.86
<b>2010</b>						
VFD	133,489	13,759	13,997	64,227	19,297	22,209
	100	10.30	10.48	48.12	14.46	16.64
NNR	16,144	1,994	473	10,550	1,057	2,070
	100	12.35	2.93	65.35	6.55	12.82
<b>2014*</b>						
VFD	380,600	7,300	39,900	307,200	12,300	14,000
	100	1.92	10.5	80.7	3.23	3.68
NNR	9,400	-	-	9,400	-	-
	100	100	-	-	-	-

\*Results of selective statistical monitoring of the use of migrant labor (based on a sample survey of population conducted in 2014)

So far, labor migration has become a driver for the development of several economic industries. In many regions of the Russian Federation, foreign labor has become a predetermining factor in the economy, which cannot effectively solve economic problems without engaging foreign qualified personnel [14, 15]. In the short term, the development of the Russian economy will depend on the

possibility to engage migrants in the labor market. However, it is not enough to make foreign citizens come to work. The structure of the foreign workforce needs to correspond to the needs of the economy of the district and its regions. Today, the district's economy suffers from a lack of employees of certain qualifications and in certain segments, which migrants are not yet able to compensate. A significant part of arriving foreigners usually find a job in the trade or service sector, rather than production. Today, the problem of attracting migrants to the labor-deficit sectors is solved by means of quotas [16, 17, 18].

In 2010-2014, the need of the VFD regions in the foreign labor increased by 237,117 people, which was confirmed, on the one hand, by production growth and investment growth in several regions of the district, and on the other hand, by a decrease in the proportion of working age population. However, some regions of the VFD do not require a large influx of labor migrants, since they have their own excessive labor resources and in this case quoting covers only the sphere with a lack of internal specialists.

The NNR is one of the district's regions, which suffers from a significant deficit of migrant workers. In the request for foreign labor resources, their number has increased by 18,238 people. This increase is associated with an increase in the volume of housing and production construction, along with an increase in the production of military goods.

Labor market needs of the district's regions can also be partly compensated by the forced migrants (FMs), who had to leave their place of permanent residence due to the situation in Ukraine.

As of the beginning of September 2014, 63% of FMs in the VFD were persons of working age, of which 46% were registered in the employment service as "needing assistance in employment", while only less than 25% of those registered were employed.

In the NNR, the number of Ukrainian migrants staying in the region amounted to 15% of the total number of Ukrainian migrants in the VFD, of which 62% were people of working age. Moreover, 70.5% of the latter applied to the employment service, of which 19.6% were employed [16, 17]. Obviously, it is not possible to reduce the labor market demand at the expense of the FMs in full, since they are temporary labor resources. However, it is quite possible to solve short-term needs.

### 3. Factors influencing the migration processes in the Russian regions

Therefore, economic factors (such as the extent and direction of investment, the presence of an upturn and decline in production, high wages and living standards of the population in the region) are defining factors and causes of migration behavior [10]. To determine factors that influence migration processes in terms of the VFD, the authors carried out an extensive research which included preparation works for an expert survey, identification of experts, conducting a survey procedure, study and analysis of presented indicators [14, 15, 19, 20].

The evaluation of systemically important factors of migration was conducted in a survey of 200 respondents (heads of enterprises of different ownership forms and scientists in the field of labor economics). The respondents expertly applied the method of rank correlation to identify key indicators in each group that affected processes under study [21].

Questions of the questionnaire along with answers in percentages are presented in Table 4. Based on the analysis of the questionnaires the authors concluded that, in general, society has adopted a stereotype concept about migrants imposed by the media.

1. The respondents did not agree on "softening" of the demographic situation in the region by attracting migrants. Moreover, there is no clear agreement on the possibility of saving money for training specialists in case of employment of highly educated migrant personnel. Neither there is an agreement on the possibility of worsening the situation of the indigenous population

in their employment.

**Table 4:** Respondents' answers to the questionnaire

No.	Questions	Average Score	Distribution of answers in%				
			1	2	3	4	5
1	Is it appropriate to attract labor migrants to the country's economy?	3.25	8	16	38	19	19
2	Do you believe that migrants can improve the demographic situation in the country?	2.81	22	21	21	26	10
3	Will the attraction of migrants help to reduce the production costs associated with the lower price of labor?	3.26	8	20	23	36	13
4	Do you think it is necessary to introduce quotas for jobs?	3.78	14	7	14	17	48
5	In your opinion, will the use of qualified migrants save the country's money for training specialists?	2.81	20	25	19	26	10
6	Do you think there is discrimination in hiring a migrant?	3.96	6	5	18	29	42
7	Do you believe that attracting migrants worsens the situation of indigenous people in employment?	3.54	7	13	29	21	30
8	Do you think it is necessary to regulate internal interregional migration?	4.89	11	55	14	24	46
9	Has the criminal situation aggravated with an increase in the number of migrants?	3.51	10	23	23	44	10
10	Does your organization need to attract migrant personnel?	1.87	59	14	16	3	8
11	Will you give preference to a representative of a European country over a migrant, other things being equal?	3.00	24	11	26	19	20
12	Will you give preference to the employment of a male migrant, other things being equal?	3.03	16	13	37	20	14
13	Are you ready to provide social guarantees (for example, payment for a rented apartment or assistance in purchasing a house) to highly qualified personnel?	2.58	35	11	23	20	11
14	Will the involvement of labor migrants in your organization allow transferring the existing workers and specialists to highly technological sites?	2.31	34	21	29	12	4
15	Will the involvement of labor migrants increase social tension in your organization?	2.84	22	19	25	21	13

2. Since most experts responding to the questionnaire have been managers, it is understandable why they believe that attracting labor migrants can really help to reduce production costs.

3. More than 50% of respondents indicate the need to introduce quotas for migrant workplaces in order to exclude the influx of "excessive" labor.

4. More than 70% of respondents almost totally agree there is discrimination in the employment of migrants. Therefore, it is important to influence interregional migration in order to reduce and eliminate the excess of labor in a particular region, since the growing number of migrants in the region might be a negative factor affecting the criminal situation.

The required labor migrants include both highly skilled personnel (high-tech production, military production, innovation activities, science and scientific services, education) and unskilled workers (transport, public services, trade, cleaning, etc.).

5. Experts believe that the required qualified personnel should be 35-45 years old, that is, migrants with certain knowledge, professional experience, and motivation to work.

#### 4. Study of interdependence between the extent of labor migration and social and economic factors of the region

The authors have further developed economic and mathematical models of correlation and regression for interdependence between the number of labor migrants and socio-economic indicators reflecting the status and development of the district [21, 22].

For the study, the authors had data on 14 regions of the VFD for several consecutive periods of time, i.e. panel data. A panel is presented by regions. To consider another time dimension, the authors decided to introduce dummy variables:

$$C_1 = \begin{cases} 1, & t = 2001 \\ 0, & t \neq 2001 \end{cases}, C_2 = \begin{cases} 1, & t = 2002 \\ 0, & t \neq 2002 \end{cases}, C_3 = \begin{cases} 1, & t = 2003 \\ 0, & t \neq 2003 \end{cases}$$

$$C_4 = \begin{cases} 1, & t = 2004 \\ 0, & t \neq 2004 \end{cases}, C_5 = \begin{cases} 1, & t = 2005 \\ 0, & t \neq 2005 \end{cases}, C_6 = \begin{cases} 1, & t = 2006 \\ 0, & t \neq 2006 \end{cases}$$

$$C_7 = \begin{cases} 1, & t = 2007 \\ 0, & t \neq 2007 \end{cases}, C_8 = \begin{cases} 1, & t = 2008 \\ 0, & t \neq 2008 \end{cases}, C_9 = \begin{cases} 1, & t = 2009 \\ 0, & t \neq 2009 \end{cases} \quad (1)$$

The migrants were divided into three groups depending on the radius of their movement: migration within the region, migration to other regions of the Russian Federation, migration outside the Russian Federation. Each group was divided into two components: arrived and departed migrants.

1. Study of the number of migrants who arrived in the VFD from abroad (Y).

With the help of multiple correlation-regression analysis by the method of least squares, the authors have calculated multifactor dependence and quantitative relationship between the objective function (Y) and social and economic indicators influencing migration:

$$Y_1 = 9.373 + 0.483C_1 + 0.311C_2 + 0.69C_7 + 0.473C_8 + 0.815C_9 + 0.092X_2 + 0.013X_5 + 0.012X_6 - 0.224X_7, \quad (2)$$

where  $Y_1$  is the number of migrants arrived from abroad;  
 $X_2$  is the total area of residential premises, average total floor space per person (square meters);  
 $X_5$  is GRP per capita adjusted for inflation (thousand rubles);  
 $X_6$  is the proportion of roads paved (end of year, %);  
 $X_7$  is equidistance from a place of permanent residence ( $C^\circ$ ).  
 $C_1, C_2, C_7, C_8, C_9$  are the dummy variables to record time.

It should be noted that indicators revealing the district's infrastructure situation and favorable living conditions are of great importance to the migrants.

2. Study of the number of migrants in the interregional exchange of the VFD with other districts of the Russian Federation.

Intra-Russian migration is not a significant demographic donor for the VFD due to increased centripetal flow caused by the highest

natural decline in population in the Central District, combined with high potential and rapid development of such a metropolis as Moscow. The study focuses on migration issues of residents of the VFD to other regions of the Russian Federation.

The dependence model of  $Y_2$  – the number of migrants to other regions of the Russian Federation is as follows [21]:

$$Y_2 = 11.85 + 1.66C_1 - 2.14C_2 - 1.64C_3 - 1.81C_4 - 1.43C_5 - 0.52C_6 - 0.00005X_1 - 0.065X_2 - 0.52X_3, \quad (3)$$

where  $X_1$  is GRP per capita adjusted for inflation (thousand rubles);

$X_2$  is the overall labor market participation (%);

$X_3$  is the number of unemployed citizens registered in the state employment offices, per claimed position (people).

In this model, like in the previous ones, all the coefficients of the regression equation are significant by Student's test, the equation (3) is significant by the Fisher criterion.

Thus, the proposed economic-mathematical model creates conditions for predicting the flow of migrants in the VFD, since it combines both subjective expert assessments and dry statistical data, which makes the forecast more realistic and allows its use in various federal and regional services dealing with migration issues.

## 5. Conclusion

1. Migration in the VFD, including the NNR, is the most significant factor of the socio-economic, demographic and cultural development of the regions. The study revealed that the VFD was a donor region for other regions of Russia and, above all, for the Central Federal District. Migration growth in the region is ensured due to migration exchange with foreign countries, primarily with the CIS countries. That is, the region is less attractive to its citizens than to labor migrants from the former union republics who are less qualified than the indigenous population.

2. Migrants are necessary for the VFD, primarily to improve the demographic situation. Migrant workers are a labor force with low salaries, the number of which must be strictly regulated and assessed in terms of competition to the indigenous population.

3. The study revealed that the specific features of migratory flows in the regions of the VFD were primarily due to the difference in socio-economic development as well as the negative consequences of the demographic situation, investment attractiveness, infrastructure development, housing provision, the attitude of indigenous population to the migrants that had a profound effect on the labor market.

4. Experts have identified factors characterized by socio-economic indicators that affect migration processes in the district. The results obtained will allow for scientifically grounded analysis of the structure and dynamics of migration processes.

5. Moreover, the authors developed economic and mathematical models to determine the number of labor migrants in the VFD in terms of their movement, depending on the state of the labor market in the form of the correlation-regressive dependence of the number of labor migrants on socio-economic indicators. This will allow considering migrants' preferences when choosing a region for their work. The relevant services related to labor migration can adjust their actions, using the proposed models, which will help to determine the optimal number of migrants in the district's regions.

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