

**CDSSES 2020****IV International Scientific Conference "Competitiveness and the development of socio-economic systems" dedicated to the memory of Alexander Tatarkin****REGIONAL DIMENSION OF INEQUALITY OF OPPORTUNITY  
IN RUSSIAN FEDERATION**

Zulfiya Ibragimova (a)\*, Marina Frants (b)

\*Corresponding author

(a) Bashkir State University, 32, Zaki Validi St., Ufa, Russia, badertdinova@mail.ru

(b) Ufa State Aviation Technical University, 12, K.Marks St., Ufa, Russia, tan-Marina@mail.ru

**Abstract**

The paper aims to study assessing inequality of opportunity in Russian regions. The analysis is based on the data from the survey «Statistical Survey of Income and Participation in Social Programs» conducted by the Federal state statistics service of the Russian Federation. The estimation technique is parametric and based on the ex-ante definition of equality of opportunity. The L– Theil index was used as a measure of inequality. According to the results obtained, inequality of labor income slightly tends to decrease in the Russian Federation. The contribution of inequality of opportunities to inequality of labor income in Russia insignificantly varies throughout 2014-2018 (from 24.27% to 27.80%). Inequality of opportunity varies significantly across Russian regions (from 2,8% to 31,65% in 2018). The regional dimension raises a new layer of research issues within the studies on the inequality of opportunity. Space factor can constrain the set of opportunities that people face or, in other words, people with the same personal characteristics, can obtain very different outcomes depending on their region. A high level of regional inequality of opportunity may stimulate an active part of the population to migration, so regional levels of opportunity inequality may be useful to explain interregional migration.

2357-1330 © 2021 Published by European Publisher.

*Keywords:* Factors-circumstances, factors-efforts, inequality of opportunities, regional inequality, spatial factor

## 1. Introduction

The subject of socio-economic inequality is currently a trendy line of research. This is because the level of inequality, which was gradually declining in the developed capitalist countries after the Second World War until into the 80s of the 20th century, started growing steadily again, creating the conditions for the growth of social strain. As for Russia, the inequality level had been growing dramatically between 1990 and 2010, followed by a slight declining trend in the last decade.

The peculiar view on inequality was put forward by the theory of equal opportunity formed in Western social philosophy at the end of the 20th century. The distinction of factors generating income differences between, on the one hand, those resulting from individual responsibility, commonly called efforts, and on the other hand, those exogenous to individual choices, called circumstances, has been supported by philosophers as Dworkin, Arneson, Roemer. These authors have advocated that inequality that individuals can be held responsible for should not be corrected, while it is fair to aim at correcting inequality originating from factors exogenous to the individual.

In a practical sense, studies on the inequality of opportunity are of great importance because they shift the goals and priorities of public policy from equalizing achievements to equalizing opportunities. It makes it possible to move towards both a more just and more rapidly developing society.

## 2. Problem Statement

The early opportunity inequality studies never focused on evaluating inequality of opportunities in society until Roemer (1998) made a substantial contribution to evaluating inequality of opportunity by offering a mathematical definition for equal opportunities. A wide range of methods for measuring inequality of opportunity has been developed and tested on the microdata. The work (Ramos & Van de Gaer, 2016) provides an excellent overview of methods for assessing inequality of opportunity and makes it possible to classify the methods on various grounds.

In terms of describing the relationship between the circumstances, efforts and achievements, there are distinguished parametric and non-parametric approaches. A specific type of function is selected in the parametric approach, the parameters of which are evaluated through regression analysis, whereas the non-parametric approach's function is considered unknown.

As to how the equality of opportunity is understood, there exist two approaches: ex-ante and ex-post. The ex-ante approach builds upon the idea that equality of opportunity is achieved if the conditional distributions of achievement are the same under any circumstances and coincide with its unconditional distribution. It is recognized that in an ex-post approach, equality of opportunity is considered achieved when the achievements of individuals making equal efforts are the same.

Finally, methods for assessing inequality of opportunity vary depending on the measures of inequality they use. There is a very wide choice of inequality indices in the case of a continuous variable of achievement, given a plethora of measures developed and applied for measuring inequality, the best known of which being the Gini index, a families of the Atkinson and Dalton indices, and generalized entropy measures.

Methods for measuring of opportunity inequality were applied to microdata from many countries including China (Golley et al., 2019; Jinyan & Wen, 2019), India (Choudhary et al., 2019; Sharma & Paramati, 2017), EU countries (Brzezinski, 2019; Pasqualini et al., 2017; Suárez-Álvarez & López-Menéndez, 2017; Suárez-Álvarez & López-Menéndez, 2020), Egypt (Assaad et al., 2017; Galal & El Enbaby, 2020), Russia (Ibragimova & Frants, 2019; Ibragimova & Frants, 2020). Most studies deals with evaluation of inequality of opportunity on the national level. Few studies are examining regional aspects. Some of them are discussed below.

The work (Suárez-Álvarez & López-Menéndez, 2020) studies inequality of opportunity in Spanish regions and their changes over time for the period of years 2004-2010. The authors find that both income inequality and inequality of opportunity increase between 2004 and 2010 for the great majority of the Spanish regions. Moreover, they observe convergence between regions in terms of inequality of opportunity, while there is not convergence in terms of income inequality. In addition, the contribution of the different variables used as circumstances to estimate inequality of opportunity varies greatly.

The work (Perez-Mayo, 2019) is also devoted to evaluation of inequality of opportunity in Spanish regions. According to the results obtained, nearly 10% of the whole Spanish income inequality is related to differences in opportunities. Poorer regions, besides of presenting worse levels of out-of-control characteristics, have worse returns to those characteristics, so that these regions are poverty traps where the risk of poverty inheritance is considerably higher than the average value in Spain.

The research (Carpantier & Sapata, 2013) studies inequality of opportunity in France and its regions. The authors reveal that the measures of inequality of opportunity largely vary across regions, and that this is due to differences in reward schemes and in the impact of the non responsibility factors of income.

The work (Cecchi & Peragine, 2010) deals with inequality of opportunity in Italy. According to the results, inequality of opportunity accounts for about 20% of overall income inequality. Moreover, the regions in the South are characterized by a higher degree of opportunity inequality than the regions in the North, especially when considering population subgroups by gender. In authors opinion, these greater obstacles and lack of adequate incentives in local labour markets can be linked to existing evidence of internal migration flows, that is strong migration of highly skilled workers from the South towards the Northern regions.

The work (Chetty et al., 2014) studies features of intergenerational mobility in the United States. According to the results obtained, intergenerational mobility varies substantially across areas within the United States. For example, the probability that a child reaches the top quintile of the national income distribution starting from a family in the bottom quintile is 4.4% in Charlotte but 12.9% in San Jose.

The review of studies dealing with the issue of the regional disparities in terms of opportunity inequality shows that the level of opportunity inequality can vary significantly across regions. In this paper, we aim at assessing variation of inequality of opportunity across Russian regions. As it is well known, Russian regions are extremely different from each other in many aspects – from climate and demography to the level of economic development. This allows us to assume that inequality of opportunity can vary significantly across Russian regions. Testing of this hypothesis is in the focus of the paper.

### 3. Research Questions

In this paper, we shall focus mainly on the two following questions:

1. How much income inequality is related to out-of-control factors in Russia and Russian regions?
2. Does inequality of opportunity varies significantly across Russian regions?

### 4. Purpose of the Study

In this paper, we aim at assessing opportunity inequality in the Russian Federation and its regions.

### 5. Research Methods

The study is based on the data of «Survey of population income and participation in social programs» (ISPS), waves 2014, 2015, 2016, 2017, 2018, conducted by the Federal state statistic service of the Russian Federation<sup>1</sup>. Sample size details are shown in table 1. Survey of population income and participation in social programs is representative both for the Russian Federation and its regions, so it makes possible measuring opportunity inequality both for the whole country and it's regions. As a measure of individual achievement, the income from primary employment is used. Factors-circumstances available in the survey include gender, age, and the type of locality where the individual lives.

**Table 1.** The number of the respondents in the Survey of population income and participation in social programs

Wave	Total number of respondents	Total number of working adults
2014	105620	50105
2015	105099	49161
2016	138395	63681
2017	367106	164235
2018	138219	62025

Currently, a wide range of methods for measuring inequality of opportunity has been developed and tested on the microdata. In terms of describing the relationship between circumstances, efforts and achievements, there are distinguished parametric and non-parametric approaches. A specific type of the relationship function is selected in the parametric approach, of which the parameters are evaluated by

<sup>1</sup> Survey of population income and participation in social programs. (2020). [https://rosstat.gov.ru/free\\_doc/new\\_site/USP/survey0/overview.html](https://rosstat.gov.ru/free_doc/new_site/USP/survey0/overview.html)

means of regression analysis, whereas the function in the non-parametric approach is considered to be unknown. As to the way the equality of opportunity is understood, there exist two approaches: ex-ante and ex-post. The ex-ante approach builds upon the idea that equality of opportunity is considered achieved if the average achievement is the same for individuals in all groups that are homogeneous by circumstance-factors. The ex-post approach implies that the equality of opportunity is considered achieved when the achievements of individuals making equal efforts are the same. Finally, methods for assessing inequality of opportunity vary depending on the measures of inequality they use. There is a very wide choice of inequality indices in the case of a continuous variable of achievement, given a plethora of measures developed and applied for measuring inequality, the best known of which being the Gini index, the Atkinson and Dalton indices families, and generalized entropy measures.

The evaluation technique that we used in this study can be characterized as parametric and based on an ex-ante approach to the interpretation of equal opportunities. L-Theil index is used as inequality measure.

The calculation algorithm includes the following steps:

1. The regression equation (1) relating individual achievement to a set of circumstance-factors is estimated.

$$y_i = f(C_i, u_i) \quad (1)$$

In equation (1)  $y_i$  – achievement of the  $i$ -th individual,  $C_i$  – vector of the values of the circumstance - factors of the  $i$ -th individual,  $u_i$  – other unobserved determinants of dependent variable.

Labor income was used as an individual achievement. The semi-logarithmic specification was used which is almost always applied in the works dealing with an individual’s income or earnings as the indicator of achievement.

$$\ln(y_i) = C_i \cdot \alpha + u_i \quad (2)$$

In equation (2)  $\alpha$  – is the vector of regression coefficients.

2. Predicted values  $\hat{y}_i$  are calculated. Variation of  $\hat{y}_i$  s connected with the variation of the circumstance – factors included in the model. Given that, inequality measured with the help of distribution  $\hat{y}_i$  is used as an absolute measure of inequality of opportunity. To assess the contribution of inequality of opportunity to achievement inequality, a relative measure of inequality of opportunity  $\theta$  is calculated by formula (3).

$$\theta = I(\hat{y}_i)/I(y_i) \quad (3)$$

Descriptive statistics is presented in table 2.

**Table 2.** Descriptive statistics

Variable	2014	2015	2016	2017	2018
Age*	42.63 (11.21)	42.86 (11.22)	43.12 (11.22)	42.82 (11.07)	43.05 (11.09)
Sex					

- male	48.07	48.31	48.36	48.75	49.12
- female	51.93	51.69	51.64	51.25	50.88
Type of locality					
urban, >1 mln	18.60	18.24	16.13	18.88	16.99
urban, 100 тыс- 1 млн	23.69	22.71	21.43	21.98	22.37
urban, city 50-99 тыс	9.40	7.86	7.89	7.82	7.63
urban, city <50 тыс	22.02	25.50	26.75	24.20	25.51
rural, >1000 pop.	17.09	14.76	16.91	15.37	15.16
rural, <1000 pop.	9.21	10.94	10.89	11.75	12.33

\* standard error is given in parentheses

As it evident from table 2, sample structure is quite stable, so the dynamic comparisons are eligible.

After the removal of the respondents with gaps in the data and limiting the sample to the respondents aged 24-70, in some regions the sample size decreased very significantly. In this regard, we limited ourselves to the regions the number of observations in which comprised minimum 300 respondents. Consequently, the calculations were made for 63 regions in year 2014, 57 regions in year 2015, 60 regions in year 2016, 82 regions in year 2017, 80 regions in year 2018.

## 6. Findings

OLS- regression results are provided in table 3. The following base categories for ordinal independent variables were used: for sex- female, for type of locality- urban area, having a population of 100000-1000000 people.

**Table 3.** OLS- regression results

	2014	2015	2016	2017	2018
Sex					
- male	0.3399***	0.3440***	0.3187***	0.3049***	0.3049***
- female	(base)	(base)	(base)	(base)	(base)
Age	0.0571***	0.0614***	0.0624***	0.0596***	0.0571***
Age2	-0.0007***	-0.007***	-0.0008***	-0.0007***	-0.0007***
Type of locality					
urban, > 1000000 pop.	0.4630***	0.5203***	0.5048***	0.5063***	0.4638***
urban, 100000-1000000 pop.	(base)	(base)	(base)	(base)	(base)
urban, 50000-100000 pop.	-0.0630***	-0.0367***	-0.0351***	-0.0385***	-0.0860***
urban, <50000 pop.	-0.1338***	-0.1507***	-0.1543***	-0.1373***	-0.1489***
rural, >1000 pop.	-0.3534***	-0.3624***	-0.3437***	-0.3087***	-0.2876***
rural, <1000 pop.	-0.5662***	-0.5269***	-0.5212***	-0.4905***	-0.4666***
const	11.22***	11.18***	11.23***	11.31***	11.44***

\*\*\* p<0.001

As table 3 shows, the gender factor is highly significant in relation to labor income: women earn less than men. Residence in rural areas, as well as in small towns makes a significant negative effect on the level of labor income. Regression coefficients for Age and Age<sup>2</sup> have expected signs. The high significance of the coefficients is due to the large sample size.

The results of opportunity inequality assessment are given in table 4. As it follows from table 4, inequality of labor income in Russian Federation slightly tends to decrease. The contribution of inequality of opportunities to inequality of labor income in Russia insignificantly varies throughout the period under consideration (from 24.27% to 27.80%).

**Table 4.** Inequality of opportunity assessment results

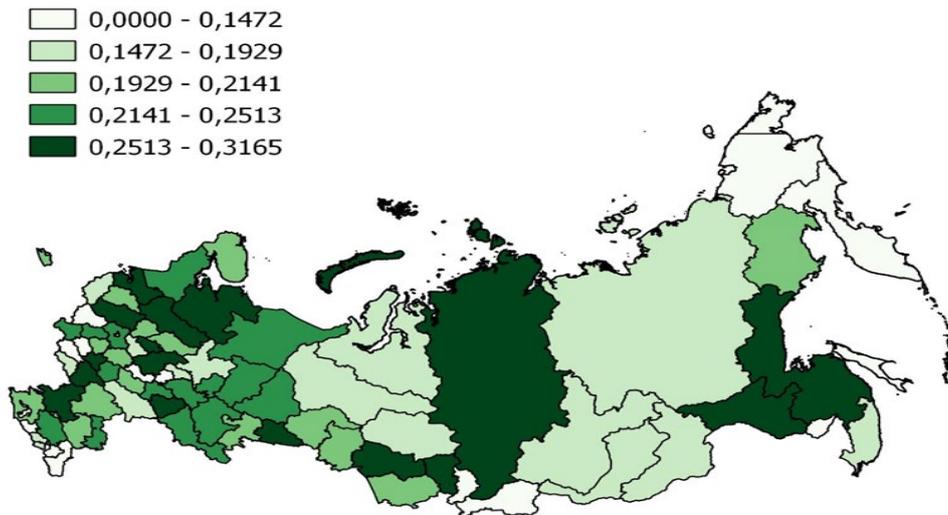
	2014	2015	2016	2017	2018
Russian Federation					
$I(y)$	0.2808	0.2695	0.2665	0.2473	0.2321
$I(\hat{y})$	0.0681	0.0749	0.0694	0.0679	0.0599
$\theta$	0.2427	0.2780	0.2605	0.2745	0.2583
Regions of Russian Federation					
$I(y)$					
min	0,1239	0,1025	0,0993	0,100617	0,0834
Q1	0,1879	0,1706	0,1707	0,15196	0,1427
Median	0,2161	0,2015	0,1957	0,178832	0,1777
Q3	0,2451	0,2307	0,2249	0,212481	0,2063
max	0,3323	0,3096	0,3144	0,279618	0,3119
$I(\hat{y})$					
min	0,0160	0,0139	0,0139	0,0108	0,0033
Q1	0,0330	0,0336	0,0289	0,0215	0,0258
Median	0,0424	0,0417	0,0375	0,0313	0,0351
Q3	0,0555	0,0517	0,0484	0,0401	0,0432
max	0,0808	0,1001	0,0916	0,0546	0,0763

$\theta$					
min	0,1140	0,1202	0,0871	0,0723	0,0284
Q1	0,1696	0,1796	0,1557	0,1325	0,1562
Median	0,1941	0,2232	0,1990	0,1733	0,2012
Q3	0,2382	0,2558	0,2270	0,2082	0,2413
max	0,3134	0,3792	0,3139	0,2734	0,3165
N					
min	301	308	329	375	313
max	3704	3771	4528	14264	4798

The variance of income inequality across Russian regions is significant (from 0.0834 to 0.3113 in 2018 when using the L-Theil index as inequality measure) and seems to be quite stable over the period under consideration. The level of opportunity inequality also fluctuates significantly across Russian regions (from 0.0033 to 0.0763 in absolute terms when using the L-Theil index as inequality measure, from 2,8% to 31,65% in 2018 in relative terms), what goes in line with the hypothesis we test. Figure 1 presents the cartogram of opportunity inequality in Russian Federation.

The obvious drawback of our research is very narrow range of circumstances taken account of. We could name a number of circumstance factors, which are ignored in the calculations due to complete absence of information about them (for example, individual's family background, the genetic traits he inherited). Consequently, our results should be treated as a low-bound estimation of opportunity inequality.

The problem of imperfect data is a common drawback of empirical studies on assessing the inequality of opportunity. The reason is that the studies are based on the data from ready-made sociological surveys, hence, the choice of circumstance-factors is limited by the availability of data. We could not find any works which would carry out a data collection tailored for assessing the inequality of opportunity, or at least, would theoretically design a sociological survey focused on this task.



**Figure 1.** The cartogram of opportunity inequality in the Russian regions, 2018.

## 7. Conclusion

Finally, over the period under consideration inequality of opportunity tends to remain rather stable and represents approximately 25% of labor income inequality in Russia. The variation of inequality of opportunity across Russian regions is significant, what goes in line with the hypothesis we test in the paper.

The regional dimension raises a new layer of research issues within the studies on inequality of opportunity. Education quality, employment chances, economic dynamism may differ significantly between regions. As a result, space, defined as the place where people live, can constrain the set of opportunities that people face or, in other words, people with the same personal characteristics, can obtain very different outcomes depending on the region they live in. High level of regional inequality of opportunity may stimulate an active part of the population to migration, so, regional levels of opportunity inequality may be useful to explain interregional migration.

## Acknowledgments

The reported study was funded by RFBR according to the research project №19-410-020017 p\_a.

## References

- Assaad, R., Krafft, C., Roemer, J., & Salehi-Isfahani, D. (2017). Inequality of Opportunity in Wages and Consumption in Egypt. *Review of Income and Wealth*, 64, S26-S54. <http://dx.doi.org/10.1111/roiw.12289>
- Brzezinski, M. (2019). The evolution of inequality of opportunity in Europe. *Applied Economics Letters*, 1–5. <https://doi.org/10.1080/13504851.2019.1613493>
- Carpannier, J.-F., & Sapata, C. (2013). An Ex-Post View of Inequality of Opportunity in France and its Regions. *Journal of Labor Research*, 34(3), 281-311. <https://doi.org/10.1007/s12122-013-9161-5>

- Checchi, D., & Peragine, V. (2010). Inequality of opportunity in Italy. *Journal of Economic Inequality*, 8(4), 429-450. <https://doi.org/10.1007/s10888-009-9118-3>
- Chetty, R., Hendren, N., Kline, P., & Saez, E. (2014). Where is the land of Opportunity? The Geography of Intergenerational Mobility in the United States. *The Quarterly Journal of Economics*, 129(4), 1553–1623. <https://doi.org/10.1093/qje/qju022>
- Choudhary, A., Muthukkumaran, G., & Singh, A. (2019). Inequality of Opportunity in Indian Women. *Social Indicators Research*, 145(1), 389-413. <https://doi.org/10.1007/S11205-019-02097-W>
- Galal, R., & El Enbawy, H. (2020). Inequality of opportunity in earnings and assets in Egypt. *Applied Economics*, 52(38), 4146–4161. <https://doi.org/10.1080/00036846.2020.1731409>
- Golley, J., Zhou, Y., & Wang, M. (2019). Inequality of Opportunity in China's Labor Earnings: The Gender Dimension. *China & World Economy*, 27(1), 28-50. <https://doi.org/10.1111/cwe.12266>
- Ibragimova, Z., & Frants, M. (2019). Neravenstvo vozmozhnostey: teoriya i praktika izmereniya na mikrodaynykh RLMS-HSE [Inequality of opportunity: Theory and practice of measurement using RLMS-HSE microdata]. *Applied Econometrics*, 54(2), 5-25. <https://doi.org/10.24411/1993-7601-2019-10001>
- Ibragimova, Z., & Frants, M. (2020). Neravenstvo vozmozhnostey: teoriya i praktika izmereniya na mikrodaynykh [Inequality of opportunity: theory and practice of measurement using micro-data of RLMS-HSE]. *Economic Policy*, 15(1), 64-89. <https://doi.org/10.18288/1994-5124-2020-1-64-89>
- Jinyan, Z., & Wen, Z. (2019). Contributions of education to inequality of opportunity in income: A counterfactual estimation with data from China. *Research in Social Stratification and Mobility*, 59, 60–70.
- Pasqualini, M., Lanari, D., Minelli, L., Pieroni, L., & Salmasi, L. (2017). Health and income inequalities in Europe: What is the role of circumstances? *Economics & Human Biology*, 26, 164–173. <https://doi.org/10.1016/j.ehb.2017.04.002>
- Perez-Mayo, J. (2019) Inequality of opportunity, a matter of space? *Regional Science Policy and Practice*, 11(1), 71-87. <https://doi.org/10.1111/rsp3.12181>
- Ramos, X., & Van de Gaer, D. (2016). Approaches to Inequality of Opportunity: Principles, Measures and Evidence. *Journal of Economic Surveys*, 30(5), 855-883. <https://doi.org/10.1111/joes.12121>
- Roemer, J. (1998). *Equality of opportunity*. USA: Harvard University Press.
- Sharma, C., & Paramati, S. (2017). Measuring Inequality of Opportunity for the Backward Communities: Regional Evidence from the Indian Labour Market. *Social Indicators Research*, 138(2), 479-503. <https://doi.org/10.1007/s11205-017-1676-3>
- Suárez-Álvarez, A., & López-Menéndez, A. (2017). Assessing Changes Over Time in Inequality of Opportunity: The Case of Spain. *Social Indicators Research*, 139(3), 989-1014. <https://doi.org/10.1007/s11205-017-1759-1>
- Suárez-Álvarez, A., & López-Menéndez, A. (2020). Inequality and Opportunities in the Spanish Regions: The Role of Immigration. *International Regional Science Review*, 43(6), 655-680. <https://doi.org/10.1177/0160017620906208>