

# INTERREGIONAL DIFFERENTIATION OF POPULATION INCOMES IN RUSSIAN FEDERATION IN THE POST-CRISIS PERIOD

**Galina P Litvintseva, Novosibirsk State Technical University**  
**Vladimir V Glinskiy, Novosibirsk State Technical University**  
**Elena A Stukalenko, Novosibirsk State Technical University**

## ABSTRACT

*The present study was aimed to quantitatively investigate the income differentiation of the population using a new quantitative model proposed by the authors based on the different purchasing power of Rouble in the Russian regions. The main approach in this model is dividing the populations of the target region into needy and wealthy groups. All populations of Russia were rearranged from regional quintile groups into the all-Russian groups. The authors have compared the obtained results with the corresponding data of official statistics by the Gini coefficient and other statistical indicators. We have developed our model which is based on the division of the population of country into needy and wealthy groups in our previous studies and now it was used in this study for the real financial data. The calculations and recommendations on the redistributive overcoming of poverty at the expense of increase of the rate of surtax on the incomes of wealthy group are developed. The models of Pen, Lorenz, modified by the authors of the article, were applied in the research. The calculations were carried out for all subjects of the Russian Federation on the Russian State Statistical Service figures for the period of 2008-2013 years.*

**Keywords:** Population, Quintile Groups, Gini Coefficient, Russian Regions.

## INTRODUCTION

Inequality increase and opportunities limitations are among the significant concerns of most of countries. Adopting of many political solutions by progressive politicians is disrupted by a critical level of the inequality in many countries. The inequality effects appear not only in the economic life, but also in the democracy and in the globalization processes. Nobel laureate Joseph Stiglitz writes the following: “We are paying a too high price for the inequality: the point is not only in development weakening and GDP decrease, but also in a general instability. And all this is without mentioning a wide range of other losses: weakened democratic system, slackening of justice position as a value in a human’s consciousness and to my mind even identity loss danger” (Stiglitz, 2015). All above mentioned is pertinent to present-day Russia, where regions economic growth is known to be notable for its essential differentiation. Together with dynamically developing territorial entities of the RF which are marked by quality and level of living increase, there exist grossly depressed regions with a low level of living. The population’s income inequality in Russia is one of the most intense and constant factors of destabilization of a socioeconomic situation in the country (Stukalenko, 2009). Today, as the world has witnessed different crises particularly economic crises in many countries due to

natural and artificial phenomena. In this regard and also the issue of imposing economic sanctions to Russia the country faces an urgent need for economy reforming. Despite the national peculiarities of our country to execute all the reforms “from the top” these reforms success depends on the society readiness for their execution. One of the important conditions is a civil solidarity, population motivation for cooperation, which decreases essentially due to the high society differentiation concerning the level of living. A great inequality of income and consequently of social opportunities of the citizens that appears in the inequality of getting of education, professional development and the like amenities substantially hampers building of an innovative economy and finally moves aside such an important “import phase-out” and other aims realization for an indefinite term.

A steady monitoring of social indicators which reflect properly the situation in regions and an immediate applying of regulatory measures on basis of this monitoring are in our opinion in the list of the most important tasks of the government. Today according to the market system apart from the essential differentiation of the nominal income of the population there is a huge price differentiation for services and wares in the regions of the RF that influences tremendously the level of living in the regions. Nevertheless, an official statistics ignores these regional differences which are about different purchasing power of the Rouble in the regions of the RF and consequently, the information needed for solutions adopting in the area of the welfare and for poverty reduction of the population is distorted to a varying degree.

### **Basic Definitions, Statistical Data Characteristics**

Starting from year 2007, the authors have been making researches concerning the inequality of population incomes of the Russian Federation with regard to processed approach considering the Rouble purchasing power parity in the regions of Russia (Litvintseva, Voronkova & Stukalenko, 2007). The question concerning the relevance of hidden earned was for the first time raised by Litvintseva in 2008 (Litvintseva, 2008). In 2009 the authors analyzed social transfers in kind influence on the population income inequality level (Litvintseva, Voronkova & Stukalenko, 2009). In this article the results of the further research of the population money income inequality for the period of 2008-2013 years, i.e. the period of economic recession and stagnation in the middle of the first period a twenty years of the XXI century are represented.

Due to this fact let us note a content of the terms used in the research.

Population incomes include incomes of persons engaged in the entrepreneurial activity, paid salary of waged earners (wage paid adjusted to the overdue change), social benefits (pensions, reliefs, scholarships, insurance indemnity and other payments), property incomes as interest on deposits, yields, dividends and other incomes (earned, revenues from foreign currency sales, cash transfers and incomes not having a widespread occurrence).

Purchasing power parity of the Rouble (PPPR) in the region is calculated as a ration of the average Russian value for the fixed set of goods and services to the value for this set in this very region (in average annual prices).

As information base for the research the official data of the Russian Federal State Statistics Service were used (Russia, 2015). The calculations were made in view of all the territorial entities of the RF (starting from 2008) and five 20 % (quintile) groups of the population in each of the entities.

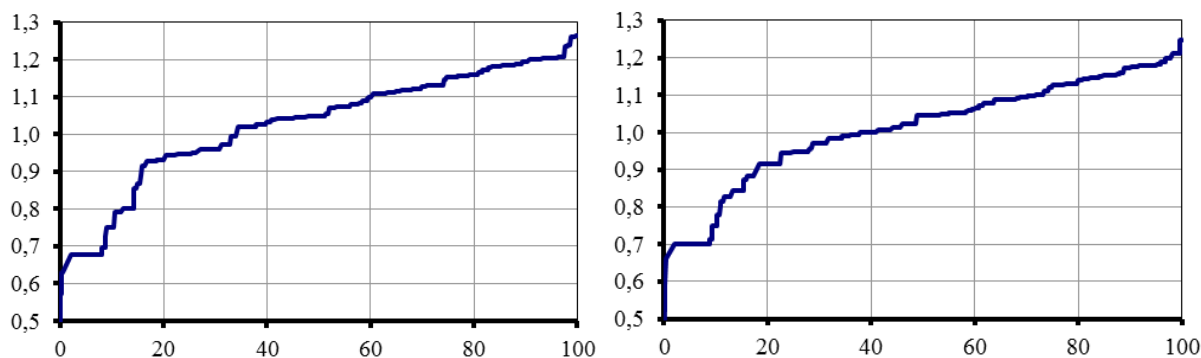
## RESEARCH METHODOLOGY

For such a research type Gini coefficient, R/P 10% ratio, Herfindal index, Theil index, Robin Hood index (known as Hoover index), Atkinson index and other are applied (Kolomak, 2013; Zubarevich, 2010). In our research we used quintile Gini coefficient and R/P 10% ratio. Nevertheless historical series of the statistical information were modified to the similar kind not only with regard to time but also with regard to regional factors (of area), in our case of the Russian Federation (Glinskiy, Serga, Chemezova & Zaykov, 2016; Glinskiy, Serga & Khvan, 2016). Besides, for estimation of the level of the absolute (according to the approach of the Russian Federation) and the cumulative poverty modified by the authors (Litvintseva, Stukalenko & Voronkova, 2010) model of Pen (Breul, 1973) and model of Lorenz (Eliseeva, 2003) were used.

## CALCULATIONS RESULTS ANALYSIS

At the first stage of the research average money monthly incomes for each of the quintile groups of the population in average Russian prices for the basal year are calculated for each year of the analyzed period and territorial entity of the RF. The basal year according to this approach is considered to be the last year of the period under study. So first the money incomes are worked out to the basal year prices with the help of the regional deflator indexes and then are multiplied by PPPR for the particular region. In the same way a living minimum wage (LMW) of all the regions is converted into average Russian prices.

The PPPR levels in the regions of the RF varied from 0.598 in the Kamchatka region to 1.254 in the Republic of North Ossetia in 2008. The closest to 1 PPPR was found in the Leningrad region-0.999 (Figure 1). Inclusively, it means that a purchasing power of the average Russian Rouble in Kamchatka was 59.8 kop. in the Republic of North Ossetia was 25.4 kop. and in the Leningrad region it was almost 1 rub. Moreover, in 2013 the PPPR levels varied from 0.594 in the Kamchatka region to 1.247 in the Republic of Ingushetia that shows practically not changing PPPR difference among the regions in general, but shows the PPPR change inside of the regions. The closest to 1 PPPR in 2013 was found in the Tver region (1,001) and also in the Novosibirsk region (0.995) and the Samara region (1.0013).



**Figure 1**  
**PURCHASING POWER OF THE ROUBLE (Y) IN THE REGIONAL GROUPS OF**  
**POPULATION OF THE RF (X; PERCENT TO TOTAL NUMBER) IN 2008 AND IN**  
**2013 (2008-2013)**

At the second stage of calculations the analyzed population groups were separated in the order of the average incomes increasing. And after this, the Gini coefficients/indexes, R/P 10% ratio and other indexes needed for analysis in the federal districts (FD) and in Russia in general, were calculated (Table 1).

<b>Table 1</b>														
<b>GINI COEFFICIENT IN THE REGIONAL GROUPS OF POPULATION IN 2000-2013 YRS. (PERCENT; IN AVERAGE RUSSIAN PRICES IN 2013)</b>														
Years	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Author's calculations	41.7	41.8	41.6	42.9	43.2	43.1	42	42.7	41.7	41.6	41.4	41.3	41.4	41.2
Assessment of the Russian Federal State Statistics Service	39.5	39.7	37.7	40.3	40.9	40.9	41.5	42.2	42.1	42.1	42.1	41.7	42	41.9

Gini coefficient calculations made during the examined period showed the difference to the higher side from the marks presented by the Russian Federal State Statistics Service by 2008 and to the lower side during the period of 2008-2013 yrs. The reduced according to our calculations differentiation can be explained by different factors, including various rates of growth of the population incomes and value for the fixed set of goods and services in the regions. For instance, according to the Russian Federal State Statistics Service information: the Belgorod region-real money income of 2013 with relation to 2012 was 102.5 and fixed set value change was 112.0; and the Sakhalin region-real money income increased by 114.0 and fixed set value increased by 105.3.

In the course of the population income analysis with the use of PPPR and in the course of regional groups of population separating in order of average incomes magnitude many of them transfer from their regional quintile groups into the other groups. In the Table 2 all-Russian quintile groups (1-5) are presented which include absolutely different regional groups.

<b>Table 2</b>	
<b>ALL-RUSSIAN AND SOME REGIONAL QUINTILE GROUPS CORRESPONDENCE IN 2013</b>	
All-Russian group 1	2: Kalmykia, Tyva, the Republic of Altai, Karachay-Cherkess Republic
All-Russian group 2	3: Kalmykia, Tyva, the Republic of Altai, Karachay-Cherkess Republic, Jewish Autonomous Oblast, the Republic of Mordovia, Kabardino-Balkar Republic, Mari El Republic, the Republic of Ingushetia, Chuvash Republic, Republic of Khakassia, Altai Territory, the Kurgan Region, the Pskov Region, the Vladimir Region, the Saratov Region, Leningradsky District, the Volgograd Region, the Kirov Region, 4: Kalmykia
All-Russian group 3	2: Moscow, 4: Tyva, the Republic of Altai, Karachay-Cherkess Republic; Jewish Autonomous Oblast, the Republic of Mordovia, Mari El Republic, the Republic of Ingushetia, Chuvash Republic, Republic of Khakassia, Altai Territory, the Kurgan Region, the Volgograd Region, the Tver Region, the Vladimir Region, the Kirov Region, the Kurgan Region, the Ivanovo Region, the Saratov Region, Leningradsky District, the Vologda Region
All-Russian group 4	3: Moscow, 5: Kalmykia, Tyva, the Republic of Altai, Karachay-Cherkess Republic, Jewish Autonomous Oblast, the Republic of Mordovia, Kabardino-Balkar Republic, the Republic of Ingushetia, Mari El Republic, Chuvash Republic, the Kostroma Region, the Tver Region, the Pskov Region, the Volgograd Region, Altai Territory
All-Russian group 5	4: Moscow

Therefore, quintile group 4 of Moscow gets into the quintile group 5 of the RF population and 2 quintile groups of the Republic of Ingushetia, Kalmykia, Tyva, the Republic of Altai and Karachay-Cherkess Republic get into the first group of the RF. The biggest quantity of transitions is observed in the All-Russian groups 2, 3 and 4. For instance, All-Russian group 2 includes the 3d and the 4th groups of Kalmykia. That is why we consider that one should distinguish between regional quintile groups of population and all-Russian quintile groups. The regional groups are formed according to the citizens' income level in the regions and all-Russian groups are formed according to the citizens' income level in the whole country.

<b>Year</b>	<b>The 1<sup>st</sup> group of the RF</b>	<b>The 2<sup>nd</sup> group of the RF</b>	<b>The 3<sup>d</sup> group of the RF</b>	<b>The 4<sup>th</sup> group of the RF</b>	<b>The 5<sup>th</sup> group of the RF</b>
2008	7	8.6	10.4	12.9	18.3
2013	6	8.1	9.6	11.4	15.1

The following trends in the incomes change for the period of 2008-2013 yrs. are defined:

1. The higher the income level is the higher is the inequality inside of the group, although the inequality rate in 2013 in all the groups became lower than it was in 2008 (Table 3).
2. In all the quintile groups of population there was a reduction of inequality inside of the group, but by a lower value in comparison with the prior period. For the period of 2000-02008 yrs.: in the first, the poorest group the Gini coefficient was reduced by 5.4 pp; in the second group-by 4.4 pp; in the third group-by 4.5 pp; in the fourth group-by 6.9 pp; and in the fifth group-by 12.3 pp. And for the period of 2008-2013 yrs.: in the first group-by 1 pp, in the second group-by 0.5 pp, in the third group-by 0.8 pp; in the fourth group-by 1.5 pp, in the fifth group-by 3.2 pp. Consequently, the most essential inequality reduction during the period under investigation was observed just as in the prior period in the quintile group of the richest population.
3. Average income decrease for the period under investigation took place in the same way in all the quintile groups that creates a difference between the present period and the prior period. For the period of 2000-2008 yrs. average money incomes (in prices of 2008) were increased 2.72 times, the incomes of the quintile group 1 were increased 2.28 times, of the quintile group 2-2.5 times, of the quintile group 3-2.65 times, of the quintile group 4-2.76 times, of the quintile group 5-2.83 times are showed in the Table 4.

<b>Year</b>	<b>The 1<sup>st</sup> group of the RF</b>	<b>The 2<sup>nd</sup> group of the RF</b>	<b>The 3<sup>d</sup> group of the RF</b>	<b>The 4<sup>th</sup> group of the RF</b>	<b>The 5<sup>th</sup> group of the RF</b>	<b>The RF</b>
2008	5489	10286	15459	23446	49968	20930
2013	6589	12446	18705	28244	59394	25076
Increase (times)	1.200	1.21	1.21	1.205	1.189	1.198

The calculated average income in the RF with regard to the PPPR differs from that of the Russian Federal State Statistics Service to the lower side. For instance, the average money income (AMI) in 2013 in the RF in general with regard to the PPPR was 25076 rub. which regardless of the PPPR according to the Russian Federal State Statistics Service data, it was

25928.2 rub. The average incomes increase (2008-2013 yrs.) in the FD took place irregularly: the minimal increase of the AMI with regard to the PPPR was observed in the Urals Federal District and in the Siberian Federal District (1.076 times), the marginal increase was in the Southern Federal District (1,309 times). In general, the marginal average income in the regions of Russia (Moscow-69900 rub.) in 2008 in prices of 2008. exceeded the minimal income (Republic of Kalmykia-2083 rub.) 33.6 times. In 2013, the marginal and minimal income owners saved their positions (Moscow-101833 rub. and Republic of Kalmykia-3791 rub. in prices of 2013 with regard to the PPPR), but the difference was reduced and became 26.86 times.

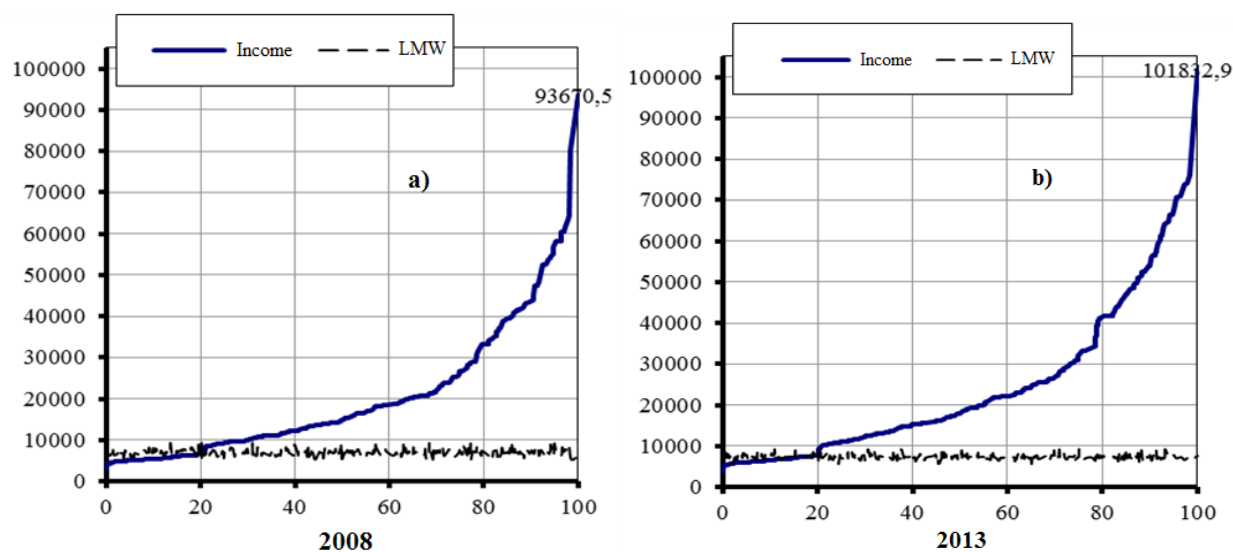
The indexes of the level of the average money income inequality in separate territorial entities of Russia in 2013 are showed in the Table 5.

<b>Table 5</b>					
<b>THE INDEXES OF THE LEVEL OF THE AVERAGE MONEY INCOME INEQUALITY IN SEPARATE TERRITORIAL ENTITIES OF RUSSIA IN 2013 (IN AVERAGE RUSSIAN PRICES OF 2013)</b>					
Federal district	Minimal and marginal money income (rub.)		Ratio of the marginal income to the minimal income (times) in prices of the appropriated year with regard to the PPPR		Changes in 2013 in comparison with 2008.
			2013	2008	
Central	the Tambov Region	5752	17.7	23.9	Decrease
	Moscow	101833			
Northwestern	Leningradsky District	5778	12.8	11.5	Increase
	St. Petersburg	73751			
Southern	Republic of Kalmykia	3791	17.0	14.5	Increase
	Krasnodar Krai	64611			
North Caucasian	Karachay-Cherkess Republic p.	5071	11.1	-	-
	Dagestan	56477			
Volga	Mari El Republic	5047	14.0	14.3	Decrease
	Republic of Tatarstan Татарстан Республикасы	70696			
Urals	the Kurgan Region	5524	13.8	16.8	Decrease
	the Tyumen Region	76058			
Siberian	Republic of Tyva	4338	13.7	14.8	Decrease
	the Omsk Region	59409			
Far Eastern	Jewish Autonomous Oblast	5168	13.0	12.6	Increase
	the Sakhalin Region	67415			
The Russian Federation	Republic of Kalmykia	3791	26.9	33.6	Decrease
	Moscow	101833			

The regions having the minimal and marginal AMIs in 2013 basically saved their positions of 2008 in the FD. The change took place in the Central and in the Northwestern Federal district in the minimal incomes: the Voronezh Region gave place to the Tambov Region and the Novgorod Region gave place to Leningradsky District. As concerning the territorial entity with the marginal income, the change took place only in the Siberian FD: Kemerovo Oblast gave place to the Omsk Region. The increase of the ratio of the marginal income to the

minimal income in 2013 in comparison with 2008 was observed in the Southern FD-from 14.46 to 17, in the Northwestern FD-from 11.47 to 12.8 and in the Far Eastern FD-from 12.6 to 13. In the rest of the FDs there was a decrease of the ratio. The most significant decrease was found in the Central FD-from 23.9 times to 17.7 and in the Urals FD-from 16.79 to 13.8.

When defining the number of poor people the Russian statistics is known to use the absolute concept of poverty according to which those citizens are considered to live below the poverty line whose incomes are lower than a formal living minimum wage (LMW) in the present region. During the analysis of the RF population distribution according to the average money income and a formal living minimum wage with the help of the modified model of Pen there were 19.68% of the population (27.68 million people) below the poverty line in 2008 and 15.58% of the population (22.178 million people) were below the poverty line in 2013 (Figure 2).



**Figure 2**

**THE RF POPULATION DISTRIBUTION ACCORDING TO THE AVERAGE MONEY INCOME (X; IN PERCENTS TO THE GENERAL POPULATION NUMBER) AND LMW (Y; RUB.) IN 2008 AND IN 2013 (IN PRICES OF 2013 WITH REGARD TO THE PPPR)**

Despite the positive dynamics, these indexes exceeded significantly the official data of the Russian Federal State Statistics Service according to which the poverty level in the RF in 2008 was 13.4% (19 million people) and in 2013 this level was 10.8% (15.5 million people).

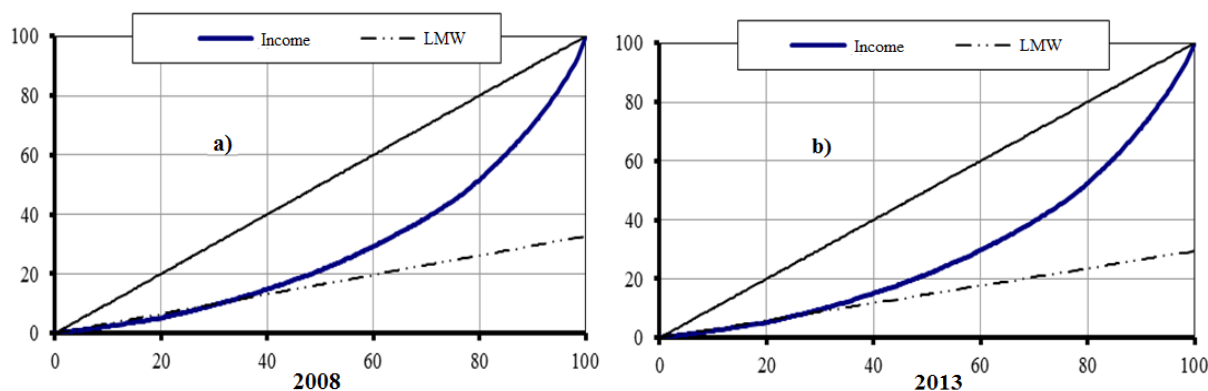
A significant poverty reduction for the examined period of time in relative ratio took place in the Northwestern FD: from 20% to 12.6%, in the Urals FD-from 14% to 7.2%, in the Central FD-from 20% to 13.8%, in the Volga FD-from 20% to 15.2%. In the rest of the FDs the relative level of poverty remained with approximately the same indexes (20%).

According to the absolute indexes, the most significant poverty reduction took place in the Central FD-from 7.43 million people to 5.35 million people.

Moreover, if using some other statistical approaches for the poverty definition, which are used in the financial statistics of the foreign countries from 2013 onward, 31% of the population

lived below the 50% of the average income in the RF and 24.1% of the population lived below the 60% of the median income.

We applied a modification on the model proposed by Lorenz which was complemented with a curve of a cumulative living minimum wage and built according to the calculation results for all the population groups of the RF (Figure 3).



**Figure 3**

**CURVES OF LORENZ AND OF THE CUMULATIVE LIVING MINIMUM WAGE IN THE POPULATION GROUPS OF RUSSIAN REGIONS IN 2008 (IN AVERAGE RUSSIAN PRICES OF 2008) AND IN 2013 (IN AVERAGE RUSSIAN PRICES OF 2013)**

The x-coordinate of the cross point of these two figures shows the degree of the poor population, i.e. of the population whose total income does not cover the total minimum. The y-coordinate of this cross point is the total living minimum wage of the poor population as a percentage of the total income of the whole population (cumulative poverty line). The upper estimate of the revenue position that can implicitly be redistributed in favor of the poor without making the citizens' incomes lower than the living minimum wage line, equals to 100% minus the degree of the total living minimum wage of the whole population (in percent) are shown in Table 6.

<b>Table 6</b>		
<b>CHARACTERISTICS OF THE CUMULATIVE POVERTY AND ITS REDISTRIBUTIVE OVERCOMING IN RUSSIA IN 2008 AND IN 2013 (IN AVERAGE RUSSIAN PRICES OF 2008 AND OF 2013 ACCORDINGLY)</b>		
<b>Indexes in the current prices of each year with regard to the PPPR</b>	<b>2008</b>	<b>2013</b>
Poor population (%)	32.1	24.9
Poor population quantity (million people)	45.1	35.5
Well-situated population (%)	67.9	75.1
Well-situated population quantity (million people)	95.6	106.8
Poverty gap of the poor (billion rub.)	27.78	24.56
Well-situated population income (%)	89.5	92.7
Income of the groups 4-5 (%)	70.8	70.3
Income of the group 5(%)	48.3	47.6
Increase of the TIPI for the well-situated part of population (%)	1.5	0.7
Increase of the TIPI only for the groups 4-5 of the population (%)	1.9	1
Increase of the TIPI only for the group 5 of the population (%)	2.8	1.4



Reviewing the calculations clearly shows that the degree of the income of the high-income groups 4 and 5 of the population for the period under investigation is slightly reduced, namely by 0.5 pp. and the degree of the most high-income group 5 is reduced by 0.7 pp.

Well-situated population of the RF in 2008 equaled to 67.9% or 95.6 million people and in 2013 it equaled to 75.1% or 106.8 million people. In 2013 this part of the population was joined mainly by the quintile regional groups 3, 4 and 5 and the second regional group of Moscow. The fifth all-Russian group of population was joined by the representatives of the fourth group of Moscow.

The percentage of the poor population in 2008 constituted the 32.1% citizens of the RF (45.1 million people without Chechen Republic) and in 2013 it equaled to 24.9% (35.5 million people), that is less than the indexes of 2008. In 2013 this group of the population was joined mainly by regional quintile groups 1 and 2 and some of the representatives of the group 3 of the poor regions and of the quintile group 4 of the Republic of Kalmykia.

The total monthly money income of the well-situated part of the population in 2013 equaled 3308.66 billion rub. in average Russian prices of 2013. The total scarcity of funds of the population below the poverty line equaled to 24.56 billion rub. To cover this scarcity it would be enough to increase an income tax for the well-situated part of the population by 0.7 pp. If we exclude the representatives of the quintile all-Russian group 3 from the group of the well-situated population, the income tax for the remaining 56.9 million people should be increased by 1.0 pp and if we exclude the group 4 as well, then the tax should be increased by 1.4 pp (for 28.5 million people of the quintile all-Russian group 5), i.e. 14.4% against 13% has been established today. In summary, like any other areas of managements, financial management policy makers should adopt up-to-date management theories suitable for the present century or specified for a region (Khorasani & Almasifard, 2017).

## CONCLUSION

The present study quantitatively investigated the interregional income differentiation of the populations of Russian Federation regions using a new quantitative model based on the different purchasing power of Rouble in the studied regions. The main approach in our model was dividing the populations of the target region into needy and wealthy groups. All populations of Russia were rearranged from regional quintile groups into the all-Russian groups. We then compared the obtained results by our model with the corresponding data of official statistics by the Gini coefficient and other statistical indicators. The main conclusions of the obtained results can be summarized as follow:

1. When making analysis of the levels of the money incomes of population one should scale incomes of the parity of the purchasing power of the Rouble. For the correct distribution of the population of the Russia according to the income levels the quintile regional groups of population should be reorganized into the all-Russian groups. For the assessment of the level of the absolute and cumulative poverty it is advisable to use the modified models of Pen and Lorenz.
2. The analysis of the money incomes and poverty level of the population showed that differentiation and poverty in the Russian Federation calculated with regard to the PPPR differ significantly from the assessment presented by the Russian Federal State Statistics Service.
3. The calculations of the money incomes of the population and the living minimum wage with regard to the PPPR according to the regional data show much higher poverty level indexes in comparison with the formal statistics (1.46 times higher in 2008 and 1.43 times higher in 2013).

4. Below the cumulative poverty line there were 24.9% of the population in 2013 and in 2008 there were 32.1% of the population below that line, i.e. the amount of the poor citizens in 2013 decreased essentially in comparison with 2008.
5. For the redistributive overcoming of the poverty in 2013 one should increase the income tax only for the 5th group of the population by 1.4 pp, or for the groups 4-5 of the population by 1 pp, that is in both of cases twice less comparing with the similar calculated rates of 2008.
6. Further studies using the real world financial data on the income of populations should be conducted to develop our model.

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