Facultat d'Economia i Empresa

Descriptive analysis of Russian Relative Poverty and Inequality from 1994 to 2016

Joan Mut Benítez

Grau d'Economia

Any acadèmic 2017-18

	Autor		Tutor	
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1. ABSTRACT

In this paper, we are going to analyze the evolution of relative poverty, with ½ and 2/3 of the median income, also for different household types, degrees of urbanization and sexes. Moreover, a study of Gini Indexes for groups just mentioned. These measures are important if we look at the country and time that our data is from, Russia, from 1994-2016, after the communist system ended. At first, we're not going to capture first year's changes, but from 1994-1998, there will be an increase in poverty and inequality levels that will take time to recover. Then relative poverty and inequality in all groups, especially after the 1998 financial crisis, showed a downward tendency, that it hasn't been perturbed by 2008 crisis.

2. INTRODUCTION

In the last decades measurement of poverty and inequality has become an important issue in global research. One of the main leaders in this field and one of the first ones to develop and study poverty and inequality was *Anthony B. Atkinson,* who also was mentor of *Thomas Piketty*, both studied this matter and developed many indicators and measures for it. A special mention and attention must be paid to the raise in inequality indicators in developed economies after the 80´s, and now as an important problem faced by many economies after the so called "Great Recession" (the greatest economic crisis faced since the Great Depression in the 30's). In this paper we are going to analyze these two macroeconomic variables in the context of the Russian Federation. This issue is especially important and interesting given the fact that Russia has been under a communist economic system more than 70 year. Taking into account that economic system, where there was a good redistribution mechanism which maintained inequality at low rates, meanwhile poverty we don't know by how much it was because there was no data available, but as literature and studies suggest, some part of the population faced this issue. It is relevant then to study the evolution of Russia, the transition from the old planned economy to a free market economy, how these variables would change from 1994 until 2016.

There is a lot of literature among this issue in the beginning of this process, in the 90's due to that economic transition. Taking into account specially Russia, the biggest in economic and demographic terms from the previous Soviet Union, where most researchers put their focus on it. For example, we can find studies on that field in Milanovic (1998) showed in a World Bank report a global vision of the changes suffered in many soviet countries and under the soviet atmosphere, considering main macroeconomic variables and poverty and inequality indicators, and comparing them with other past events that gave similar results, as the period of hyperinflation in Germany and Austria or the Great Depression in the United States of America. In Lokshin & M.Popkin (1999) showed the composition and determinants of poor people in the Russian Federation, where they demonstrate that only a small part of poor people was persistent and that the consideration of being poor depended on a lot of variables, also that children were the most affected and pensioners the ones with less probability. Kolienikov & Shorrocks (2005) studied the differences in poverty among the different regions in the large Russian Federation, the results were that real income and so poverty lines were not as different as it was supposed to be, but after studying nominal incomes, level of prices and inequality, separately they found regions in which one or the

combination of that indicators were the principal source of economic poverty of the regions. E. Nivorozhkin, A. Nivorozhin, L. Nivorozhkina and Ovcharova (2010) faced the situation of subjective poverty between urban and rural areas in Russia, they found that in urban areas disposable income was higher than in rural areas, but their perception of being poor was far higher than the ones living in rural spaces, which had less disposable income, but their subjective poverty line nearly matches their needs and tastes. Ravillon & Lokshin (2000) in "Who wants to redistribute? The Tunnel effect in 1990's Russia" were influenced by the article of Lokshin & M.Popkin (1995) previously mentioned, so showed the "tunnel effect" developed by A. Hirschmann, in the sense of the willingness of the Russian population for income redistribution. Results showed that rich people were supporting less redistribution in general terms, but a more strong and robust relationship if we take into account the short-term expectations of income, where if they had positive expectations they were more against income redistribution, at all income levels and when they had bad expectations income redistribution had a strong support even among rich people. Guriev & Vakulenko (2015) demonstrate the existence of poverty traps in poor regions of Russia, where as income increases emigration too, wanting to leave these poor regions, and how economic development and other factors helped to eliminate some of these barriers. Moreover, Lokshin and Ravillon (2000) in "Welfare impacts of the 1998 financial crisis in Russia and the response of the safety net" pointed out how there were winners and losers, how besides the general intuition, inequality felt, poverty increased and how the welfare state responds to that financial shock and prevented more welfare loss but with a stronger response could have helped much more.

During the Period that we are going to analyze 1994-2016, we can find two main external shocks that affected the Russian Federation, the first one was the financial crisis of 1998, with a collapse of the financial markets and a strong devaluation of the ruble. The second one is the Great Recession of 2008, that affected the global economy, these two factors are going to shape inequality and relative poverty.

3. EMPIRICAL STRATEGY
a. Data

For that analysis where going to use the Russia Longitudinal Monitoring Survey dataset, it is a panel data that guaranties the representativeness all along the Russian Federation with a multi-stage probability procedure. The survey has been made from 1994 until 2016, with only two years left, these are 1997 and 1999. This sample contains around 2.000 variables (income, education level, health status, number of family members, etc.) and more than 100.000 observations. That data enables matching the individuals with their respective household and follows the targeted individuals all along the surveyed years, making possible to monitor their evolution with time.

b. Methodology

Considering the previous data set from the RLMS, we have had to clean some variables before any analysis.

First, we are going to work basically with two main macroeconomic indicators, the Headcount Ratio (HR) and the Gini Index (GI).

The Headcount Ratio estimates the percentage of the population whose income it is under a certain poverty line, we are going to compute two HR, each of them with a different poverty line. Both of them are based on the median income settled for any period, we are not using the average income because extreme values could create some bias in our estimator, the first poverty line it is settled at $1/2$ of the median income and the other one is defined as $2/3$ of the median income. These poverty lines are the most used for calculating relative poverty. We haven´t found any suitable nominal poverty line to measure absolute poverty, the one that most of the literature uses it is in possession of Russian authorities and requires their permit for using them, but unfortunately, we couldn't have time enough to wait and then proceed.
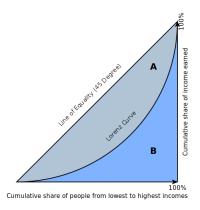
The Gini index is a coefficient of inequality, developed by Corrado Gini in 1912. With two extreme values, the first of 1 meaning that inequality it is at its maximum level, where all resources (income) it is in hands of only 1 person, the other value it is 0 where all the income is equally distributed among all the population. As we have many values for income we can represent them as a continuous variable with a range of [0, +∞) we can express the coefficient as follows:

$$G = \frac{1}{2\mu} \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} p(x)p(y)\,|x-y|\,dx\,dy$$

Being μ the mean of the income distribution.

It calculates, the area that separates a 45º line that represents the equalitarian distribution in proportion with the total triangle area, with the Lorenz curve that is listing incomes from the top bottom from the highest in a cumulative way. The greater the difference between them the higher will be the Gini Coefficient.

The Gini coefficient it has been the most important tool for analyzing inequality, mainly of countries but also between regions of it, groups of people and the whole world.

We have studied these two indicators along the time series for the whole country, but also, we found interesting to desegregate them using other variables. We have taken into account variables like the number of family members, to see if we identify some difference among household structures as literature has proved and suggested many times. Moreover, we considered the degree of urbanization of the household neighborhood, to see if there are differences in poverty and inequality between different kinds of living conditions.

Finally we have studied and analyzed some other indicators for the whole Russian Federation, such as the per capita poverty gap, that calculates for all of the ones considered to be poor (below poverty line) the difference between their actual income and the stablished poverty line, then sums all the amounts and divide the amount between all the poor, in this way we have a tangible amount that tells us on average, which quantity of money we have to give to a single poor for making him/her arrive to the poverty line minimum and not be considered poor. Then we have the Poverty Gap Ratio, that it is the same as the previous indicator but taking into account the percentage (%) difference between the mean income of the poor and the poverty line.

Secondly, we have taken income from adults and dropped the observations where the respondents didn't give us an accurate answer, such as refuse to respond, don't know or no answer because they would have given us problems with the computation. After doing so, we have summed the individual incomes to obtain household total incomes and afterwards divided that total household incomes by the total amount of number of family members. Doing so enables us to transform a personal income, to an adjusted income per capita that take into account by how many persons that personal income must be shared between the members of the family. With that procedure we are going to be able to compare incomes per capita from different households.

Table 1.
Description of Num. Family Members

	Proportion of the sample
	(%)
1 member	19,43
2 members	28,33
3 or more members	52,24
Total	100,00

Thirdly, for a more robust and easier explanation we have merger the households that had a range from 1-16, into only 1,2,3 members, as some extreme values had very few observations, so we would have had problems of bias of the estimators. These are going to be our 3 distinct family structures, 1 for single adult household, this category includes young adults that have been emancipated from their parents and do not depend economically from them, singles, divorced people without children don't have their ancient parents in charge and widowed persons who don't have any descendant in charge. Then the two-member

families are the ones which corresponds to two adults or an adult with a child or an elder person in charge, but the core of these two members families are two adults. And finally, we had 3 or more persons in a household, which we have considered and observed that were composed by 2 adults and then children or old people in charge, so we have summarized that variety of families ranged from 3-16 into only 3 and making them the category of 2 adults plus members in charge.

Also, we have been working with the degree of urbanization where de household lives, the survey provides 4 types of degrees of urbanization (1= city center, 2=town, 3=PGT, that it is considered the suburbs of a big city and 4=rural).

Table 2.
Distribution of living areas

	Proportion of the sample
	(%)
Centre (1)	42,49
Town (2)	27,12
PGT (3)	5,95
Rural (4)	24,44
Total	100,00

Table 3.
Sexes distribution

	Proportion in the sample
	(%)
Male	23,75
Female	76,25
Total	100,00

Afterwards we have also differentiated these macroeconomic variables between the two sexes, as there has been a historical discrimination in the labor market and so in wages among women, and we could see how these differences fluctuate with time, as also nowadays salary equalization is one of the major revindications of women and society as a whole.

4. RESULTS

We can see that during the period 1994-1996 (1997), the HR and the Gini Index both escalated from 17'18% to nearly 26% in the case of ½ of the median income and from 27% to more than 33% if we were talking about 2/3 of the median income, meanwhile the Gini Index growth from 0'468 to 0'638 in the same period. It would have been very interesting if you could have had data from 1989-1994, because it was on these years when the liberalization of the economy through reforms and hyperinflation appeared, that great changes in inequality and relative poverty appeared. We can attribute firstly the rise in the HR due to the privatization process rising its top in years 1996-1998, due to the financial crisis suffered by the Russian economy in August 1998, that apart from the negative impact in GDP and welfare also was accompanied by a strong devaluation of the Ruble, as well as the devaluations of many other Asian currencies in that years. Because of the year pending and more issues Lokshin and Ravallion (2000:272) empathized that:

> The data are not ideal. While the 1998 survey was carried out
> shortly after the crisis, it may well have been too soon to capture
> the full impact, as we will see when we come to the results. Also,
> to assess the welfare impact of the crisis, one would ideally

compare results of the 1998 survey with the survey of the same households immediately before the crisis. The fact that the 1996 survey was two years earlier means that the comparison with 1998 will include changes between 1996 and immediately prior to the crisis, as well as changes brought on by the crisis itself…This would mean that our analysis will underestimate the impact of the crisis.

Also, we are missing the survey from 1999 and how the recovery from the crisis would have been, but in the year 2000 data show that the conditions of poverty and inequality are more or less the same as in the period of pre-crisis. Then in the period of great economic growth worldwide that went from 2000-2008, a period only with a small crisis in the middle, the so called "dot com" crisis, in years 2003-2004, but was mainly affecting the United States of America, and with a residual impact to the Russian country that was having annual growth rates around 6%.

Table 4
Comparison between Headcount Ratio and the Gini Index

Years	Headcount Ratio		Gini index
	1/2 Median Income	2/3 Median Income	
1994	17,18%	27,20%	0,468
1995	18,30%	27,88%	0,461
1996	25,93%	33,02%	0,514
1998	22,18%	31,24%	0,638
2000	17,65%	26,86%	0,474
2001	17,34%	27,03%	0,440
2002	17,11%	26,68%	0,436
2003	16,66%	26,28%	0,795
2004	17,19%	27,15%	0,478
2005	15,22%	25,26%	0,417
2006	14,76%	25,43%	0,430
2007	13,29%	26,15%	0,394
2008	13,73%	26,70%	0,402
2009	11,84%	24,28%	0,399
2010	12,68%	23,50%	0,386
2011	10,29%	21,71%	0,366
2012	11,46%	22,34%	0,353
2013	10,92%	22,87%	0,370
2014	10,03%	21,19%	0,346
2015	9,88%	20,50%	0,344
2016	10,24%	21,78%	0,355

In that period of economic growth relative poverty decreased from 17'65% in 2000 to 11'84% in 2009 a total decrease of 33% in that variable with ½ of the median income, showing a large improvement of the lower part of the income distribution in respect to the total, by the way, if the take into account poverty line as 2/3 of

the median income, decreased from 26'86% in 2000 to 24.28% in 2009 that also decreased but less than a 10%, that gives us the idea that the most favored ones were those really poor households that managed to overtake the poverty line of ½ but didn't pass the 2/3 poverty line. But still almost the same proportion of the households fall below the 2/3 poverty line. Also, we can't say many things about the ones who are below the ½ line in 2000 and also in 2009, because we don't know the *de facto* distance to the poverty line, for those remaining below. What we might have some ideas or some indications but without many precision is the Gini Index, that was situated in 2000 with 0'474 and then in 2009 was 0'399. A strong reduction of inequality but still far to a level in correspondence with other countries such as their European ex allies and also western European countries. That had levels of inequality from (0'25-0'35) as data from the OECD tells us. After this period of strong economic growth, came the *Great Recession* of 2008, a very strong crisis had its beginning in the sub-prime mortgages in the USA that with contagious the rest of the world's financial system collapse, and after that and as a consequence of it, came the Euro's crisis focused on the high debt accumulated by southern European countries. Such an event seems to have no point in our data and then in our variables because for the period 2009-2013, indicators fare from showing increased relative poverty and inequality, far from so they continued to improve, not at the same rate and intensity as in the previous period but are nice results. We have to take into account that the Russian Federation only experienced negative economic growth in 2008, in 2009 it continued growing. Relative poverty with ½ of the median income felt from 11'84% to 10'03%, and for 2/3 of the relative income decreased from 24'28% to 22'19%. And inequality felt from 0'399 to 0'346. These results are very positive ones if we compare them to the most advanced economies for the same period, making that for example and taking into account that sample, Russia`s Gini Index was about to match the Gini Index of an advanced economy such as Spain, even so, Spain has one of the largest inequalities within Europe. After this "crisis" period that wasn't so for the Russian economy if we take only these variables. Then the period 2014-2016, we can say how it is going to continue but with the given information, now Russia that was growing the previous period meanwhile the rest of advanced economies were suffering, now Russia is facing negative economic growth and Europe and the USA are growing at reasonable rates. We have stable results in 2016 from the ones of 2014, with a slightly deterioration, passing from 10'03% of relative poverty with ½ of the median income to 10'24% in 2016, and from 21'19% to 21'78% if we consider 2/3 of the median income. For the Gini Index we have the same results passing from 0'346 to 0'355. Results that are reliable with the macroeconomic context of the Russian Federation, that also has been facing a strong depreciation of the Ruble.

4.1 Poverty Line, Average Gap and Gap Ratio

In the next two tables, tables 5 and 6 we are going to start to analyze poverty indicators more deeply. We have in order poverty lines, Headcount Ratios, Average Gap Ratios and, Gap Ratio, for both tables.

The first thing is poverty lines, we can see that for the first years there is an increase in the poverty line of about more than an 85% in the first year and more than 25% in the second year, increases in poverty lines could respond to two kinds of effects. Income effects and inflation effects as being the two critical variables. Income effects are the ones that if income as a whole increases, and

as poverty line is set as the median income, median income will increase and so poverty lines, the effect will be the same but with different direction if income as a whole decreases. Then we have got inflation effect that is the one that even if real income has no increase for a period if inflation increases, nominal income should increase, then as the income we are taking is based on nominal income more than real income, the effect of inflation will be captured by the poverty line. On the contrary as people could think, an increase on income in equally proportion or simply an increase in inflation are not going to change the Headcount Ratio as it is a relative indicator, and these are nominal variables.

Table 5
General poverty measures 1/2 median income

Years	Pov Line	HR	Average Gap	Gap Ratio
1994	61.625,00	17,18%	4.391,96	7,13%
1995	115.000,00	18,30%	10.774,00	9,37%
1996	144.000,00	25,93%	24.953,65	17,33%
1998	200,00	22,18%	26,76	13,38%
2000	434,13	17,65%	36,13	8,32%
2001	700,00	17,34%	49,26	7,03%
2002	875,00	17,11%	60,41	6,90%
2003	1.100,00	16,66%	74,63	6,78%
2004	1.283,33	17,19%	102,08	7,95%
2005	1.792,83	15,22%	94,72	5,28%
2006	2.179,00	14,76%	109,99	5,05%
2007	2.661,50	13,29%	112,99	4,25%
2008	3.622,50	13,73%	167,44	4,62%
2009	3.900,00	11,84%	148,38	3,81%
2010	4.666,67	12,68%	191,72	4,11%
2011	5.000,00	10,29%	164,69	3,29%
2012	5.833,33	11,46%	194,55	3,34%
2013	6.416,67	10,92%	195,73	3,05%
2014	7.000,00	10,03%	211,60	3,02%
2015	7.500,00	9,88%	213,94	2,85%
2016	7.930,13	10,24%	218,05	2,75%

We can see a huge decrease in the poverty line from 1996 (144.000) to 1998 (200), that was due to the high crisis, with its contraction of wealth and the most important fact was the great devaluation of the Russian Ruble.

An interesting thing to do would be too see which is the actual impact of wages increasing and inflation in the growth of the poverty line, as a simple orientation and intuition we can have a look into inflation rates and per capita income for Russia or as many reports showed, that first years inflation was the major component, then data from the World Bank, showed growth rates of around 6% meanwhile poverty lines were increasing between 2000 and 2009 from 10-25% many hypothesis show we make, but assuming GDP growth as a proxy of real income growth, then we can extract which is the component of inflation into the poverty line. Then if we have a look into Average Gap and Gap Ratio, we can see

the characteristics of those actual poor. We can see that for the first set of years, with the process of privatization of the economy and all happening, with high inflation rates and an economy in negative economic growth, HR increased but it was higher the growth of the gap between the poverty line and the average poor, meaning that in those years there were more people considered to be poor, but also the effort to take them back above the line would have been higher, after that period of crisis we can appreciate how the Gap Ratio it has been becoming smaller and smaller, in the same direction as HR, meaning that there is less people being considered poor year after year, but even better those remaining to be poor, they are consistently being closer and closer to the poverty line, making possible in the near future that some of them will go out of poverty.

Table 6
General poverty measures 2/3 median income

Years	Pov line	HR	Average Gap	Gap Ratio
1994	82.166,67	27,20%	8.909,75	10,84%
1995	153.333,33	27,88%	19.416,59	12,66%
1996	192.000,00	33,02%	39.312,76	20,48%
1998	266,67	31,24%	44,63	16,74%
2000	578,83	26,86%	68,17	11,78%
2001	933,33	27,03%	101,09	10,83%
2002	1.166,67	26,68%	124,26	10,65%
2003	1.466,67	26,28%	153,10	10,44%
2004	1.711,11	27,15%	196,03	11,46%
2005	2.390,44	25,26%	213,68	8,94%
2006	2.905,33	25,43%	254,72	8,77%
2007	3.548,67	26,15%	286,48	8,07%
2008	4.830,00	26,70%	410,15	8,49%
2009	5.200,00	24,28%	378,11	7,27%
2010	6.222,22	23,50%	475,83	7,65%
2011	6.666,67	21,71%	428,94	6,43%
2012	7.777,77	22,34%	513,76	6,61%
2013	8.555,55	22,87%	546,67	6,39%
2014	9.333,33	21,19%	572,09	6,13%
2015	10.000,00	20,50%	598,27	5,98%
2016	10.573,50	21,78%	625,32	5,91%

Another good reason of that reduced deficit in Gap Ratio, is that persons considered to be poor, if we consider their expectations and incentives, as literature suggests, they are more willing to get involved into the labor market because they face positive stimulus, rather than if they were far from the poverty line and there could appear some "poverty tramps" as Guriev and Vakulenko (2015) had studied.

4.2 Disaggregation by Number of Family Members

Then if we disaggregate the HR by the number of family members in a household, we are going to obtain clearly typical results, were as number of family members increase also its relative poverty does so, If we have a look into different

typologies of households we can see how singles, face significative lower relative poverty than the rest of household types, below 10% in all years except for the period 1996-1998, but hasn't got almost any variation being during all periods between 5-10%, in ½ of median income and 15-19% in 2/3 of median income range meaning that this group has an structural poverty, due to the low variation of poverty rates compared with the general HR. Still we don't know whether one period poor person is also poor in the next period. Then we found households composed by 2 persons, that treating this type of households are difficult to show consistent results due to the heterogeneity of this group of households (as explained before) from one point of view a two adult family who are in age to work would have similar poverty rates as a single working adult, but here we face from 1'5-2 times higher exposition to poverty, this is due to adult plus child household structure, that increases the poverty incidence in that group.

Table 7

Headcount Ratio per year and per number of family members for 1/2 median income

	General	Number of family members		
Years	HR	nfm=1	nfm=2	nfm=3 o+
1994	17,18%	6,64%	12,17%	20,74%
1995	18,30%	9,13%	14,49%	22,49%
1996	25,93%	22,64%	24,22%	26,14%
1998	22,18%	15,09%	17,80%	24,31%
2000	17,65%	7,65%	13,20%	21,65%
2001	17,34%	9,63%	13,75%	21,44%
2002	17,11%	8,73%	14,86%	21,27%
2003	16,66%	9,75%	15,43%	20,67%
2004	17,19%	9,98%	14,58%	21,62%
2005	15,22%	7,46%	14,22%	18,50%
2006	14,76%	8,48%	13,66%	17,98%
2007	13,29%	6,58%	12,98%	17,03%
2008	13,73%	7,18%	13,75%	16,07%
2009	11,84%	6,59%	11,65%	14,33%
2010	12,68%	7,19%	9,93%	14,33%
2011	10,29%	6,42%	10,22%	12,23%
2012	11,46%	6,38%	9,94%	13,27%
2013	10,92%	5,38%	9,67%	12,27%
2014	10,03%	6,36%	8,65%	11,85%
2015	9,88%	7,05%	8,17%	11,01%
2016	10,24%	5,99%	8,68%	11,57%

Afterwards we have the 3 or more household type. This one has the characteristic of being the group with a persistent higher poverty rate, that goes from 11-25% and 22-34% in ½ and 2/3 of median income respectively. We can notice that the range of variation of that group is far higher than the previous groups analyzed before, and also is the group that has contributed more to the reduction of relative poverty, also because as Table 1 demonstrate this group has more than 50% of participation among total households.

Moreover and a curious thing that we can observe from above data is that during starting from the year 2000 the HR for nfm=1 (7'65%) and nfm=2 (13'20%) we will have to wait until 2008 for nfm=1 (7'18%) to be lower than in 2000, and for nfm=2 up to 2009 (11'65%), strange figures that doesn't match with the 6% growth rate of the Russian economy, meanwhile households with 3 members or more were reducing its HR during this period, going from 21'65% in 2000 to 14'33% in 2009, 7 points less than in the beginning.

Table 8
Headcount Ratio per year and per number of family members for 2/3 median income

Years	General HR	Number of family members		
		nfm=1	nfm=2	nfm=3 o+
1994	27,20%	18,36%	21,74%	30,60%
1995	27,88%	18,58%	24,40%	31,21%
1996	33,02%	25,38%	30,95%	34,41%
1998	31,24%	18,79%	25,78%	32,39%
2000	26,86%	17,28%	23,02%	31,36%
2001	27,03%	19,01%	22,50%	30,86%
2002	26,68%	18,04%	26,02%	31,46%
2003	26,28%	16,93%	27,02%	30,80%
2004	27,15%	18,50%	25,94%	31,96%
2005	25,26%	14,69%	27,08%	28,67%
2006	25,43%	18,78%	27,25%	28,36%
2007	26,15%	19,75%	26,73%	27,92%
2008	26,70%	18,95%	29,23%	27,90%
2009	24,28%	19,29%	25,57%	24,97%
2010	23,50%	18,66%	19,90%	26,26%
2011	21,71%	17,39%	20,26%	23,78%
2012	22,34%	16,07%	21,66%	23,58%
2013	22,87%	17,31%	22,54%	25,11%
2014	21,19%	15,79%	19,22%	22,94%
2015	20,50%	17,94%	18,95%	22,27%
2016	21,78%	17,02%	20,80%	22,42%

Another important issue that we must pay attention is the escalation in proportion of poor among individual household from ½ to 2/3 of the median income. That passed from a range of 5-10% to 15-20% range taking out 1998 as an exemption. More than 2 times higher with the second poverty line, that means that there is much more people of this type of household in the range that goes from ½ to 2/3 of the median income than below the ½ of the median income. Such distribution of incomes does it appear in a smaller proportion in households formed of 2 members that increase from 8-17% to 18-30%, there is an increase but not as much as 1-member households. Then we find that this kind of distribution shown in single members is not present in 3 or more members, if we see this kind of households has a range of 11-26% of inference with ½ of the median income while 22-32% if we are now looking into Table 8, where the increase is much

lower, that means that the majority of this type of households when applying 2/3 of the median income are also below ½ of the median income.

Then if we have a look into inequality indexes we can see how on average all three types of households have almost the same inequality among the same group, but we can point out how families with only 1 member are the ones that systematically have more inequality than the rest of families, given that differences between groups are small.

We can see how the long run tendency is to decrease inequality among all groups but with certain specific moments that we shall comment, for all household types we have a strong peak in years 2003-2004, unfortunately we can't point out the reasons for that increase in inequality. Moreover, we can see a smaller maximum in families with 3 or more members in 1998, here we can attribute some responsibilities to the financial crisis, but even so, why is not affecting the rest of the groups? This paper is only descriptive, so we can't say nothing about explanatory factors of this event.

Table 9
General Gini Index and by number of family members

Years	Gini Index	Number of family members		
		1	2	3
1994	0,468	0,469	0,454	0,472
1995	0,461	0,472	0,445	0,460
1996	0,514	0,551	0,506	0,499
1998	0,638	0,435	0,449	0,736
2000	0,474	0,489	0,468	0,463
2001	0,440	0,401	0,417	0,464
2002	0,436	0,428	0,426	0,440
2003	0,795	0,827	0,705	0,811
2004	0,478	0,535	0,449	0,465
2005	0,417	0,408	0,413	0,419
2006	0,430	0,433	0,384	0,451
2007	0,394	0,432	0,392	0,377
2008	0,402	0,406	0,414	0,389
2009	0,399	0,467	0,396	0,360
2010	0,386	0,409	0,382	0,363
2011	0,366	0,393	0,355	0,349
2012	0,353	0,357	0,342	0,351
2013	0,370	0,367	0,359	0,370
2014	0,346	0,365	0,337	0,334
2015	0,344	0,362	0,321	0,337
2016	0,355	0,386	0,327	0,341

On the other hand, knowing from Tables 7 and 8 that families with 3 or more members are the poorest, then they are in mainly all years the more equal type of household, on the contrary, singles that have the lowest poverty rates, have in most of the periods the higher levels of inequality. One explanation could be that as in numerous families, wages are divided among a large group, that wages

tend to be nearer one another as here we consider per capita income adjusted by household size; on the other way, we can see how singles possess higher incomes but with higher inequality between themselves.

3.3 Disaggregation by degree of urban

Now we are disaggregating by different urban characteristics we remember that we are talking about city center, town, suburbs and rural areas.

Here we can notice how HR of all categories increase rapidly in the period 1994-1998 with the special emphasis on the increase in rural areas, passing from around 21% to 35% in the specified period, but as well in towns, where it increased from 15% to more than 23%, all regions experienced the same trend but with lower intensity.

Table 10

Headcount Ratio as 2/3 of median income and depending on the degree of urbanization

year	General index HR	Degree of urbanization 1	2	3	4
1994	17,18%	13,15%	15,48%	20,60%	21,79%
1995	18,30%	16,62%	15,88%	23,62%	27,22%
1996	25,93%	19,41%	23,11%	28,30%	35,98%
1998	22,18%	16,18%	22,02%	26,99%	29,57%
2000	17,65%	11,28%	14,17%	18,60%	23,66%
2001	17,34%	11,44%	13,89%	17,84%	22,61%
2002	17,11%	12,22%	12,70%	19,03%	19,91%
2003	16,66%	12,39%	13,60%	18,32%	20,02%
2004	17,19%	15,96%	11,69%	18,84%	18,47%
2005	15,22%	9,66%	9,98%	16,54%	19,00%
2006	14,76%	9,93%	17,75%	15,59%	17,75%
2007	13,29%	9,93%	8,13%	13,11%	14,80%
2008	13,73%	10,86%	10,12%	14,57%	13,64%
2009	11,84%	7,44%	9,24%	11,96%	14,89%
2010	12,68%	8,89%	9,97%	15,76%	14,26%
2011	10,29%	8,42%	7,96%	15,66%	12,95%
2012	11,46%	8,80%	8,75%	14,52%	13,90%
2013	10,92%	8,11%	8,45%	13,18%	11,18%
2014	10,03%	7,66%	7,29%	12,09%	12,09%
2015	9,88%	7,45%	7,99%	13,70%	11,52%
2016	10,24%	7,17%	9,21%	11,57%	10,49%

After this period all regions started to reduce their HR, but with different starting points, rural areas were the poorest urban region with its peak at nearly 36% but started a fast reduction year after year arriving to a more positive vale of 10%, more than 26 points of reduction. On the other side we have city centers and towns which they started with regular poverty rates of 13 and 15% respectively, and after the crisis started the trend of reduction of poverty with very similar

values and with the only strange figure in 2006 for towns, where passing from 9% to nearly 18%, doubling its poverty rate nevertheless in 2007 continued to the normal vale of 9%. They both reduced their poverty rates below 10% in the latest years and city center population has achieved even lower rates, arriving to 7'17% in 2016, one good explanation would be that as houses in city centers are more expensive than those on the suburbs or in other parts, they are mostly occupied by persons with higher wealth, and so they have lower poverty rates.

Moreover, rural spaces that were where poverty rates were higher, turned to be the suburbs after the 2008, maybe we can assume that in rural spaces the impact of the crisis won't have been so heavy, than in the surroundings of big cities where people is more exposed to external shocks, even so the urban region of PGT, has continued to reduce their poverty ratio.

Table 11

Headcount Ratio as 2/3 of median income and depending on the degree of urbanization

	General index	Degree of urbanization			
year	HR	1	2	3	4
1994	27,20%	23,83%	25,07%	29,65%	30,71%
1995	27,88%	25,37%	26,04%	34,17%	33,92%
1996	33,02%	27,57%	30,58%	35,85%	41,09%
1998	31,24%	25,60%	29,29%	33,19%	37,72%
2000	26,86%	20,11%	22,94%	29,75%	31,03%
2001	27,03%	22,04%	24,68%	27,39%	31,81%
2002	26,68%	21,69%	23,10%	29,96%	29,87%
2003	26,28%	23,85%	23,94%	26,01%	29,33%
2004	27,15%	26,82%	22,42%	25,34%	31,31%
2005	25,26%	23,28%	18,54%	25,56%	30,51%
2006	25,43%	23,59%	21,00%	26,44%	28,15%
2007	26,15%	23,86%	22,66%	28,09%	25,31%
2008	26,70%	23,14%	22,34%	28,48%	25,00%
2009	24,28%	20,16%	21,09%	25,25%	24,35%
2010	23,50%	19,87%	21,74%	23,41%	25,78%
2011	21,71%	18,77%	18,47%	28,18%	24,27%
2012	22,34%	19,87%	18,57%	25,52%	24,43%
2013	22,87%	19,44%	19,55%	27,00%	24,05%
2014	21,19%	18,56%	17,10%	24,94%	22,82%
2015	20,50%	18,43%	18,26%	24,28%	23,24%
2016	21,78%	18,44%	19,53%	21,30%	21,49%

Table 11 show similar results than Table 10, in terms of their dynamic tendencies. So, to not being redundant we are going to focus in the differences between the two tables. As said before the tendencies and results are almost the same but with a peculiarity, the gap between the group with less poverty ratio (city center and towns) and the ones with higher values (PGT and rural spaces), it is far shorter if we take into account 2/3 of the median income instead of ½ of it. This composition of poverty means that in PGT and rural spaces there is a huge

volume of really poor persons who don't have their correspondence in city centers and towns, but this group has a larger proportion of working poor households, than in groups 3 and 4. Making poverty rates of 2/3 of the median income closer one another.

Then in Table 12, considering the Gini's all series have similar Gini's except of city center that in the first years had a consistent lower inequality, that after the years 2005-2006 turned all the urban regions to have very similar Gini's. Also, it is important to notice that PGT and rural where the ones affected in 1998, PGT's inequality passed from 0.470 in 1994 to 0.589 in 1998 and rural regions passed from 0.435 in 1994 to 0.863 in 1998, an increase of nearly 100% in 4 years increasing only from 1996 to 1998 45%. During the same period towns inequality rose from 0.434 to 0.491, a much softer increase even decreasing in the period 1996-1998. And the strangest figure it is for the city center that during this 4 year period decreased its inequality from 0.459 in 1994 nearly one of the highest inequalities this year to 0.423 in 1998 far from other regions.

Table 12
General Gini Index and by different degrees of urbanization

Years	Gini Index	Degree of urbanization			
		1	2	3	4
1994	0,468	0,459	0,434	0,470	0,435
1995	0,461	0,412	0,454	0,517	0,476
1996	0,514	0,435	0,522	0,525	0,592
1998	0,638	0,423	0,491	0,589	0,863
2000	0,474	0,406	0,497	0,455	0,505
2001	0,440	0,377	0,452	0,466	0,481
2002	0,436	0,383	0,463	0,400	0,448
2003	0,795	0,812	0,785	0,679	0,514
2004	0,478	0,423	0,517	0,488	0,453
2005	0,417	0,377	0,401	0,422	0,433
2006	0,430	0,373	0,424	0,609	0,403
2007	0,394	0,366	0,368	0,417	0,393
2008	0,402	0,374	0,360	0,522	0,393
2009	0,399	0,338	0,470	0,378	0,366
2010	0,386	0,373	0,346	0,387	0,395
2011	0,366	0,354	0,350	0,375	0,340
2012	0,353	0,334	0,344	0,373	0,343
2013	0,370	0,331	0,409	0,383	0,332
2014	0,346	0,317	0,359	0,410	0,309
2015	0,344	0,321	0,351	0,378	0,322
2016	0,355	0,341	0,344	0,352	0,348

After this period inequality stated to fall only with the event of 2003 with a dramatic escalation of inequality, the inequality increased as the degree of urbanization was higher, for city centers inequality rose more than 110% from 2002 to 2003, and then stabilizing again on its normal values, a similar increase could be found in towns with an increase of 70% the same as suburbs meanwhile in rural spaces

it only growth by less than 15%. After this las global shock in inequality all regions started their decreasing inequality year after year, failing from 0.423, 0.517, 0.488, 0.453 in 2003 to 0.341, 0.344, 0.352,0.348 in 2016 for city centers, towns, PGT's and rural areas respectively. The only abnormal issue would be the high variation and volatility of inequality of PGT areas, that in this sequence of 20 years has suffered many shocks that elevated their inequality, in 1998 with 0.589, then in 2003 with the highest peak of 0.679 afterwards in 2006 with 0.609 and the final one in 2008 of 0.522. Then also to point out the low variation of rural spaces in inequality after the 1998 crisis, that has followed an almost straight line.

3.4 Disaggregation by sex

Table 13
Headcount Ratio, per 1/2, 2/3 of the median income and by sex also with income gap

Years	HR	Sex		HR	Sex		Income
		Male	Female		Male	Female	Gap
1994	17,18%	21,53%	15,25%	27,20%	29,78%	24,97%	11,11%
1995	18,30%	20,67%	17,58%	27,88%	29,11%	27,41%	5,00%
1996	25,93%	27,62%	25,27%	33,02%	33,05%	33,13%	5,00%
1998	22,18%	24,48%	21,36%	31,24%	31,70%	30,51%	0,25%
2000	17,65%	18,75%	16,76%	26,86%	26,04%	26,54%	5,66%
2001	17,34%	17,29%	16,82%	27,03%	26,29%	26,43%	7,14%
2002	17,11%	17,96%	15,46%	26,68%	27,43%	25,31%	5,11%
2003	16,66%	17,04%	15,09%	26,28%	26,79%	24,84%	11,61%
2004	17,19%	18,88%	15,76%	27,15%	27,83%	25,51%	0,00%
2005	15,22%	16,37%	13,17%	25,26%	27,34%	23,59%	9,71%
2006	14,76%	15,41%	13,01%	25,43%	26,94%	24,09%	5,54%
2007	13,29%	16,70%	11,00%	26,15%	28,78%	23,95%	8,81%
2008	13,73%	13,66%	11,93%	26,70%	28,42%	25,26%	4,17%
2009	11,84%	14,27%	10,06%	24,28%	27,52%	22,71%	3,90%
2010	12,68%	13,86%	11,74%	23,50%	24,05%	22,45%	-1,71%
2011	10,29%	10,52%	10,15%	21,71%	22,44%	20,68%	-2,58%
2012	11,46%	13,04%	9,89%	22,34%	23,20%	20,80%	2,49%
2013	10,92%	10,78%	9,67%	22,87%	23,15%	21,17%	0,00%
2014	10,03%	10,56%	9,35%	21,19%	22,60%	19,52%	-2,32%
2015	9,88%	9,67%	9,31%	20,50%	20,66%	20,61%	-0,05%
2016	10,24%	10,16%	9,24%	21,78%	20,85%	20,62%	-2,35%

The first thing to analyze are the HR, that we can see between male and female a consistent lower relative poverty among women, within the analysis of ½ income, all values for female were below male values. For instance, female have been only 2 years (1996-1998) with HR>20% meanwhile men have been 4 periods (1994-1998). They both have the same shape but women consistently between 2 and 5 points below, then in 2009 the rhythm and intensity of the decrease relative poverty has slowed down, and only decreased by less than 1 point in 7 years, from 10'06 to 9'24%. During this period of slow down for females, HR for male continued to decrease 4 points, from 14'27% in 2009 to 10'16% in 2016, leaving the difference only in less than 1 point.

If we have a look to the HR evolution with 2/3 of the median income, the evolution is more or less the same but with some other characteristics. First of all, the total difference between both groups it is narrower, and in some years, 1996, 2000, 2001, women faced higher inequality. Then in the period 2000 to 2008 men's inequality has increased from 26'04 to 28'52, while for women decreased by a small quantity, from 26'54 to 25'26%.

Table 14
General Gini Index and by sex

Years	Gini index	Sex	
		Male	Female
1994	0,468	0,521	0,444
1995	0,461	0,483	0,449
1996	0,514	0,551	0,498
1998	0,638	0,552	0,675
2000	0,474	0,512	0,452
2001	0,440	0,467	0,421
2002	0,436	0,460	0,420
2003	0,795	0,844	0,785
2004	0,478	0,487	0,472
2005	0,417	0,459	0,386
2006	0,430	0,475	0,394
2007	0,394	0,427	0,380
2008	0,402	0,448	0,367
2009	0,399	0,439	0,352
2010	0,386	0,480	0,349
2011	0,366	0,388	0,357
2012	0,353	0,373	0,336
2013	0,370	0,397	0,337
2014	0,346	0,352	0,328
2015	0,344	0,376	0,328
2016	0,355	0,353	0,324

Afterwards we have included a column were calculating median income for men and women, we could extract the difference between both, and we could see the salary deficit that have women. A salary deficit that seems to have some cyclical component because in every crisis 1998, 2004, 2008, 2015 the difference in income has become 0% or even positive for women. But even so we can identify a great wage gap between males and females that has been around 8-10% many years, even above 10% in 1994 and in 2003. Data indicates a reduction of the salary deficit in last years, but we can't point out if it is a temporary shock, like ones in 1998 or 2004, or if society is changing and by so a structural behavior were salaries are more in the same level, we will have to wait until the Russian Federation return to economic growth to see how salary disparity will change.

A good explanation to understand why women had a lower HR is because it is a more equal group, it has a lower Gini index in all years except for 1998. Even so inequality in both groups has decreased with time, starting in 1994 from 0.521

and 0.444 to 0.353 and 0.324 in 2016 for men and women respectively. We can also see how men's inequality is more variable with time, while the women's Gini index fluctuates less and follows a straight line after 2000. As in other Gini Tables, in 2003 the Gini index arrived at a very extreme value for both, we don't understand hundred per cent why this happened.

5. CONCLUSIONS

First, through the RMLS we have found how poverty increased in the first years, up the financial crisis of 1998, after that relative poverty has been decreasing year after year passing in 1998 from 22'18% (31'24%) with ½ of the median income (2/3 of the median income) to 10'24% (21,78%) in 2016. Although poverty has decreased as a whole, it had a higher intensity between the poorer collectives, that's why it has decreased more with ½ of the median income than with 2/3. Average Gap Ratio and Gap Ratio, confirmed this tendency, showing how the average poor person and the poverty line got closer in latest years.

Second, Gini Index behaved as HR mentioned above, with a rapid and huge increase in the period 1994-1998 from 0.468 to 0.638 in a very short period of time, that afterwards and after a high decrease 0.474 in 2000, continued a downward tendency reaching inequality levels of more "advanced" countries in last years, inequality levels around 0.340-0.360 from 2011 onwards.

Third, between number of family members, we have confirmed how higher number of members higher is the inference of this type of household in poverty, the same result was achieved with both poverty lines, but with the surprising factor that with 2/3 of median income singles' distance to other household types was strongly reduced, the study of their respective Gini Indexes showed low disparities between household types in inequality levels, but a persistent higher inequality among singles. And being numerous families the more equalitarian ones.

Fourth, if we look in different degrees of urbanization, we can identify two groups, first city centers and towns which have lower poverty rates, but they have more volatility of their poverty values, also their reduction in poverty rates was made with a lower slope than the other group PGT and rural areas, that has the higher values of poverty but did a good job in reduction their poverty with time. To have an image in 1998 the poverty difference between these groups was more than 10 points, in 2016 was only about 3 points. If we look at inequality, we can see how rural areas were highly affected by 1998 crisis but without a significant reaction in 2003 crisis, just on the contrary as the rest or urban areas, also PGT suffered many shocks facing in many years higher inequality levels than other regions, with many up and downs.

Fifth, when speaking of differentiation between sexes, we see a persistent lower relative poverty rates in women than in men, this is explained by also the higher inequality rates that men face, we say relative poverty because absolute levels of income and poverty would be the other way around, as we can see from the income gap in Table 13, which had persistent 8-10% lower median income than men during most years, and only facing a reduction of this gap in years of economic crisis.

Sixth, an interesting and complementary work would be to do the same or even more with absolute poverty lines, in which more than a descriptive analysis it could be implemented a binomial distribution of poor and non-poor individuals and then to focus on explanatory variables that determine to be poor, such analysis wasn't able to be done due to a more sophisticated analysis and a poverty line that wasn't free to everyone and needed permits.

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Note:

The author has used Stata in order to treat this dataset.