

# Measuring Unfair Inequality in Russia

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## Abstract

There has been a significant discussion of inequality in developing countries. However, many of those rely on Gini Coefficient, Mean Log Deviation or Ratio of Highest earners to Lowest and these measures introduce the normative assumption of equality of outcome, which, according to studies, is not widely shared. This paper follows the design of Peichl, Hufe and Kanbur (2018) in measuring unfair inequality using the normative position of equality of opportunity and freedom from poverty. The paper measures unfair inequality as a share of total inequality, which in turn is measured by the mean log deviation. Both mean log deviation and unfair inequality measure suggest a significant decline in inequality rate in Russia since 1994. The point-estimate of unfair inequality as a share of total inequality declines rapidly from 60% in 1998 and stays relatively constant around 20% from 2010. Decomposition of the unfair inequality measure suggests that Freedom from Poverty was the biggest contributing factor throughout this period with Inequality of Opportunity increasing in later years.

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# 1 Introduction

Development economics literature has been concerned with inequality and its effect on growth for decades. Initially, it was predicted that inequality would follow a reverse Kuznets U-curve and it will increase as countries start to grow and decrease afterwards van der Hoeven (2019). The evidence, however, seems to point that inequalities have been persisting and even where they do fall, they fall very slowly.

Modern literature highlights the negative impact that inequality can have on economic development and vice versa. Inequalities can have a tangible effect given the increase in intangible investments (Haskel & Westlake 2018). In this view, high-paid jobs can become clustered in intangible-intensive firms (such as many tech companies) due to both synergy and spillovers. Causation can also run the other way round. Others, like Piketty (2013) highlight how slow economic growth can fuel a rise in inequality and that this inherent feature of capitalism can only be alleviated by state interventionism. In Besley & Persson (2011) model, which explains investment in fiscal capacity development (i.e. the capacity of the state to raise taxes) and economic growth, income inequality can have a significant effect. Low inequality does not affect the optimum much, with fiscal capacity being fully utilised in all cases. However, as we move to higher levels of inequality, richer incumbents will have less and less incentive to develop fiscal capacity, as the potential of poorer incumbent coming to power and tax the rich would be too dangerous.

In this context, measuring inequality has become more important. Nevertheless, normative assumptions of most inequality measures, especially the ones widely used in studies focusing on developing economies, demand reassessment. For example, one of the most widely used measures - the Gini coefficient - implicitly assumes that every decile of the population should earn the same income and in this way embraces equality of outcome - an ethical position that few people share.

This paper will apply a measure developed by Hufe, Kanbur & Peichl (2018) to evaluate inequality in Russia between 1994 and 2018 that comes as a result of violation of two normative principles: equality of outcome and freedom from poverty. It will proceed in 3 main steps: first, a brief discussion of inequality and its potential causes in Russia will be presented; second data cleaning will be explained and finally, the descriptive statistics and inequality measurement with decomposition will be presented.

## 2 Review of Inequality in Russia

### 2.1 Inequality

There has been significant discussion of inequality and poverty in Russia, especially since the economic turbulence of 2014-2018 (Vedomosti 2015, Zakharov 2015, Ovcharova 2015). The fall of oil and ruble, coupled with double-digit inflation, have increased worries that part of populations, that was already in a precarious position, is getting worse.

There is a cause for cautious optimism. While data from 1990s suggest the inequality in Russia was very high Milanovic (1998), Mareeva & Tikhonova (2016) based on official government data, highlight a dramatic fall in absolute poverty rate with people below the poverty line accounting for 28.4% (41.6 million) of population in 1999 but only 11.2% (16.1 million) in 2014. However, studies also indicate an increase in Russia's inequality level. In a book Kostyleva (2011) highlights that Russia's economic growth has been highly concentrated in upper incomes: bottom 20% in 2000 earned on average 0.56x of the cost of living while top 20% earned 4.4x; in 2009 these were 0.84x and 7.89x respectively. She also highlighted that in 2009 top 20% owned 44% of the income while the rest was spread among the remaining 80% and 40% of the population was „on the brink of survival“ (p.49).

There has also been concern expressed about reliance on official figures in calculations of inequality rates. Novokmet, Piketty & Zucman (2018) argue, based on a combination of national account, survey, wealth and fiscal data, that official inequality estimates vastly underestimate increase in inequality rates since 1990. Their estimates of inequality show that the share of top 10% of income earners increased from approximately 25% in 1993 to around 50% in 1996 and remained above 45% up until 2015. Meanwhile, top 1% share increased from 10% in 1992 to 25% in 2000.

However, while most studies focus on inequality rate with measures that largely assume equality of outcome as their normative

ideal, there is evidence that people do not mind inequality if it has been achieved by fair means. Mareeva & Tikhonova (2016) cite a poll, conducted in 2012 and 2013, asking people about fairness of inequality. By a large margin (6% to 74%) people agreed with the statement that people, who work more efficiently and faster, deserve a higher salary than the people who are less productive in the same job. They also agreed (12% to 65%) that if people had equal opportunities, income inequality is justified. A different poll from 2015 shows that both on personal level and for society generally income inequality is taken to be one of the most unhealthy inequalities in the country. Thus, a more nuanced look at the level of inequality is necessary that would account for various causes of inequality.

## 2.2 Sources of Inequality

There has been a debate on the source of inequality. Concerning geographical impact, Yemtsov (2005) using regionally representative Household Budget Survey claim that the largest share of inequality comes from within regions, but unlike other European countries where this accounts for 90-95%, in Russia within-region inequality accounts for 70%. At the same time increase in inequality between regions accounted for 85% of the growth in inequality in the period of 1994 and 2000. Jansen, Dessens & Verhoeven (2013) analyse change in inequality in Russia in the period 1992 to 2002 and decompose Gini coefficient into within group (unexplained) and between group (explained) parts. They con-

clude that in the first half of this period only a small part of change in inequality could be explained but in the second one changes in between group inequality accounted for approximately 40% of inequality changes.

Different regions were endowed with different amount of resource and, given the fact that post-Soviet Russia had a much less redistribution than the Soviet system one, this meant more inter-regional inequality. Still, differences between regions explains only a third of inequality (Remington 2011). Remington cites different institutional setup of various regions in Russia as assisting or hampering both economic development and inequality. According to this argument, in some regions government created more open environment with less predation and encouraged cooperation between businesses and regional governments. This led to higher incomes, lower poverty and higher income inequality as incomes of high earners rose relative to the median. By contrast, in more corrupt and personalistic regions redistribution prevented productive economic activity and prevented both incomes and inequality from rising.

Some of regional inequalities also put bigger cities at a large advantage in the modern economy. For example, Bykov & Hull (2011) find regional disparities in terms of internet access and price, with much better availability in Moscow and St Petersburg.

One of the sources of inequality would be the discrimination faced by different groups in the labour market. An experiment carried out by Bessudnov & Shcherbak (2018) involved sending out resumes, which were identical with the exception of variation of names,

to over 9000 job advertisements. Their results indicates that in Moscow and St Petersburg employers treated application from people of European descent better than those of Southern origins. While Russians, Jews and Germans had a call back rate of around 35-40%, Armenians, Azerbaijanis and Tatars received less than 30%. Interestingly, they did not find any significant discrimination in Kazan and Ufa, suggesting that even with regards to ethnic discrimination there might be regional variations as employers in national republics are less likely to engage in discriminatory practices.

Income inequality can perpetuate itself also though outcomes such as lower health-care quality and worse educational opportunities. According to WHO in 2009 mortality among working age people in Russia was much higher than in other European countries (with the exception of Ukraine) and part of this is a result of income inequality affecting healthcare. In 2000 16.7% of poll respondents said that they do not have enough money to buy medicine - this decreased to 7.6% by 2010 (Potapchik et al. 2011). In 2009 around 10% of respondents said they were not able to afford dental treatment; poorer people are less likely to receive ambulatory treatment (Potapchik et al. 2011) while in Moscow, infant mortality was found to be statistically related to the reliance on aid as income source of residents of city district (Grafova et al. 2019). And with the move away from free Soviet higher education and despite government's attempts to achieve equal access to education, there is an increasing differentiation that makes educational outcomes depen-

dent more on parents' financial well-being, occupation and willing than student's abilities and effort (Konstantinovsky 2012). The financial accessibility of higher education can also vary significantly from one region to another of Economics (2016).

### 3 Data Cleaning

The paper used data from Russia Longitudinal Monitoring survey, RLMS-HSE (2018) covering the period from 1994 to 2018 with the exception of 1997 and 1999 when the survey was not conducted. The analysis has been done on an individual level. Note that for all variables the values of "Does not know", "Refuses to answer", "No answer" and, in case of some, "Died" have been remove. An additional check has been done, to ensure that these values do not vary as a share of total observations from year to year.

Data Cleaning involved two main stages. In the first stage the data relevant to types were cleaned. Since this paper aimed to follow Hufe, Kanbur & Peichl (2018) (from here called HKP) and Hufe, Peichl & Weishaar (2019) as closely as possible, the parental education and occupation was used to construct types. However, in this survey the data was collected only in two years - 2002 and 2011. As such, only individuals who gave their parental education and occupation in either of those years were considered. This significantly diminished the sample. Occupations in the original dataset were listed according to the International Standard Classification of Occupations (ISCO-08) and, fol-

lowing HKP, these have been divided into three groups. For each person, the value of father's and mother's education has been calculated separately. The highest value of these variables was filled for all years of a given individual.

A similar process was done with education variable. The original dataset divided education into twelve groups and the author aggregated these into three groups, making them close to HKP's "Dropped out of secondary education", "attended secondary education" and "attended at least some tertiary education".

Next, the variable for nationality is cleaned. In this respect, the author has decided to take a break from Hufe, Peichl and Kanbur (2018) and include nationality (i.e. ethnic background) instead of urbanicity of the place of birth to explore the amount of unfairness generated by ethnic differences. Since Russians dominate the sample, collectively comprising 88% of the dataset, and since many ethnic groups have only one representative, the author has decided to break this variable into two groups: Slavic peoples and Europeans in one group and everyone else in another.

Finally, types were created. The new 'type' variable was assigned to each observation based on parental occupation, parental education, gender (this was checked and all values were either male or female) and nationality. As a result of variables changes, there are three types for parental education, three types for parental occupation, two types for gender and 2 types for nationality with a total of 36 types.

In the second stage, the outcome variable was cleaned. Since the questionnaire asked about the total income for the past month, some people reported no income, but non-zero working hours. In the preliminary dataset, this constituted approximately 1% of the dataset and these values were removed. Next, values were adjusted for the inflation. Unlike HKP, which used Penn World Tables to adjust for purchasing power changes, this paper uses IMF data on inflation IMF (2020). The reason is that the former collected data until 2017 but this study has 2018 data as well. In addition, the paper also adjusted incomes prior to 1998 by a factor of 1000 due to the redenomination of Ruble in 1998. Thirdly, the final dataset that we work with includes only those individuals who reported parent education and occupation in the two years when this question was asked, with first year being 2002. This likely introduces bias in the sample. Finally, values of zero were replaced with one to make log transformation possible and the data was winsorized at 1% from the lower tail and 0.5% from the upper tail.

Regarding the poverty threshold, initially this paper followed Hufe et al. (2018) and used 60% of the year-specific median income as the poverty threshold. However, due to significant income changes in this period, in particular the rapid drop of income in late 1990s, this measure became too low. For this reason, this paper followed the Russian national "minimum subsistence income" [Прожиточный минимум]. This has been developed in 1997 and it includes money necessary for food as well as other goods and

services. The calculation of this minimum has been changed in 2000. This paper used the information on the minimum income from two sources (for both 1st quarter of the year was taken and only for the working-age population): Elizarov (2002) for the period prior to 2000 and ROSSTAT (2020) for the period after 2001.<sup>1</sup>

## 4 Descriptive Statistics

### 4.1 Headcount Ratio, Poverty Gap, Watts Index and Gini Coefficient

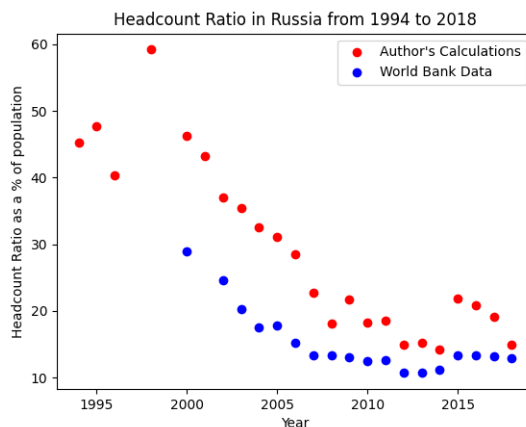


Figure 1: Headcount Ratio

In addition to the unfair inequality measure it is worthy to look at the dynamics offered by traditional measures of inequality:

<sup>1</sup>All codes and data files for the project are available in a Github repository: <https://github.com/edgarakopyan/Measuring-Unfair-Inequality-in-Russia>

the headcount ratio, poverty gap, Watts Index and Gini coefficient. As one can see in the Figure 1, the headcount ratio - which is the share of people falling below the poverty line - is consistently higher in this sample than the World Bank estimates WorldBank (2020) and changes significantly. It reaches the maximum value of 59% in 1998 and comes down afterwards with lowest value in 2014 of approximately 11%. Notably, it has increased after the financial crisis in 2014-2015, confirming the worries of many that many people have been pushed into poverty. However, this has come down afterwards as the effect of the crisis were subdued. Due to time constraints, this study has not been able to adjust for sample weights and this can also account for some part of the discrepancy. However, it is worth noting that the direction of both this paper's estimates and World Bank's agree with each other and the estimates of this paper are close to other estimates encountered in the literature - another paper based on RLMS put the Headcount at 37% in 1996 WorldBank (1999) - and that the ratio agrees with World Bank estimates in latter dates.

However, the headcount ratio generally has the disadvantage of not showing the extend of poverty: it shows how many people fall below the poverty line but does not capture how far below poverty line people are. For a better picture we look at the Poverty Gap in Figure 2 which measures the average poverty gap relative to the poverty line. As the case with headcount ratio, the measure from the survey does not coincide well with the WorldBank (2020) - it is much higher. However, it

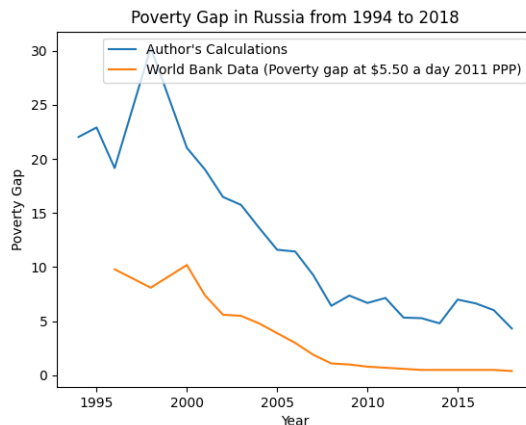


Figure 2: Poverty Gap

is worth noting that WorldBank (2020) does not have a measure of poverty gap using national poverty line. As a result, the one presented here is \$5.50 (2011 PPP) a day which, in 2011 was less than half of Russia's poverty threshold. Because of this, one would expect World Bank to significantly underestimate the poverty gap. Nevertheless, this index does not consider the inequality among the poor and it is worth looking at the development of the Watts Index. Gini coefficient, as one of the most popular and common inequality measures, should be explored as well.

Figure 3 demonstrates Watts Index. As we can see, according to this index the value is high in 1990s and peaks in 1998 at 0.53, coming down afterwards and reaching the lowest value in 2018. This is consistent with some of the previous data of the WorldBank (2020) in terms of inequality dynamics. Unfortunately, there is no other Watts Index estimation offered by any international body to compare

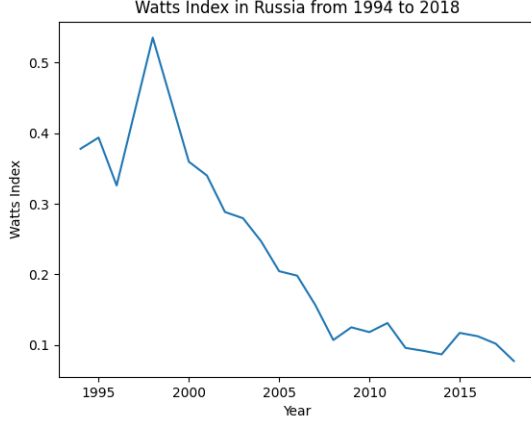


Figure 3: Watts Index

to.

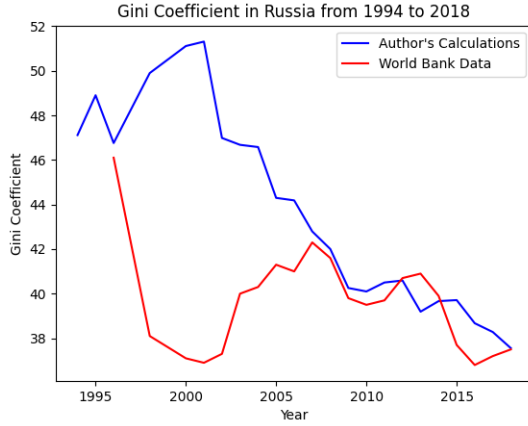


Figure 4: Gini Coefficient

The situation with Gini coefficient - shown in Figure 4 - is more interesting. One thing that is apparent is that both this paper estimates and World Bank estimates are very high, especially for earlier dates. The values of both the dataset of this paper and

WorldBank (2020) are very closely related in late 2000s and up until 2018 and both show decreasing trend. However, trends of 1990s are the opposite - while the World Bank says the inequality decreased rapidly, this paper's data suggests that it, in fact, increased. Another paper that uses the same survey data Lisina & Kerm (2019) also suggests that the Gini coefficient, contrary to what World Bank says, increased, peaking at approximately 0.5 in 1998. Thus, it seems to be a difference between the dataset that World Bank uses and RLMS. This is also present in the literature generally as various datasets can significantly alter estimates of the Gini coefficient in Russia - Jansen, Dessens and Verhoeven (2013), for example, use other 15 survey datasets and conclude that Gini coefficient rose to 0.4 in 1995 and stayed at approximately that level up to 2001. This is also consistent with the criticism, raised by Novokmet, Piketty & Zucman (2018), that relying on national accounts in Russia may severely inequality.

## 5 Estimating Unfair Inequality

### 5.1 Main Results

Finally, we estimate the level of unfair inequality in Russia. The formula for unfair inequality measure is:

$$\frac{1}{N} \sum_{i \in P} \left\{ \ln \frac{y_{min}}{y_i^e} - \left( \frac{y_{min} - y_i^e}{y_{min}} \right) \right\} +$$

$$\frac{1}{N} \sum_{i \in R} \left\{ \ln(1 - \tilde{y}_i(\tau^{FfP} + \tau_i^{EOP}(1 - \tau^{FfP}))) \right\} +$$



$$\frac{1}{N} \sum_{i \in R} \left\{ \frac{\tilde{y}_i(\tau^{FfP} + \tau_t^{EOP}(1 - \tau^{FfP}))}{1 - \tilde{y}_i(\tau^{FfP} + \tau_t^{EOP}(1 - \tau^{FfP}))} \right\}$$

where:

$$ymin$$

is the poverty threshold,

$$\tilde{y}_i = \frac{y_i^e - ymin}{y_i^e}$$

,

$$\tau^{FfP} = \frac{N_P(ymin - \mu_P^e)}{N_R(\mu_R^e - ymin)}$$

for  $P$  poor population (i.e. below the poverty threshold) and  $R$  the rich (i.e. above the threshold),

$$\begin{aligned} \tau_t^{EOP} = & \frac{\mu_t^e + \frac{N_{P \cap t}}{N_t}(ymin - \mu_{P \cap t}^e) -}{\mu_t^e + \frac{N_{R \cap t}}{N_t}(ymin - \mu_{R \cap t}^e) -} \\ & \frac{-\tau^{FfP} \frac{N_{R \cap t}}{N_t}(\mu_{R \cap t}^e - ymin) - \mu}{-\tau^{FfP} \frac{N_{R \cap t}}{N_t}(\mu_{R \cap t}^e - ymin) - ymin} \end{aligned}$$

In the Figure 5 the mean log deviation (MLD) and the estimate of unfair inequality as a percentage of total inequality with 95% confidence interval are show (the confidence interval is obtained using bootstrap with sample of 500 from each year and 500 tries). The mean log deviation rises up until 2001 and dramatically falls since then. While this may seem surprising, this result is close to the one obtained by Lisina & Kerm (2019) using the same RLMS dataset. In comparison to the Hufe et al. (2018) this MLD of Russia in 2010 is equal to the MLD of the US. And while the US saw an increase in the amount of unfair inequality from 1995 to 2012, the Russian one

has been declining. The unfair inequality as a share of total inequality rises substantially in late 1990s up to 60% in 1998 and falls after that to around 20% by 2018. Comparing to European estimates of unfair inequality, Russian one is close to Estonia and Latvia (but Russian MLD - 0.3 - is higher than either of them - 0.19 and 0.22). It is interesting to note, that the economic crisis from 2014 does not seemed to have much impact on unfair inequality.

Meanwhile, 95% confidence intervals are wide and largely fall within the range of confidence interval of inequality of opportunity of Hufe et al. (2019) albeit a bit smaller range. This is to be expected as this paper uses fewer variables for types - for instance, this paper used nationality in place of urbanicity of birth and did not use height.

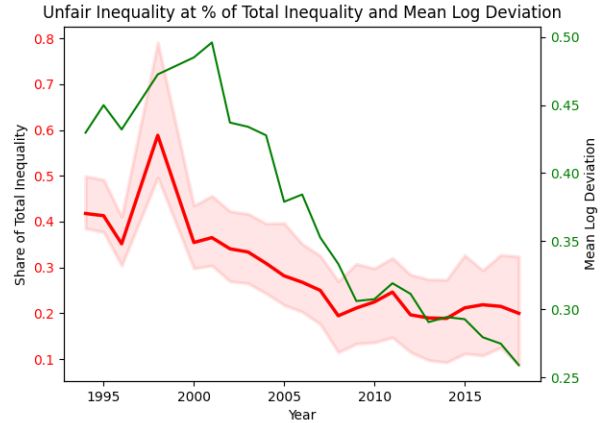


Figure 5: Unfair Inequality with 95% Confidence interval and MLD

## 5.2 Decomposition

It is also possible to look which normative principle contributes to the Unfair Inequality. It is not possible to calculate exact contribution of each normative principle but it is possible to get the upper and lower boundaries. Upper bounds were calculated using:

1. For Equality of Opportunity:

$$\frac{1}{N} \sum \ln \frac{\mu}{\mu_i^e}$$

2. For Freedom from Poverty:

$$\frac{1}{N} \sum_{i \in P} \left\{ \ln \frac{y_{min}}{y_i^e} - \left( \frac{y_{min} - y_i^e}{y_{min}} \right) \right\} +$$

$$\frac{1}{N} \sum_{i \in R} \left\{ \ln(1 - \tilde{y}_i) + \frac{\tilde{y}_i \tau^{FfP}}{1 - \tilde{y}_i \tau^{FfP}} \right\}$$

Since those two principles are mutually exclusive and collectively exhaustive for our inequality measure, it is possible to deduce the lower boundaries of each by subtracting the upper boundary of the other principle from the total measure of unfair inequality. Figure 6 shows the lower and upper bound of each normative principle as a share of total unfair inequality. Overwhelming majority of unfair inequality in Russia in this period comes from Freedom from Poverty principle - i.e. the difference of type means from overall mean is not as significant as the fact that within types many people fall below poverty line. However, the structure of the unfair inequality has seen a substantial change. While Freedom from Poverty was by far the most dominant

contributor to unfair inequality in 1990s and early 2000s, this has slowly changed. By 2008 the lower boundary of Freedom from Poverty is less than the higher boundary of the Equality of Opportunity. Nevertheless, likely due to the 2008 Financial crisis, the shares diverge again, coming close to equality by 2018. Notably, the 2014-2015 Financial crisis in Russia did not increase the share of Freedom from Poverty - in fact, despite the crisis the share of Freedom from Poverty kept decreasing.

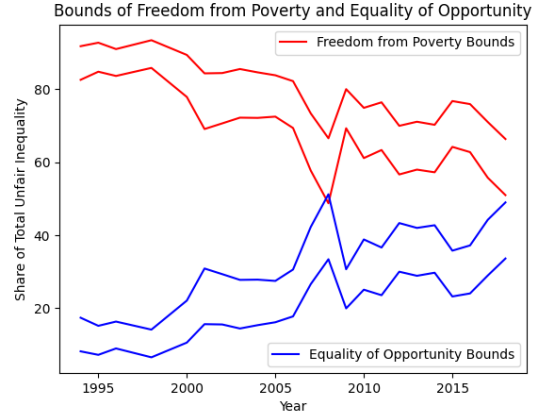


Figure 6: Upper and Lower Bounds of Freedom from Poverty and Equality of Opportunity as a share of Total Unfair Inequality

## 6 Discussion and Conclusions

The results of this paper should be taken with a grain of salt as many circumstance variables which could, to the knowledge of the author, affect the rate of unfair inequality, have not been used in constructing types.

For instance, there is a notable divide between cities and rural areas as well as between large cities and smaller urbanities; there is also a divide between different regions of Russia. Neither of those variables could be considered, primarily due to data limitations - limited sample did not allow for incorporation of types while the fact that the dataset is not representative of Russian regions but only nationally means that it is impossible to study effects of regions. However, this does not mean that the result is invalid - it means that in reality, the rate of unfair inequality is likely to be higher than the estimated 20% and could be higher than the upper boundary of 33%. An interesting topic for future research could be why Freedom from Poverty keeps declining after 2014 Financial Crisis while Inequality of Opportunity grows. It is possible that marginal groups experienced more setback from the crisis.

The main findings of this paper are:

1. Approximately a fifth of total inequality in Russia can be accounted by unfair inequality. This rate was significantly higher in 1990s and early 2000s, reaching 60% and possibly up to 80% in 1998. It has declined since then, plateauing at around 20% by 2010.
2. Most of unfair inequality in this period constitutes Freedom from Poverty but by the latter years the Inequality of Opportunity is rising as well. By 2018 the upper boundary of the Inequality of Opportunity reaches the lower boundary of the Freedom from Poverty.

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