

# UNDERSTANDING INEQUALITY AND POVERTY TRENDS IN RUSSIA

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## **Abstract**

The distribution of income in Russia changed significantly over the past 20 years. We observe an overall decrease of inequality, poverty and increase in levels of income. In this paper, we address the question of what factors were responsible for the fall in inequality and poverty during the last decade in the Russian Federation. We observe that the evolution of socio-demographic characteristics together with labour market employment had no impact on inequality and poverty. Changes in market returns, earnings and pensions, are the main drivers of changes in income distribution. Falling inequality and poverty is the result of decrease in dispersion of earnings and increase in levels of pensions at the lower part of income distribution.

**Keywords:** earnings, inequality, poverty, counterfactual analysis, Russian Federation.

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## 1. INTRODUCTION

The distribution of income has changed globally over the past decade. There has been a clear trend of rising income inequality in most industrialized countries (OECD, 2019). This trend and its determinants have been studied extensively (Biewen, Ungerer, & Löffler, 2017; DiNardo, Fortin, & Lemieux, 1995; Ferreira, Firpo, & Messina, 2017; Hyslop & Maré, 2005; Murphy & Welch, 1992). Controversially to this, some emerging economies experienced a fall in income inequality (Balestra, Llana-Nozal, Murtin, Toso, & Arnaud, 2018). This was the case of Russia. In this paper, we provide a comprehensive analysis of decline in income inequality and poverty in Russia.

Russia has typically been subject to macroeconomic volatility, accompanied by periods of high and very high inflation, sovereign default, periods of economic recovery and geo-political instability. This has attracted the attention of researchers around the world. Early studies focused on the level of inequality and poverty during the transition from a planned to a market economy (Comander, Tolstopiatenko, & Yemtsov, 1999; Denisova, 2007; Flemming & Micklewright, 2000; Jovanovic, 2001; Milanovic, 1999). Later studies on inequality in Russia focused on the period of economic growth from 2000 to 2008 (Gorodnichenko, Sabirianova Peter, & Stolyarov, 2010; Lukiyanova & Oshchepkov, 2012). These studies found that Russia experienced a dramatic rise in income inequality in the 1990s, which reversed in the 2000s. The top and bottom tail of income distribution gained, while the middle-income class lost (the so-called hollowing out of the middle effect). Economic growth from 2000-2008 had a pro-poor nature.

The latest studies on income inequality in Russia cover such issues as documenting the top income shares (Novokmet, Piketty, & Zucman, 2018) and understanding factors behind wage inequality (Calvo, López-Calva, & Posadas, 2015) and mobility trends (Dang, Lokshin, Abanokova, & Bussolo, 2018). Calvo et al. (2015) find that employment type and returns to employment are the most relevant factors for explaining wage inequality. While understanding changes in wage structure is important, we still lack understanding of changes in income inequality and poverty in Russia.

In this study we examine the reasons for the observed changes in income inequality and poverty in Russia over the period 1994-2015. The study is based on the data from the Russia Longitudinal Monitoring Survey - Higher School of Economics. This survey data offers a wide range of socio-demographic characteristics of household and individuals together with detailed information on income sources over a long period of time. We use total household disposable income as the main variable to measure inequality and poverty. We document an overall decrease of inequality, poverty and increase in levels of income.

When thinking about possible determinants of the decline in inequality and poverty, three groups of factors were defined: socio-demographic characteristics, labour market participation and labour market returns. We only consider those determinants that changed the most over the examined period of time.

Aiming to understand mechanisms behind trends in income inequality and poverty, we follow a semi-parametric decomposition method introduced by DiNardo, Fortin and Lemieux (1996) (DiNardo et al., 1995). This technique allows to construct a counterfactual income distribution of the world by keeping some determinants fixed in time, while changing others. Afterwards, the actual and counterfactual states are compared and the effects of the determinants are defined. We believe that the counterfactual analysis can convey the main information about the main drivers of changes in inequality, poverty and income levels.

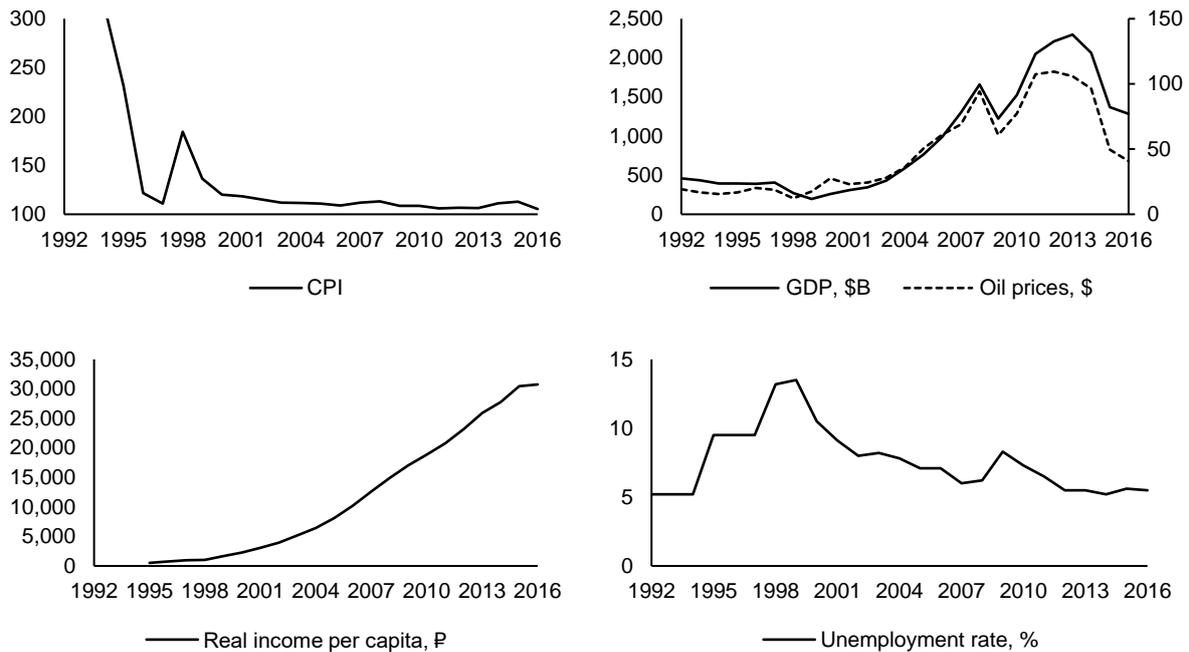
Our findings suggest that changes in socio-demographic characteristics and labor market outcomes did not have any impact on income inequality and poverty in Russia. Falling inequality and poverty is the result of changes in earnings and pensions. No other income source including home-food production had affected inequality and poverty. We find evidence for increase in levels of pensions and decrease in earnings dispersion over the examined period. These effects are prevailing at the lower tale of income distribution. Therefore, income inequality and poverty decreased in Russia since 1994.

The remainder of the paper is organized as follows. In section 2 we present Russia's development over the period 1994-2015. In section 3 we introduce the survey data, and document trends in income inequality and poverty. In section 4, we determine and analyze possible determinants of observed changes. Section 5 presents a method for studying changes in income inequality and poverty, and finally in section 6 we present our empirical analysis. Section 7 concludes.

## **2. ECONOMIC CONDITIONS**

The analyzed period covers 20 years including recession, economic growth and crisis. We, thereby, believe that understanding the economic situation during this time will help to analyze the trends of inequality and poverty in Russia. We divide the period from 1994 to 2015 into three distinctive phases and sketch the most important economic changes. Figure 1 summarizes the main stylized facts about the Russian economy, on the one hand, including GDP, CPI and, not least important, oil prices, and well-being of its citizens including real per-capita income and unemployment rate, on the other hand.

The last decade of the 20<sup>th</sup> century was a tumultuous period for the Russian economy. The collapse of the Soviet Union brought an unprecedented scope and speed of changes, which affected more than 250 million people in many countries. These changes were price liberalization, establishment of new economic institutions and property rights, high and very high inflation, and, in the end, government default in 1998. Moreover, while a tiny group of people was accumulating its wealth, the majority of Russians were suffering from a severe and worsening recession, reflected in a decline of real earnings starting right after the Soviet collapse. There is much more that could be said, but the most important outcome is that the economic reforms of this time led to an extreme and rapid social and economic stratification in Russia.



**Figure 1** Economic Development in Russia 1994-2017

**Source:** Russian Statistical Office, (2017); The World Bank, (2019).

By the period 2000 to 2008, thanks to constantly increasing oil prices, Russia was enjoying its economic growth. On average GDP was growing by 26% on an annual basis. The rates of inflation were reasonably moderate and fluctuating on average between 11% and 15%. Note that in the context of Russia these inflation rates are seen as reasonably low. The economic growth had an ultimate effect on the well-being of individuals. The real income per capita increased from 2,281 rubles in 2000 to 15,000 rubles in 2008. The average unemployment rate decreased to 6.2% by 2008 compared with 7.1% in France, 5.6% in the UK and 7.1% in Germany (see World Development Indicators, 2019). The economic growth in Russia had a non-negligible impact on the well-being of Russian families in general, but poor households benefited from it relatively more. Gorodnichenko et al., (2010) documents that the economic growth had a pro-poor character.

This was the economic situation right before the financial crisis in 2008: stable GDP growth, financially stable economy, surplus of state budget, increase in real individual income and decrease in unemployment. In 2008 the financial crisis was spreading all over the world. Russia experienced massive after-math impacts of this crisis: increase in capital outflow, fall of oil prices by 35% and, thus, budget revenues, decrease in GDP by 26.4%, fall in real income per capita and rise in unemployment. This was the end of economic growth and the beginning of a bumpy-ride development.

Looking at the after-crisis period, we see a very uneven dynamics: fast and momentary economic recovery in 2010-2011, economic stagnation in 2012-2015, and even growth in 2016. It is not surprising to see that this dynamics follows ups and downs of oil price developments. This clearly tells us that the country's development is still strongly dependent on oil prices. Apart from this, it is difficult to tell how this dynamics affected the well-being of Russian families. On the one hand, figure 1 shows that since 2010 the real income per capita was on an increasing path and unemployment

rate – on decreasing. On the other hand, it is impossible to ignore the impacts of ongoing geo-political crisis, depreciating national currency and diminishing national budget on inequality and poverty in Russia.

In sum, despite a very unbalanced economic development during the last 30 years there has been a distinctive step in poverty and inequality reduction and improvement of well-being. Despite this good news, these are all good news to tell. We do not know much about future policies in Russia. However, what we know is that there is still a long way towards more equality and poverty reduction.

### **3. DATA OVERVIEW**

The goal of this paper is to measure and explain changes in income inequality and poverty among individuals in Russia. For this analysis we need a reliable source of data that collects information on income, its sources and various households and individual characteristics such as number of women, pensioners, children, educational qualification, employment status, type of employment, etc. Therefore, survey data is our principal source of evidence. In addition to the above-mentioned criterion, we need a survey that is conducted on a regular basis for a long time period. This would allow us to concentrate on long-term changes in income distribution and its impacts of different determinants on it. For this reason, we do not consider the National Survey of Household and Program Participation (NOBUS) as potential data source. Based on the requirements and availability, we are left with two options: Rosstat Household Budget Survey (HBS) and the Russia Longitudinal Monitoring Survey (RLMS-HSE).

#### **3.1. Data Availability**

The HBS is a survey conducted by the Federal Statistical Service of Russia on annual and quarterly basis. The survey is designed to monitor consumption, expenditures, well-being and living conditions of Russian households across the whole country. It is a cross-sectional dataset that contains information on income, consumption, expenditures, and living conditions on household level. This is the source that is used to construct poverty and inequality indices published by Russia's statistical agency. An indisputable advantage of the HBS that it aims to survey 45,000 households in all 85 Russia's regions and, therefore, it is a nationally and regionally representative survey. Furthermore, it includes extremely large questionnaire on consumption and expenditures. The publicly available data covers time span 2003-2015.

On one hand, the HBS seems to be an appropriate data source. However, like many survey data it has its disadvantages too. The most important feature of the HBS is that the main variable of interest, income, is not collected, but constructed using expenditures and flow of funds information. As we aim to understand trends in inequality and poverty measured by household income, making an analysis with income variable constructed from expenditure data might bias our results. Additionally and not least importantly, the information on individual characteristics is very limited: no data on employment status neither on education of individuals. Thus, using this survey we would not be able to quantify effects of changes in socio-demographic

characteristics and labour market outcomes on inequality and poverty trends. For all other limitations including inequality indices based on model estimations and relatively over-representativity of small regions (Yemtsov, 2008).

For very long time the only source of data on Russia for many researchers was the RLMS-HSE (National Research University “Higher School of Economics” and OOO “Demoscope” together with Carolina Population Center, 2019). This survey is managed by the Carolina Population Center, the University of North Carolina and the Higher School of Economics in Moscow. It is a household panel and cross-sectional survey that is conducted annually since 1994 with the exception in 1997 and 1999. It aims to survey households in 38 out of 85 regions in Russia. This still accounts for 96% of the whole Russian population (Kozyreva, Kosolapov, & Popkin, 2016). This means that it is a nationally, but not regionally representative survey. Additionally, the RLMS-HSE survey measures a wider range of socio-economic variables than the HBS. It includes detailed individual and household information such as educational qualification, employment, type of employment and many others. The data is available on household and individual levels (including adults and children).

Here comes a question: should the RLMS-HSE be a preferred source over the HBS and other way around? The RLMS-HSE was never designed to substitute the HBS, but to capture as much variation as possible (Kozyreva et al., 2016). This has resulted in higher between households inequality in comparison to the HBS. The RLMS-HSE is indeed a small survey compare to the HBS and, thus, it is prone to data contamination issues.

Despite the disadvantages of the RLMS-HSE, we regard it as the most reasonably suitable data source, as it provides sufficiently rich information on income and its different sources along with a wide range of individual and household characteristics over the last 20 years. These aspects of the data are very crucial for our study because the more data we have on household and individual levels, the better our understanding of changes in inequality and poverty in Russia is. Following this logic, the analysis would be impossible by using the HBS data. Additionally, we do not aim to explain regional differences and, thus, the issue of non-regional representativity is not relevant for this paper.

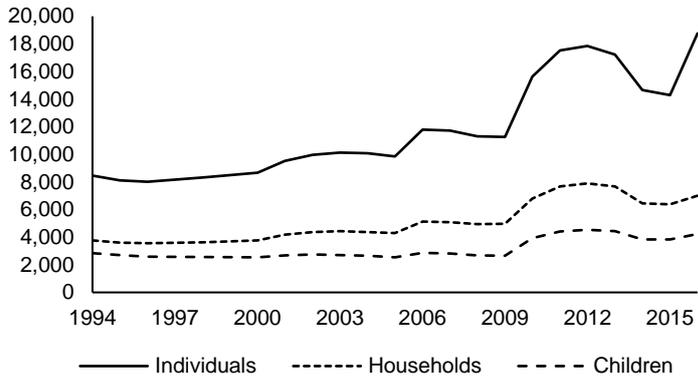
### **3.2. Data Description**

Our dataset includes 20 waves from 1994 to 2015. The RLMS-HSE was not conducted in 1997 and 1999 due to a lack of financing and, thus, we miss data for these years. The variable of interest is total household net income. Total net income includes all private sources of income, state transfers minus household taxes and debts. We adjust the net total income by inflation and regional price differences, as prices vary greatly on a regional level in Russia. To do so, we use consumer price indices for 38 regions for 20 years and converted this index to price levels of Moscow in 2015. As a result, all the income values are expressed in prices of Moscow in 2015.

The units of our analysis are household individuals. This means that we create a dataset of individuals from household data and merge it with individual data. Doing so we add such information as educational qualification, employment type, race etc.

According to the RLMS-HSE survey, households are defined as a group of people living together in a given domicile and share a common income and expenditures. It also includes unmarried children under 18 years of age who were temporarily absent in the household.

In Graph 2, we present basic descriptive statistics for the cross-sectional part of the RLMS-HSE. Like any survey, the RLMS-HSE has undergone changes in its survey design. Particularly in case, there was a sample refreshment in 2010 which has resulted in 1600 new households entering the survey in 2010. Given the fact that the RLMS-HSE is a small survey, this is a considerable increase in sample size. We document changes in 2010 that cannot be explained by anything else rather than sample refreshment. The changes have affected trends in families' characteristics. We observe that in 2010 in the RLMS-HSE survey there were proportionally less pensioners and more children than before. This affects dynamics of family composition and, correspondently, dynamics of income, inequality and poverty. Despite this change, trends before and after 2010 follow parallel dynamics. This means that the explanatory power of these variables remain the same.



**Figure 2** Participation of households, individuals in the RLMS-HSE. Source: own calculations based on the RLMS-HSE.

Overall inequality and poverty are measured in terms of household disposable income which is defined in the following way:

$$Y = \frac{\text{Household Income}}{(1 + \alpha * (N_{adults} - 1) + \beta * N_{children})^q} \tag{1}$$

As basis we use the total household monthly income. This information is taken from the total household income variable constructed by the RLMS-HSE. Then we redistribute this income across all household members using the OECD modified equivalence scale. According to this scale the head of household receives a weight of 1.0 (refers to  $q$ ), further household members over 14 years receives a weight of 0.5 (refers to  $\alpha$ ) and those under 14 years are assigned with a weight of 0.3 (refers to  $\beta$ ). This means that in our dataset all individuals receive a net total income that is adjusted by status in household and/or age. We have both individual (such as education and type of job) and household (such as consumption data and expenditures data) information for each individual. Note that all individual and household characteristics

described in the dataset is what individuals and households report about themselves by themselves.

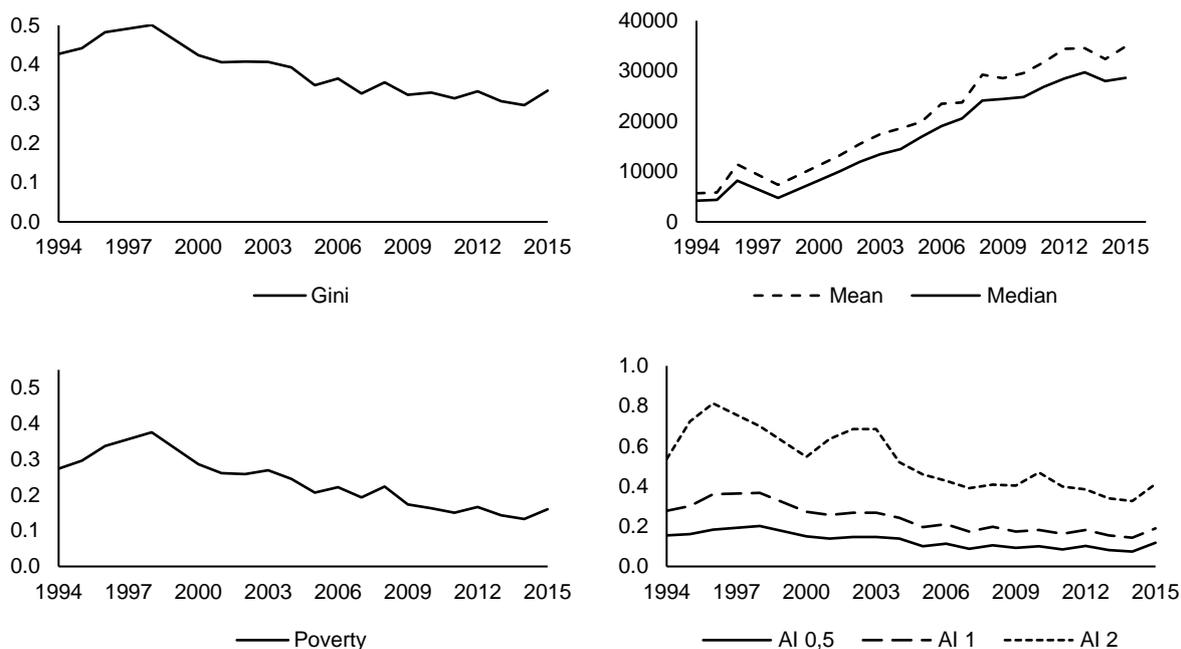
### **3.3. Data Validity**

We believe that rich Russians are under-represented in the RLMS-HSE data, and that this affects our inequality and poverty estimates. Nevertheless, our Gini estimates are generally consistent with estimates from previous studies (see figure A1 in Appendix): the inequality trends are similar, though the levels are different. In addition, in this study we use the inequality estimates that are not too sensitive to the top income. Nevertheless, in the next section we correct the data via fitted Pareto distribution to tackle the issue of „missing rich“ and, thus, improve the reliability of estimates.

### **3.4. Overall Trends**

Before turning to the empirical analysis of inequality, we present aggregate trends of key variables describing the socio-economic behavior of Russian households. Figure 3 displays the development of income inequality and poverty over the period 1994-2015 using different welfare indicators: mean and median income, Gini index, Atkinson index (AI) with different degrees of society aversion to inequality and relative poverty rate. We include different measures to allow for less biased understanding of inequality and poverty. Gini index is the most common measure of income inequality which varies from 0, a state of absolute equality, to 1, absolute inequality. The Atkinson index shows a percentage of income that society would have to give up to have more equal income among different individuals. Societies might have different attitudes towards inequality which itself affects inequalities too. Therefore, different degrees of aversion are introduced, where higher values denote higher willingness to redistribute. Poverty rate represents a percentage of people living with less than 50% of average income in the RLMS-HSE survey.

The first thing to notice is that the overall evolution is quite similar: first, income inequality increased reaching its peak in 1998, then it was decreasing, and finally it appears to be on its way to regaining its pre-2008 crisis levels. Note that the Gini coefficient reached its historical maximum in 1998, while peak of Atkinson index (2) occurred in 1996 and poverty rate – in 1998. This indicates that low and upper tails of income distribution experienced fall in income at different points of time. This goes in line with previous evidence (Novokmet et al., 2018). Income levels rise tremendously and continuously since the fall of the Soviet Union: from small values in the 90s to high values in 2015. Median income lies below average income, which means that majority of Russians have less than the average income and that income of the very rich is pushing the average income up.



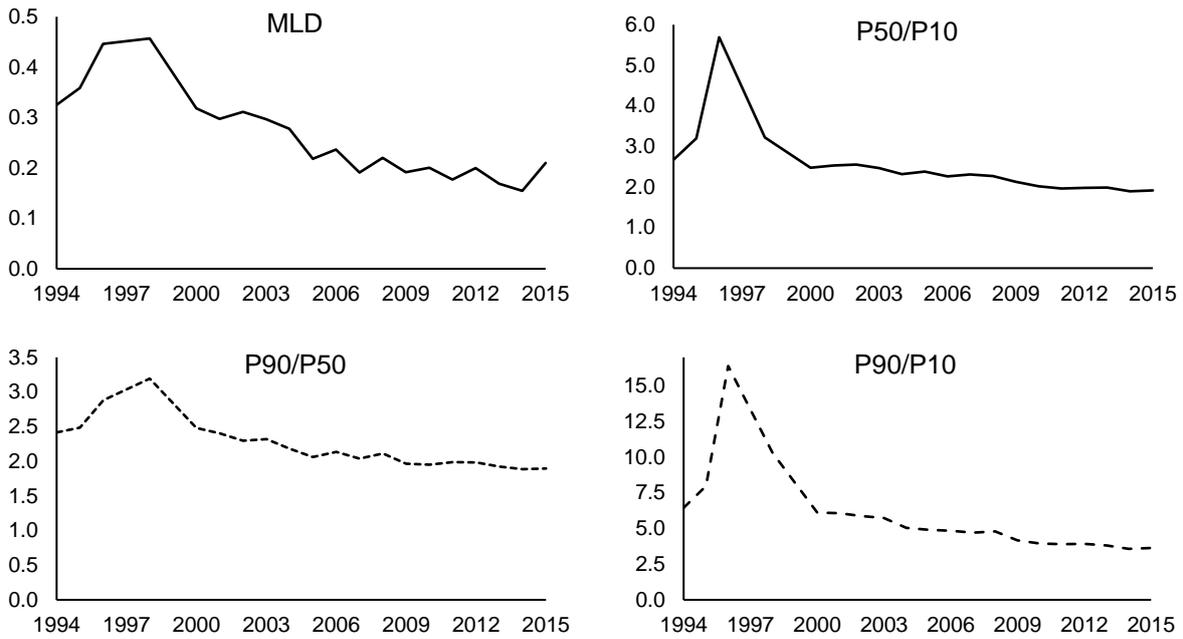
**Figure 3** Inequality and poverty trends in Russia: 1994-2015.

**Source:** RLMS-HSE, own calculations.

**Note:** Income is measured as total net household monthly income adjusted to the household size and regional differences. We excluded eight households with suspiciously high reported total income in 2008.

Seeking to understand welfare dynamics better, we also present more socio-economic indicators. Figure 4 illustrates dynamics of the mean log deviation measure (MLD) and different ratios of income percentiles. The MLD measure is another measure, which belongs to the class of generalized entropy measures. It is more sensitive to the changes at the lower tail of distribution. Percentile ratio means exactly what is said: ratio of different income percentiles. It is a simple, easy to understand and interpret inequality measure.

The dynamics of the above-described measures is very similar compared to what we documented above: first, income inequality increased reaching its maximum in 1998, and, then, decreased. The MLD index depicts dynamics that is very similar to the Gini and poverty rate, though the levels are different. After reaching its peak in 1998 the MLD decreased more than the Gini index. This is a sign of more equality at the bottom of distribution. The percentile ratios, however, have a similar but at the same time different pattern. The percentile ratio between median income, that is P50, to the lowest percentile, P10, reached its maximum in 1996. A similar pattern holds for the ratio between the highest income percentile, P90, and the lowest. Interestingly, the percentile ratio between the highest and the median income gained its highest value in 1998. This confirms the fact that individuals at the low tail of income distribution lost its shares in 1996, while individuals at the top of income distribution experienced most dramatic decline in income shares in 1998.



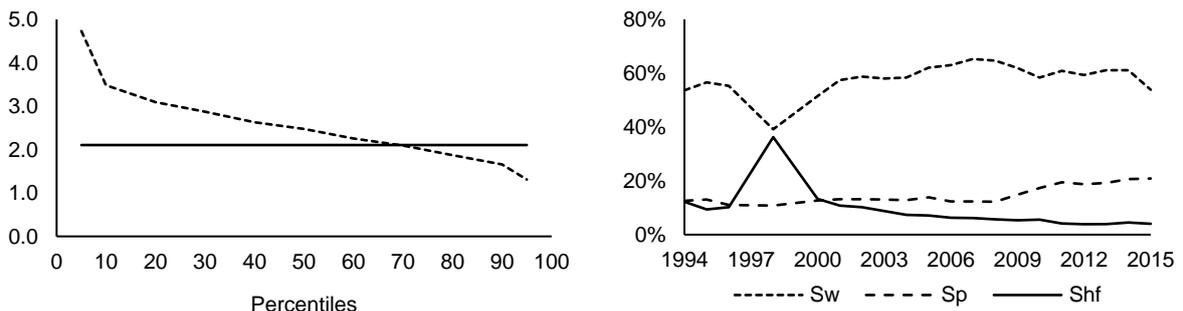
**Figure 4** Inequality and poverty trends in Russia: 1994-2015.

**Source:** RLMS-HSE, own calculations.

**Note:** Income is measured as total net household monthly income adjusted to the household size and regional differences. We excluded eight households with suspiciously high reported total income in 2008. MLD stands for mean log deviation.

After analyzing basic measures of inequality and poverty, it is clear that income below and above median behave differently. Therefore, figure 5 depicts growth incidence curves (GIS) and changes in total household income composition. The GIS is a tool to capture graphically income growth for every percentile of income distribution: from P5 to P95. The second graph shows importance of different income sources in total household income.

Growth of the income below P70 was higher than the growth rate of the average income. The income of the lowest 5 percentiles increased by 5 times from 2000 to 2015, while the richest 5 percentiles – by twice. This indicates that the economic growth in Russia had a pro-poor nature. The main source of income for households in Russia is wages with pensions occupying the second place. However, home food production is also important, though it loses its importance. In 1998, very difficult year for many families in Russia, households experienced a fall and delays of real wages, which was compensated by home food production. State benefits occupy insignificant share in total household income.

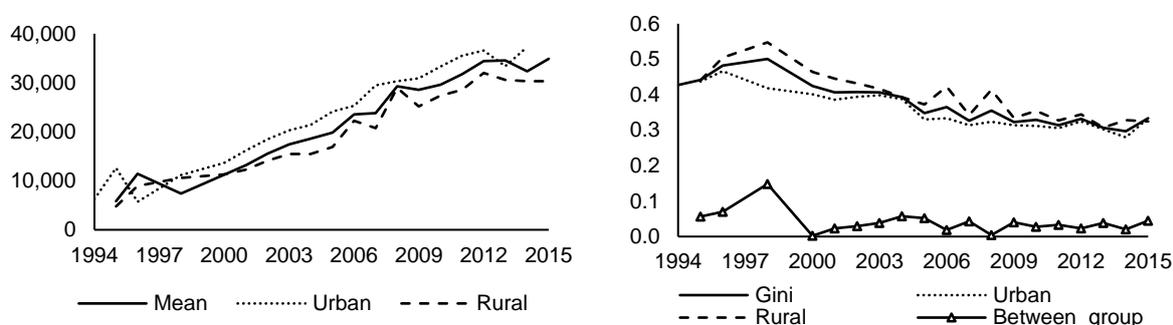


**Figure 5** Growth incidence curve 2015/2000 (left-hand) and dynamics of different income sources (right-hand) in Russia: 1994-2015.

**Source:** RLMS-HSE, own calculations.

**Note:** Income is measured as total net household monthly income adjusted to the household size and regional differences. We excluded eight households with suspiciously high reported total income in 2008. The share of wages (Sw) is the share of average wages in average total household disposable income. Similar logic applies to the share of pensions (Sp) and share of home food production (Shf). The GIS represents income growth at different income percentiles between 2015 and 2000 years.

As prices and life standards vary greatly across the country, inequality and poverty dynamics might differ as well. Below we present dynamics of average income, the Gini coefficient in urban, rural areas and between group Gini index. Naturally, the average income in urban settlements is higher than in rural. Graph 6 shows that both of the income are very close to the values of the average income and that they follow the same pattern. Therefore, we assume that based on the RLMS-HSE there are no significant differences in income trends between rural and urban areas in Russia.



**Figure 6** Regional perspective on inequality and poverty in Russia: 1994-2015.

**Source:** RLMS-HSE, own calculations.

**Note:** Income is measured as total net household monthly income adjusted to the household size and regional differences. We excluded eight households with suspiciously high reported total income in 2008. The RLMS-HSE distinguishes between rural, urban and PGT types of settlement. We make two groups by adding PGT to rural type. PGT (poselok gorodskogo tipa) means city-type village. No data on settlement type is available for 1994.

At this stage, the following conclusions can be drawn regarding the well-being in Russia over the past 20 years. Firstly, we see an overall decrease of income inequality, poverty and different ratios of income percentiles. For example, the Gini index decreased from 0.43 to 0.33, while the ration between 90<sup>th</sup> and 10<sup>th</sup> percentiles decreased from 6.5 to 3.6 in 15 years. Similarly, the share of individuals below the poverty line of 50 percent of the mean equivalized income fell from 27% in 1994 to 16% in 2015, excluding the jump in 1998. Secondly, the income inequality measured by the Gini index reached its peak in 1998, while the low tail of income distribution lost its shares already in 1996 and the top income shares – in 1998. Based on this, we conclude that different parts of distribution react differently on macroeconomic shocks. Thirdly, we document a continuous increase in income levels (median and average). Fourthly, regional analysis of income dynamics does not reveal significant income differences, and thus, this will not be taken into account for the future analysis.

We find that the socio-economic well-being of Russians has changed considerably since the last decade. Consequently, we come to the main question of the study: what are the determinants of these changes?

#### **4. POSSIBLE DETERMINANTS**

In this section, we provide a discussion of possible sources of changes in income inequality and poverty in the Russian Federation. Figures 3-4 from the previous section show fall in inequality and poverty measured by total household disposable income. Therefore, we aim to identify factors that have resulted in changes in household income. We carefully select our explanatory factors and divide them into three main groups: socio-demographic (household type, number of children, number of women, age structure etc.), labour market participation (employment status and employment type) and labour market returns (different sources of income such as wages, pensions, home food production etc.). Note that below we focus only on those factors that changed most during analyzed period and, therefore, most likely to be the candidates of observed changes.<sup>1</sup>

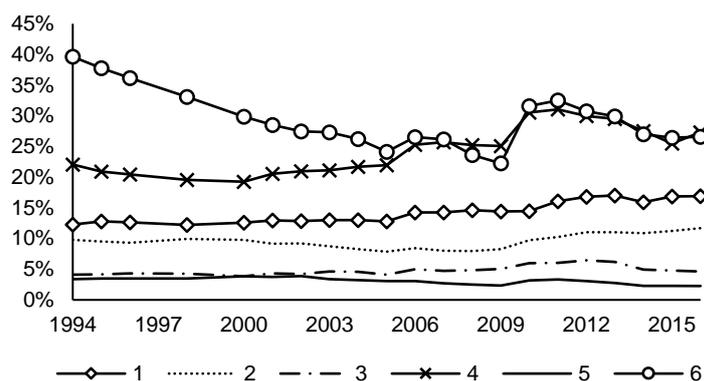
##### *Group 1: Changes in household types*

Naturally, any household can change its household type from year to year. Given that income within a household is pooled together, we expect that different household types differ in their income, and, thus, changes in household types might explain a change in the overall distribution. We distinguish 6 types of households: type 1 - single pensioner, type 2 - multiple pensioners, type 3 - single adult without children, type 4 - multiple adults without children, type 5 - single adult with children, type 6 - multiple adults with children. This means that every household is assigned to a particular household type according to its composition.

Dynamics of household types is depicted on figure 7 below. We see that, indeed, households change their structure over time. We observe a remarkable decrease in the population share of multiple adults with children and, correspondently, an increase in the share of multiple adults without children. We also document an increase in the share of households consisting of single pensioners. Additionally to this evidence, we document a tendency towards smaller families up to two members. Similar tendencies were found in other countries (Biewen et al., 2017; Ferreira et al., 2017).

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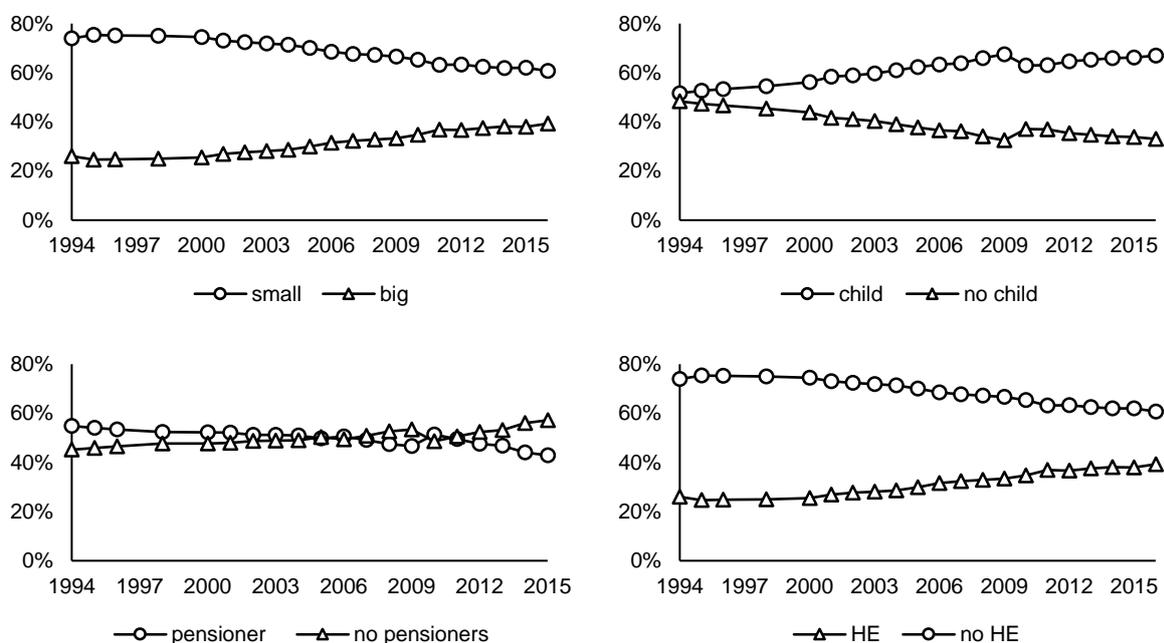
<sup>1</sup> We checked carefully the dynamics of all the possible household and individual characteristics including different age groups, educational qualification, working industry, share of students, share of housewives, every income source and many others. We do not include those the characteristics that do not change from 1994-2015 and rather focus on those that changed. Similar approach was implemented by other studies (see Biewen et al. (2017) for Germany; Hyslop & Maré (2005) for New Zealand; and others).



**Figure 7** Dynamics of family types in Russia 1994-2015.  
**Source:** RLMS-HSE, own calculations.

*Group 1(extended): Changes in other socio-demographic attributes*

Not only the composition of families has changed, but also its socio-demographic attributes (share of women, share of pensioners, share of disabled, educational qualification etc). Figure 8 depicts dynamics of family’s size, changes in age structure and improvements in educational qualification of the families. In particular, we document the following trends in socio-demographic characteristics of Russian households: towards smaller families with pensioners, less children, and with highly educated family members.



**Figure 8** Dynamics of socio-demographic indicators in Russia.  
**Source:** RLMS-HSE, own calculations.

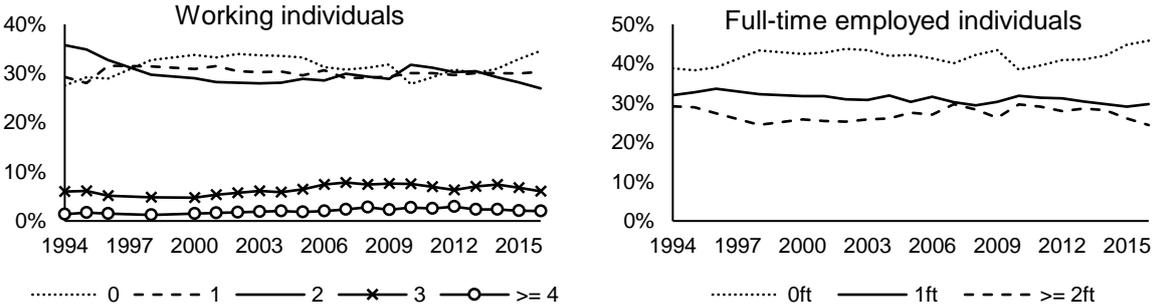
**Note:** Small families consist of up to two individuals. HE stands for highly educated individuals.

Since families tend to become smaller, with less children and, at the same time, more pensioners (changes in age structure), we expect that less income is shared among family members, and, consequently, inequality and poverty should be rising. Changes in educational qualification, that is rise in the share of household members with tertiary education, should result in increase in inequality as well, since not all the families improved its educational qualification, but only half. Therefore, the analysis of changes in socio-demographic characteristics revealed changes, which should have resulted in rise of inequality and poverty.

*Group 2: Changes in labour market participation*

The second group of factors responsible for falling inequality and poverty are changes in labour market participation. This include, for example, the share of employed individuals, the share of self-employed, working hours, the industry of employment and many others. These factors are important for analysis of inequality, as Russia experienced economic growth from 2000-2008. During this period, unemployment rate decreased from 10.6% to 5.6%, which accounts for 2.7 million of people entering the labour market and having positive income. Given that, we expect that this increase would have large and positive impacts on inequality and poverty, especially if the employment growth was concentrated in the lower part of the income distribution.

Figure 9 shows changes in share of employed and full-time employed individuals per family. The later one captures dynamics of working hours. These are factors that changed the most. For this reason, part-time labour participation is not included. We consider those to be full-time employed that work more than 120 hours at the first job. Note that these are the factors that changed most during this time period in Russia. We do not consider informal employment and working hours due to missing data.



**Figure 9** Dynamics of labour market determinants in Russia.  
**Source:** RLMS-HSE, own calculations.

**Note:** We consider people to be employed if: (a) they are currently working; or (b) they are on paid leave; or (c) they are on unpaid leave; or (d) they are self-employed; or (e) they are farmers. Those people that do not fall into one of these categories are considered to be non-working. For example, students, pensioners, actively and passively unemployed.

Evidence shows that following the fall of the Soviet Union, the share of unemployed households had risen, and after 2004 it is on a decreasing path. The share

of families with two and more employed individuals follow an opposite pattern: first, it had declined, and then increased.

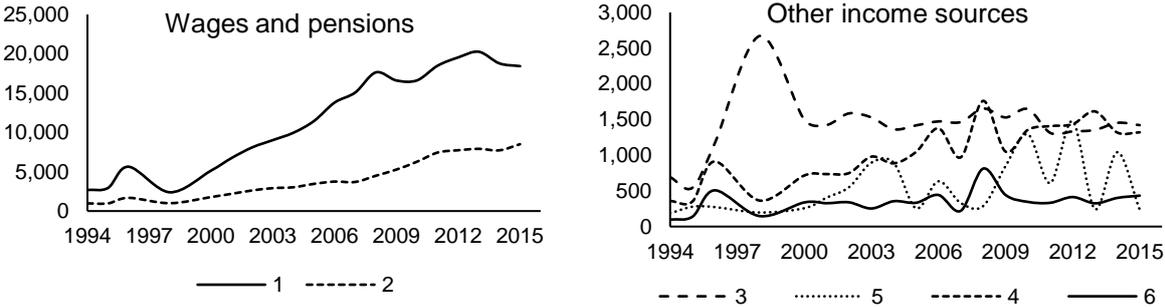
The full-time employment is not straightforward neither, though the pattern of one household member being full-time employed is stable. The pattern of no member and at least two member being full-time employed is correlated with economic stability of the country: increase in unemployment during the downturns and decrease – during the upturns.

Due to its direct link to the market returns we include changes in the labour market participation of the households to empirical analysis.

*Group 3: Changes in labour market incomes*

As the next group of factors, we consider changes in market returns. Market returns is a broad term, which might include such income as salaries, self-employment income, pensions, state transfers, capital gains and many others. Market returns has been growing since the collapse of the Soviet Union following the process of privatization. Dynamics of different income sources such as wages, pension and home food production are shown in figure 10. The RLMS-HSE survey allows to decompose total household income into more than 10 components including salaries, pensions, child benefits, unemployment benefits, help from other family members and many other. We check development of every income source and find that wages and pensions changed the most over the period (see right-hand graph on figure 10). However, we also include home-food production as the 3<sup>rd</sup> most important income source for many Russian households (see left-hand graph on figure 10). Any other income source into analysis due to its very small shares in total household income.

We find a persistent increase of average values of wages and pensions. The average home-food production, however, does not follow the same trend: it has remained stable after a sharp increase in 1998.



**Figure 10** Dynamics of average income sources in Russia.

**Source:** RLMS-HSE, own calculations.

**Note:** Income sources: 1 is earnings, 2 – pensions, 3 - home-food production, 4 – help from family / relatives, 5 – property sale, 6 – live stock sales. Income is measured as total net household monthly income adjusted to the household size and regional differences. We excluded eight households with suspiciously high reported total income in 2008.

Despite these clear dynamics of market returns, on the one hand, and, on the other hand, its complexity, it is very difficult to predict to which extend different sources of income contribute to the inequality and poverty trends of individuals. We include

wages, pensions and child benefits in the analysis of possible determinants as they have contributed to the decrease of poverty and inequality during the period.

Until now, we have documented trends in inequality and poverty and defined possible factors responsible for these trends. These factors are divided into 3 groups: socio-demographic characteristics, labour market outcomes and labour market returns. Are changes of these determinants are responsible for changes in inequality and poverty in Russia since 1994?

## 5. METHODOLOGY

To answer the above-defined question, we apply a semi-parametric reweighting method to explain a fall in inequality, poverty and rise in income levels. This method was proposed by DiNardo et al. (1995), and, therefore, it is known as DFL method. The main idea is to build counterfactual state of the world where defined determinants remain fixed in time, but other things change. We conduct this exercise for the three above-defined group of determinants: socio-demographic characteristics, labour market outcomes and labour market returns. We do this stepwise. Firstly, changes in socio-demographic characteristics of families are hold constant and new inequality and poverty measures are estimated. Then, changes in socio-demographic characteristic together with changes in labour market outcomes are tested. Finally, we come to the last step of the analysis where we keep market returns conditional on socio-demographic characteristics and labour market outcomes constant. By keeping possible influence factors constant, we quantify the effect of these factors by eliminating their effects on total inequality and poverty. When interpreting the results, one should ask a question: what would happen to inequality and poverty if a particular factor would not change?

The DFL decomposition we apply in this paper has its limitations too. Firstly, it might be sensitive to the order of determinants. We argue that the order of determinants introduced in the paper is reasonable: starting with pre-determinants such as socio-demographic characteristics of households, following with employment characteristics and finishing with market income. Analyzing the effects of income sources before checking impacts of different household and individual characteristics might be illogical.

Secondly, the method does not account for interaction between groups of determinants. However, the DFL is generally acknowledged as a reasonable approach for detecting the main drivers of distributional changes (see Fortin, Lemieux, & Firpo ,2011).

### *Group 1: Changes in socio-demographic characteristics*

At the first stage of the decomposition, we consider changes in socio-demographic characteristics only. More specifically, suppose we are interested in estimating changes in the distribution of income between two periods (period  $0$  and period  $t$ ) and we relate these changes to shifts in household characteristics. Then the counterfactual distribution in which distribution of household characteristics as in period  $0$ , but everything else change over time (period  $t$ ) is given by:

$$f_{cf} = f_{tj}(y | t_x = 0) = \int_x f_{tj}(y|x) dF_{0j}(x) \quad (2)$$

, where  $f_{tj}$  is income distribution of households  $j$  in period  $t$ ,  $t_x = 0$  denotes the distribution of household characteristics in period  $t = 0$ . The actual distribution of income in the base period would be given as  $f_0(y | t_x = 0)$ . At this stage of the decomposition the household income distribution is explained only by socio-demographic characteristics that changed over the analyzed period: household type, family's size, age structure and educational qualification.

### *Group 2: Changes in socio-demographic characteristics and employment outcomes*

The second stage of our decomposition considers changes in distribution of socio-demographic characteristics  $x$  and changes in labour market outcomes  $e$  conditional on the characteristics  $x$ . The counterfactual distribution is the distribution where we keep distribution of socio-demographic characteristics  $x$  and distribution of labour market outcomes  $e$  conditional on these characteristics as in the period 0. That is

$$\begin{aligned} f_{cf}(y | t_x = 0, t_e = 0) &= \int_e \int_x f_{tj}(y|x, e) dF_{0j}(e|x) dF_{0j}(x) \\ &= \int_e \int_x f_{tj}(y|x, e) \left[ \frac{dF_{0j}(e|x)}{dF_{tj}(e|x)} \right] dF_{tj}(e|x) \left[ \frac{dF_{0j}(x)}{dF_{tj}(x)} \right] dF_{tj}(x) \\ &= \int_e \int_x \Psi_{x|j} * \Psi_{e|x,j} * f_{tj}(y|x, e) dF_{tj}(e|x) dF_{tj}(x) \end{aligned} \quad (3)$$

, where  $\Psi_{x|j}$  and  $\Psi_{e|x,j}$  are reweighting factors, that can be rewritten as

$$\Psi_{x|j} = \frac{P_j(x|t = 1)}{P_j(x|t = 0)} = \frac{P_j(t = 1|x) * P_j(t = 0)}{P_j(t = 0|x) * P_j(t = 1)} \quad (4)$$

$$\Psi_{e|x,j} = \frac{dF_{1j}(e|x)}{dF_{0j}(e|x)} = \frac{P_{1j}(e|x)}{P_{0j}(e|x)} \quad (5)$$

At this stage of the DFL decomposition we aim to answer the following question: what would have happened to the income inequality and poverty in Russia if socio-demographic characteristics and labour market outcomes would remain as in the base year?

### *Stage 3: Changes in market returns*

Now we consider changes in market returns. The counterfactual distribution of total household income in period  $t$  accounting for the expected change in market income (wages, pensions and home-food production) due to changes in individual and household characteristics together with labour market outcomes is given by:

$$y_{jt}^{cf} = y_{jt}^{total} - y_{jt}^{earn} * \left( 1 - \frac{\hat{y}_{j0}^{earn}(x_{jt})}{\hat{y}_{jt}^{earn}(x_{jt})} \right) \quad (6)$$

,where  $y_{jt}^{total}$  is total household income of household  $i$  in period  $t$ ,  $y_{jt}^{earn}$  are earnings (wages, pensions or home-food production) of individual  $j$  in period  $t$ ,  $\hat{y}_{jt}^{earn}(x_{jt})$  are expected earnings of individual  $j$  in period  $t$  due to changes in individual and household characteristics (1<sup>st</sup> group of determinants) and labour market outcomes (2<sup>nd</sup> group of determinants). We estimate this equation for three income sources (wages, pensions and home-food production).

When expected earnings of the base year is equal to expected earnings in period  $t$ , then counterfactual distribution becomes equal to actual. At this stage of the DFL decomposition, we consider changes in different income sources separately. This means that we keep levels of wages, for example, as in the base year and see what changes it brings to the income distribution. The question we aim to answer is: What would happen to income distribution if particular income sources would not change its values?

The analysis of the overall trends in the previous section revealed a continuously sharp increase in levels of income. The increase in levels of real income sources combines many different things together: real monetary increase, increased returns to particular individual (and household) characteristics and increased share of the particular income source in the total household income. As we aim to understand mechanisms behind changes in inequality and poverty, it is important to analyze these contributions separately. Therefore, we consider two further modifications of the counterfactual distribution.

Firstly, a real increase in income levels is taken into account. Figure 3 shows a sharp increase in average wages and pensions since 1994. How would the income distribution look like if income levels are leveled-off? Counterfactual distribution where inequalities in levels are eliminated is given by:

$$\begin{aligned} y_{jt}^{cf} &= y_{jt}^{total} - y_{jt}^{earn} * \left( 1 - \frac{\frac{\hat{y}_0^{earn}(x_{jt})}{\mu_0}}{\frac{\hat{y}_t^{earn}(x_{jt})}{\mu_t}} \right) \\ &= y_{jt}^{total} - y_{jt}^{earn} + y_{jt}^{earn} * \frac{\hat{y}_0^{earn}(x_{jt})/\mu_0}{\hat{y}_t^{earn}(x_{jt})/\mu_t} \\ &= y_{jt}^{total} - y_{jt}^{earn} + y_{jt}^{earn} * \frac{\hat{y}_0^{earn}(x_{jt})}{\hat{y}_t^{earn}(x_{jt})} * \frac{1}{\mu_0/\mu_t} \end{aligned} \quad (7)$$

, where  $\mu_0$  is average total household income in base period,  $\mu_t$  is average total household income in period  $t$ . We estimate this equation for three income sources (wages, pensions and home-food production). A term earnings represent different income sources (wages, pensions and home-food production). The difference between

equation 7 and 6 is the term  $\frac{1}{\mu_0/\mu_t}$ . It represents inverse relation between average household income in the base year and in any other year. By multiplying the equation 6 we consider real income growth between two periods of time and let the real income raise by the inverse value of average income of these two periods. This allows us to compare income from different years despite differences in real levels.

Secondly, we take into consideration inequalities in returns to individual characteristics which affects income sources. Figure 10 shows that wages were increasing much faster than pensions and home-food production. Therefore, by increasing “new income source” by the total average household income we may under or overestimate inequality and poverty (see equation 7). Counterfactual distribution where earnings are unchanged and inequalities in different returns to individual characteristics are eliminated is given by:

$$\begin{aligned}
y_{jt}^{cf} &= y_{jt}^{total} - y_{jt}^{earn} * \left( 1 - \frac{\frac{\hat{y}_0^{earn}(x_{jt})}{\mu_0^{earn}}}{\frac{\hat{y}_t^{earn}(x_{jt})}{\mu_t^{earn}}} \right) \\
&= y_{jt}^{total} - y_{jt}^{earn} + y_{jt}^{earn} * \frac{\hat{y}_0^{earn}(x_{jt})}{\hat{y}_t^{earn}(x_{jt})} \\
&\quad * \frac{1}{\mu_0^{earn} / \mu_t^{earn}}
\end{aligned} \tag{8}$$

, where  $\mu_0^{earn}$  is average income in base period,  $\mu_t^{earn}$  is average income in period  $t$ . This equation takes into account real growth of income sources, which might be different from growth of total household income. The term  $\frac{1}{\mu_0^{earn} / \mu_t^{earn}}$  accounts for income growth which happened between two periods for particular income source.

Thirdly, increase in income sources might be due to increased importance of this source in total household income. We rewrite the equation 8 in the following manner so that the changes in shares of income sources are taking into account:

$$\begin{aligned}
y_{jt}^{cf} &= y_{jt}^{total} - y_{jt}^{earn} * \left( 1 - \frac{\frac{\hat{y}_0^{earn}(x_{jt}) / \mu_0^{earn}}{\hat{y}_t^{earn}(x_{jt}) / \mu_t^{earn}}}{\mu_0^{earn} / \mu_t^{earn}} \right) \\
&= y_{jt}^{total} - y_{jt}^{earn} + y_{jt}^{earn} * \frac{\hat{y}_0^{earn}}{\hat{y}_t^{earn}} * \frac{\mu_t^{earn}}{\mu_0^{earn}} * \frac{\mu_t}{\mu_0} * \frac{\mu_0}{\mu_t} \\
&= y_{jt}^{total} - y_{jt}^{earn} + y_{jt}^{earn} * \frac{\hat{y}_0^{earn}}{\hat{y}_t^{earn}} * \frac{\mu_t}{\mu_0} * \frac{\mu_t^{earn}}{\mu_0^{earn} / \mu_t}
\end{aligned} \tag{9}$$

, where  $\frac{\mu_t}{\mu_0}$  is difference in levels as in equation 7,  $\frac{\mu_t^{earn}}{\mu_t}$  represents a share of particular income source in total household income in period  $t$ ,  $\frac{\mu_0^{earn}}{\mu_0}$  – a share in period 0. This suggests that the equation 9 equalize income levels to the income growth of the average income source, on the one hand, and to the income growth of the average household income and changes in shares of income sources, on the other hand.

The above described equations 7-9 allow to distinguish changes in income distribution that are due to changes in income levels, changes in different returns and changes in shares of income sources in total household income. Keep in mind, that equations 8 and 9 are identical. Therefore, the exact decomposition of the changes in market returns will be conducted in two additional steps (equation 7 and 8).

Despite a switch from progressive to flat income tax rate in 2001, we do not include taxes in the counterfactual analysis. The period before the tax system change is known for massive tax evasion (see Gorodnichenko, Martinez-Vazquez, & Sabirianova Peter, 2009; Ivanova, Keen, & Klemm, 2005) and informal employment, especially in rural areas. Thus, adding taxes into the analysis would bias the results.

## 6. EMPIRICAL RESULTS

In this section we decompose the overall income distribution into its various components. We keep some determinants fixed at the level of the base period 0, but hold everything else as in period  $t$ . 2000 year is the base year. The results presented below are robust to the chosen base year. Replication of the counterfactual analysis with different base years can be found in the Appendix.

The following determinants are considered and added step by step in the same order: socio-demographic determinants (family type, family size, share of children, share of pensioners, share of individuals with tertiary education), labour market outcomes (share of working individuals, share of full-time employed) and labour market returns (salaries, pensions, home-food production). Adding the possible determinants gradually allows us to see the marginal effect of every factor. We believe this technique is close to what one has in mind when asking about possible factors of change in the income distribution.

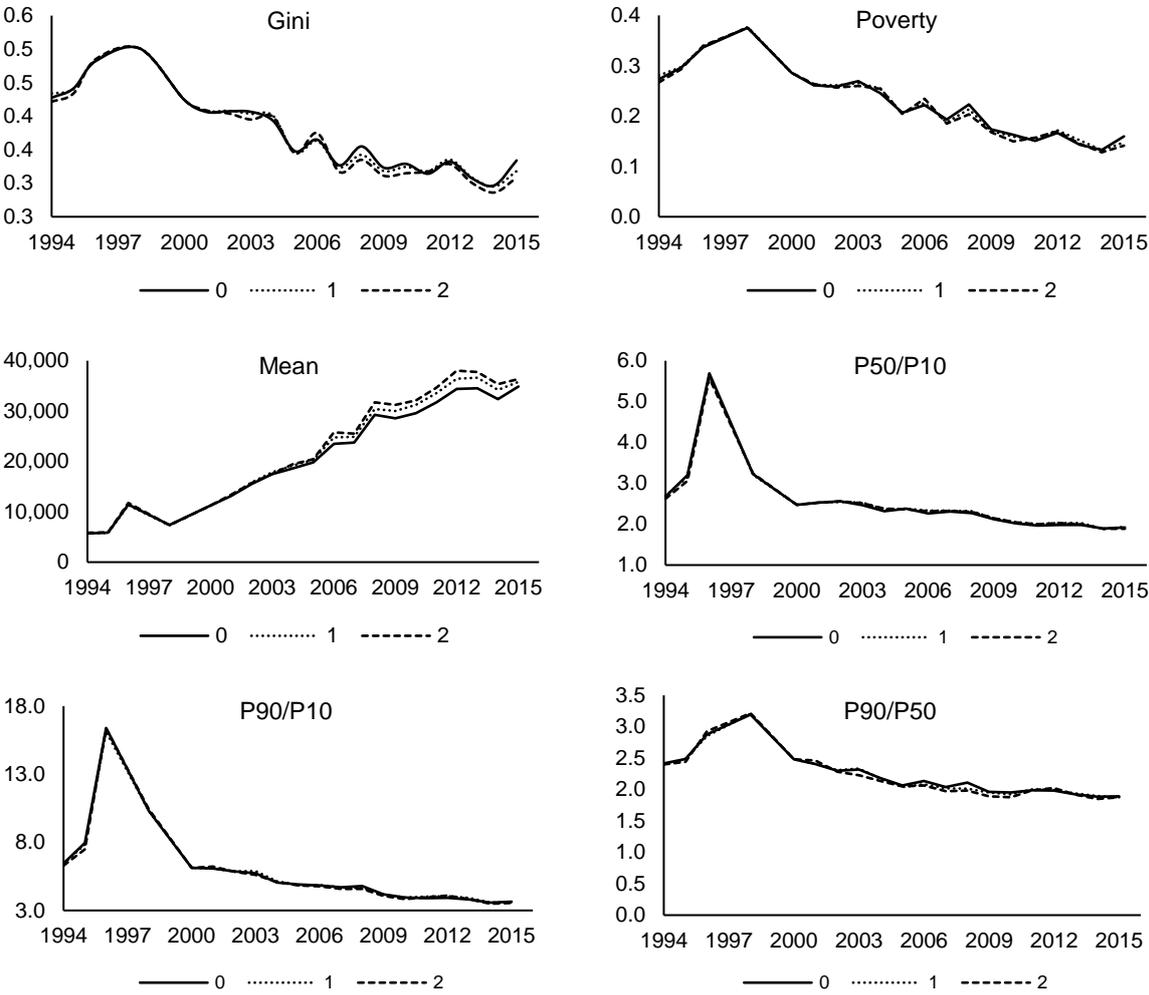
### 6.1. Effects of possible determinants

We begin with presenting the results for the first two groups of factors; changes in socio-demographic characteristics and labour market outcomes. The figure shows an actual distribution of income (black line) and two different scenarios (red and blue lines) using 2000 as the base year. The two counterfactual distributions of income, are constructed as follows; the red line shows the income distribution that would prevail if socio-demographic characteristics of Russian households are held fixed at its period 0 level, whereas the blue line illustrates what would have happened to the distribution of income if socio-demographic characteristics, together with labor market outcomes keep their values as in the base year, but everything else would change. When reading these graphs, it is important to keep in mind that dynamics of labour market outcomes

and socio-demographic factors should have resulted in an increase in income inequality and poverty.

Figure 11 depicts two counterfactual analysis: 1 – income distribution with socio-demographic characteristics as in 2000, 2 – income distribution with socio-demographic characteristics and labour market outcomes as in 2000. When reading these graphs it is essential to answer the following question: what would happen to the income distribution if a group of determinants would remain as in 2000?

Figure 11 shows that keeping the socio-demographic characteristics of Russian households constant does not affect the income distribution. Bringing labour market outcomes conditional on the socio-demographic characteristics of households stretches the Gini index and the poverty rate slightly downwards, and lift the mean income up. The percentile ratios are not affected by changes in these determinants.



**Figure 11** Changes in socio-demographic characteristics and labour market outcomes.

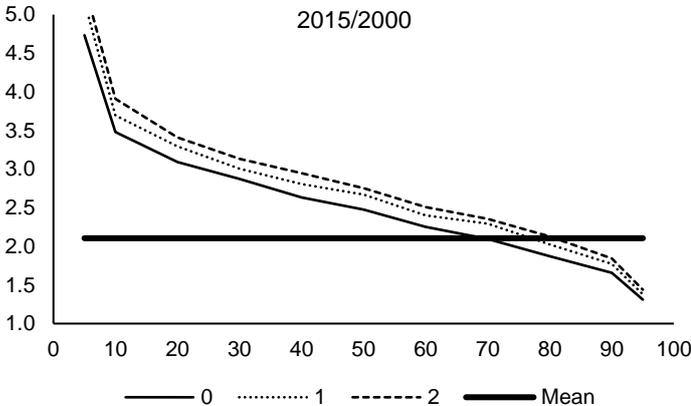
**Source:** RLMS-HSE, own calculations.

**Note:** 0 stands for actual distribution, 1 – for distribution with constant socio-demographic characteristics, 2 – for distribution with constant labour market outcomes. Income is measured as total net household monthly income adjusted to the household size and regional differences.

In addition to the overall trends in inequality and poverty, we show growth incidence curve (GIC) on figure 12. It represents the income growth (y-axis) of different

percentile ratios (x-axis) which happened from 2000 to 2015. Households below 70 percentiles experienced income growth above the average income. This growth would be higher if socio-demographic characteristics and labour market outcomes would remain as in 2000. In other words, these two groups of determinants were developing in a way (smaller families with more pensioners, less children, more individuals with tertiary education and changes in uneven changes in labour market employment) which decreased income levels between 2000 and 2015.

The results of the first two groups of determinants suggest that changes in income inequality and poverty cannot be explained by changes in socio-demographic characteristics and labour market employment. Previous studies on decomposition show that a much longer time period is needed to see the larger impacts of non-economic determinants (Biewen et al., 2017; Ferreira et al., 2017; Fiorio, 2006).



**Figure 12** GIC for 2015/2000.

**Source:** RLMS-HSE, own calculations.

**Note:** 0 stands for actual distribution, 1 – for distribution with constant socio-demographic characteristics, 2 – for distribution with constant labour market outcomes. Income is measured as total net household monthly income adjusted to the household size and regional differences.

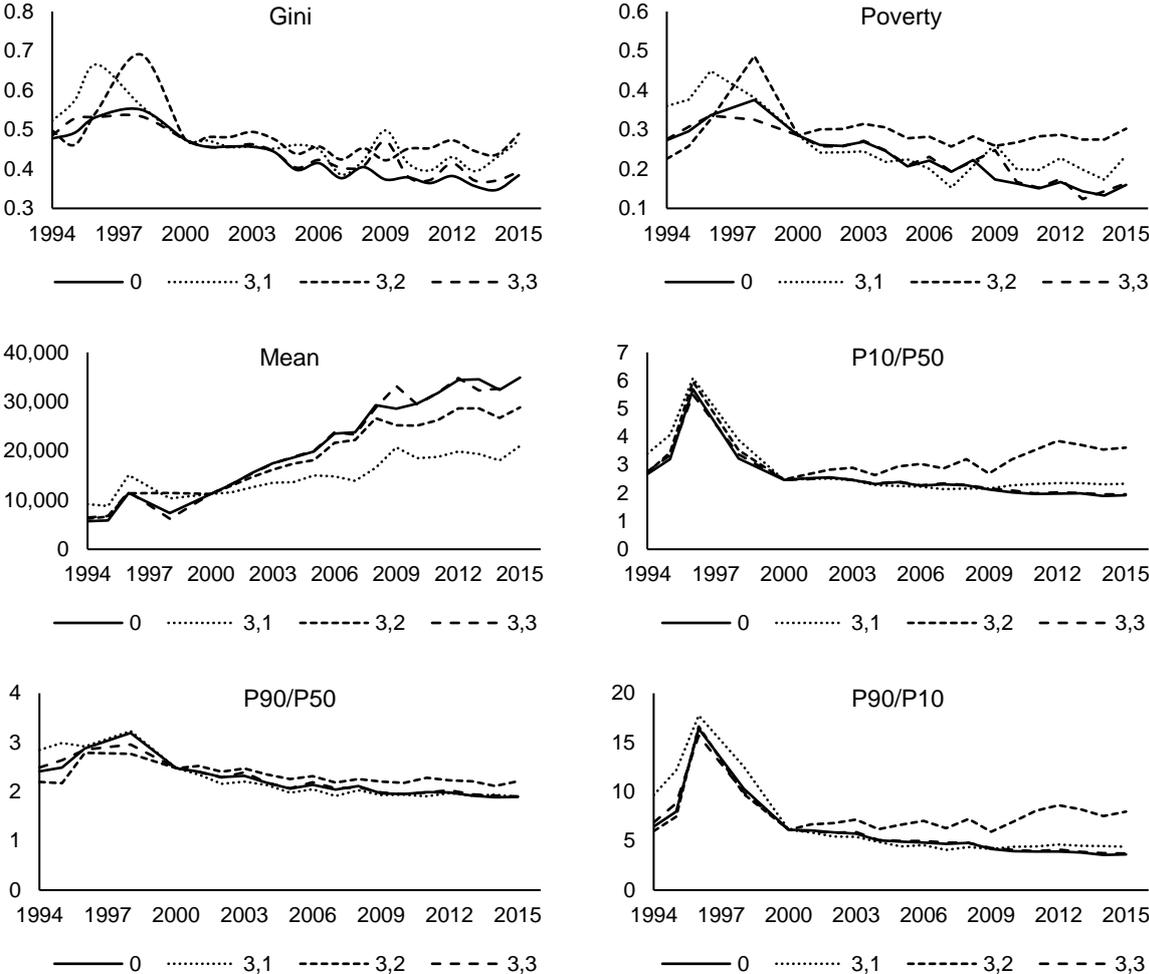
The third group of determinants are changes in labour market returns, in particular wages, pensions and home-food production. These are top 3 important income sources, and wages and pensions occupying 80% of the total household income (see figure 5 and 10).

What is the impact of the increase in wages, pensions, and home-food production on income distribution in Russia since 1994? Figure 13 below shows the actual distribution of income (1) and three counterfactual scenarios: 3.1 – income distribution with wages as in 2000, 3.2 – income distribution with pensions as in 2000, 3.3 – income distribution with home-food production as in 2000. In order to interpret these graphs in a correct way one should ask a question: what would happen to the income distribution if a particular income source would not change?

Results indicate that including changes in income sources, in particular wages and pensions, makes a big difference. If wages and pensions would keep their values as in 2000, then income inequality and poverty would be higher, and levels of income would be lower. The Gini gap for wages and pensions in 2015 would be 10 points. Wages have large counterfactual difference on the average income: if wages would

keep its value as in 2000, then the average household income would be much lower. This is explained by the fact that wages occupy the biggest share in total household income. Increase in wages is stronger for the lower part of income distribution.

Pensions, on the other hand, have larger impacts on poverty rate, P10/P50 and P90/P10 percentiles: if pensions would freeze its values as in 2000, then the poverty rate would be higher. In addition, changes in pensions can explain dynamics of percentile ratios better than changes in wages. In overall, if pensions would remain as in 2000, then inequality and poverty would be higher and income levels lower.



**Figure 13** Changes in labour market returns.

**Source:** RLMS-HSE, own calculations.

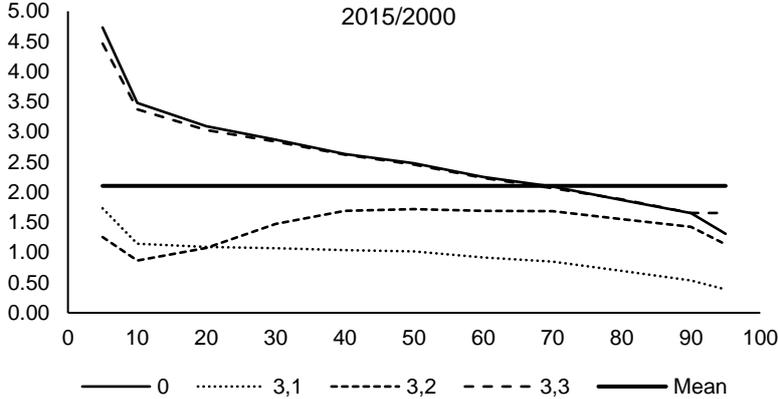
**Note:** 0 stands for actual distribution, 3.1 – for distribution with constant wages, 3.2 – for distribution with constant pensions, 3.3 – for distribution with constant home-food production. Income is measured as total net household monthly income adjusted to the household size and regional differences.

We observe an interesting pattern between counterfactual distribution of wages and pensions and their impacts on Gini index and poverty rate. If wages would be fixed, Gini index and poverty rate would be much higher in 1996. While if pensions would remain constant, then Gini and poverty rate would be much higher in 1998. This suggests that wages contributed to the decrease in inequality and poverty in 1996, while pensions – in 1998. In the previous section, we showed that below bottom part of distribution lost its shares in 1996, while above bottom – in 1998. Since pensions

are a prevailing source of income for the poor families, this dynamics suggests that pensions had an equalizing effect in 1998, while wages - in 1996.

Changes in inequality and poverty are not explained when keeping the home-food production constant. Though home-food production is the 3rd most important income source for Russian families (especially in rural areas), it did not change significantly over the observe period and, therefore, it does not have an impact on changes in income distribution. The impact of this source is, however, larger in 1998 and 2009. This might be due to income smoothing through home-food production.

What the income growth would be if wages, pension and home-food production would be fixed in time? Figure 14 provides the answer to this question. It shows that home-food production does not have any effect on income distribution, while wages and pensions do. If wages would not change, then in overall the income growth would be much lower. The lower part of distribution would lose the most. If pensions would remain constant, then lower part of income distribution would lose the most as well. This suggests that changes in wages and pensions affected the bottom part of income distribution at most.



**Figure 14** GIC for 2015/2000.

**Source:** RLMS-HSE, own calculations.

**Note:** 0 stands for actual distribution, 3.1 – for distribution with constant wages, 3.2 – for distribution with constant pensions, 3.3 – for distribution with constant home-food production. Income is measured as total net household monthly income adjusted to the household size and regional differences.

Figures 13-14 shows that between 1994 and 2015 wages and pensions kept increasing, which allowed income inequality, poverty, different percentile ratios to fall, while income levels – to increase. It had much stronger equalizing effect on the bottom part of income distribution. Home-food production does not have any impact on changes in income distribution over this period. Any other income sources – neither.

Summing up the evidence so far, changes in socio-demographic characteristics together with labour market outcomes have no effects on income inequality and poverty. Dynamics of wages and pensions appear to be the answer to the question about causes of falling income inequality in Russia: if wages and pensions would not increase since 2000, then income inequality and poverty would be higher and income levels lower. Any other income source do not have such significant impact.

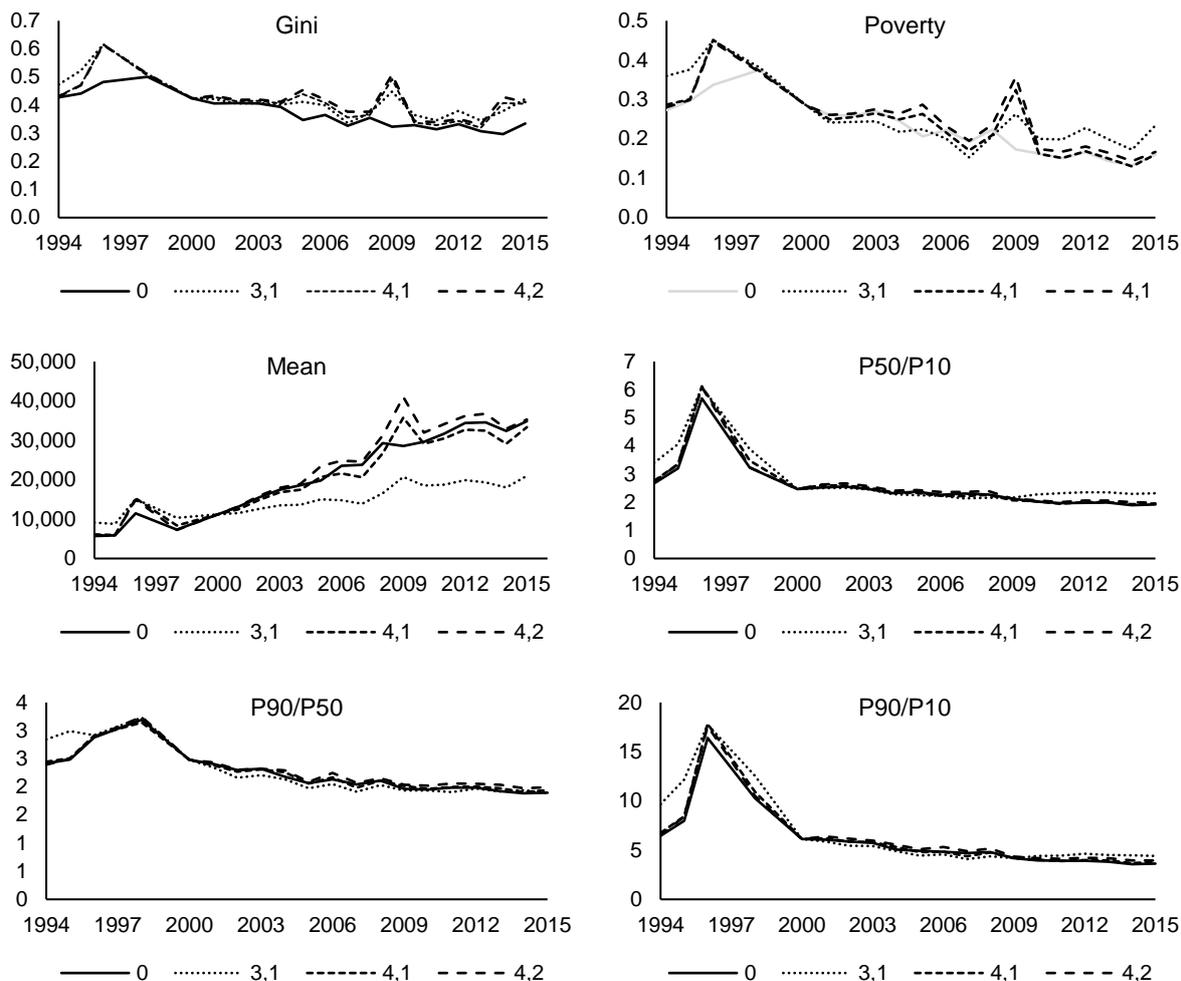
A drawback of this counterfactual analysis is that we put together different causes of increases in wages and pensions. In the next section, we present an exact decomposition of increase in income sources (wages and pensions) which enables us to understand better the fall in inequality and poverty.

## **6.2. Exact decomposition of the decrease in inequality and poverty**

We proceed by decomposing the increase in wages and pensions into changes that are due to (a) income levels, (b) relative importance of in total household income, and (c) returns to individual and household characteristics. We separate the three above-mentioned components by estimating counterfactual income distributions as shown in equations 7-10.

Figures 15 and 16 display counterfactual distribution of income in which we keep wages (figure 15) and pensions (figure 16) constant. Firstly, we are concerned with the effects of wages. Results from the previous section showed that keeping wages constant should result in increase in inequality, poverty and decrease in income levels. But we also know that wages increased a lot over the period. Therefore, our aim is to see what would happen if levels of wages would increase as much as the average household income (equation 7) and as much as wages on average (equation 9). Figure 15 shows that, indeed, extra decomposition steps bring income levels to the initial levels (see graph with mean income). When we look at the changes in inequality and poverty, we see that if wages would remain as in 2000 and would increase as much as the average household income, then the Gini index and poverty would not decrease to its initial levels. Nothing changes in the analysis of wages when we introduce extra steps following equations 7 and 9. This suggests that increase in wages is not associated with real increase in levels neither with changes in relative importance in total household income.

Another income source that changed significantly over the period is pensions. Above we showed that keeping pensions constant would have increased income inequality, poverty and decrease income levels. As we have already mentioned, the levels of pensions changes too. Therefore, as the next step we aim to know what would have happened if pensions would remain as in 2000 and increase as much as the average household income (equation 8) and as much as average pensions (equation 10)?

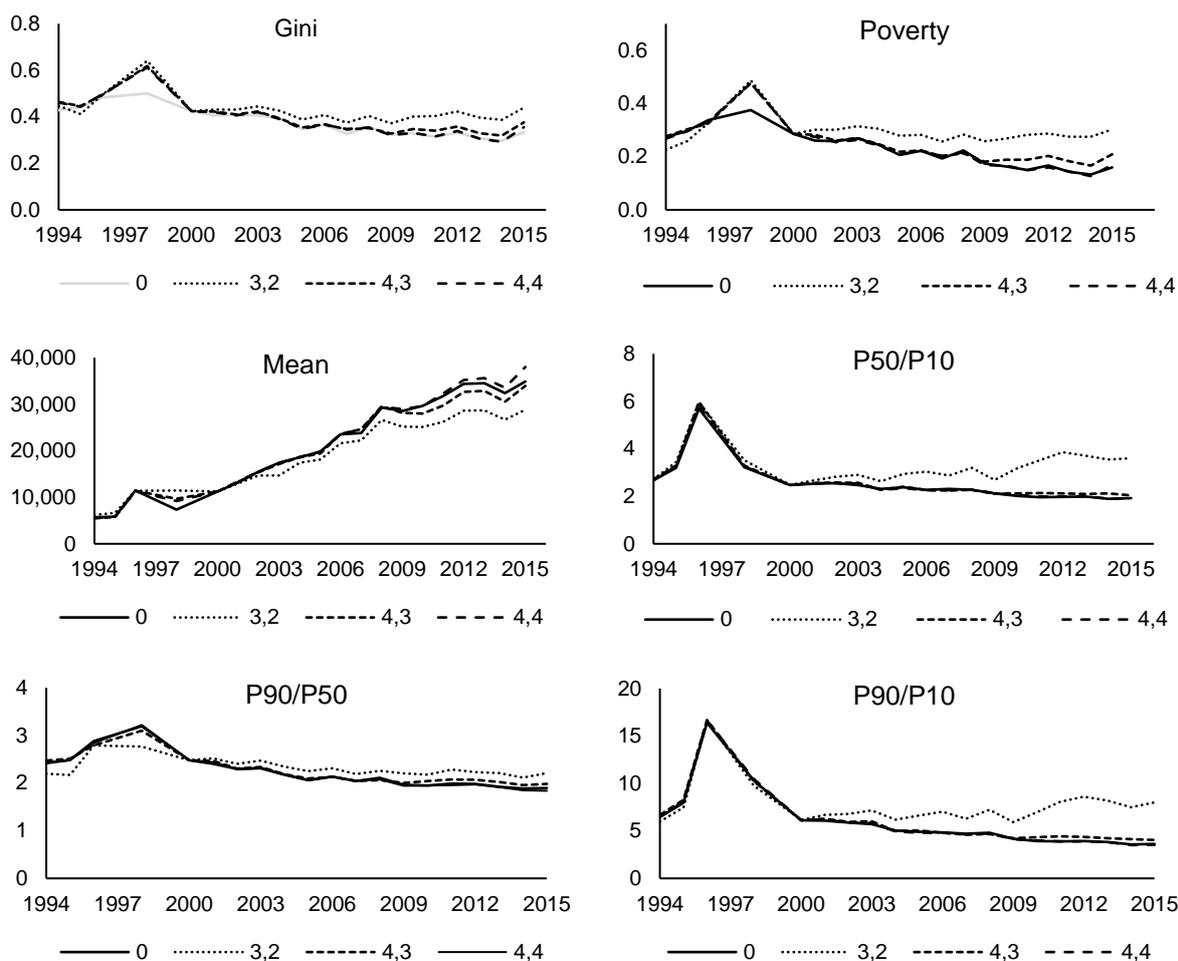


**Figure 15** Decomposition of counterfactual analysis for wages.

**Source:** RLMS-HSE, own calculations.

**Note:** 0 stands for actual distribution, 3.1 – for distribution with constant wages, 4.1 – for distribution with constant wages and equal household income levels, 4.2 – for distribution with constant wages, equal household income levels, equal returns to household characteristics. Income is measured as total net household monthly income adjusted to the household size and regional differences.

Figure 16 shows that if pensions would increase as much as average household income, then income inequality and poverty would return to its “actual” values. Introducing changes in the shares of pensions in total income bring the estimates even closer to the actual state of art. These effects are, however, small. This suggests that increase in pensions is, indeed, associated with real increase in levels. In other words, if pensions would not increase in real terms, then income inequality and poverty would be higher and level of income would be lower.



**Figure 16** Decomposition of counterfactual for pensions.

**Source:** RLMS-HSE, own calculations.

**Note:** 0 stands for actual distribution, 3,2 – for distribution with constant pensions, 4,3 – for distribution with constant pensions and equal household income levels, 4,4 – for distribution with constant pensions, equal household income levels, equal returns to household characteristics. Income is measured as total net household monthly income adjusted to the household size and regional differences.

### 6.3. Sensitivity analysis

The DFL decomposition we applied in this paper might be sensitive to the order of determinants. We argue that the order of determinants introduced in the paper is reasonable: starting with pre-determinants such as socio-demographic characteristics of households, following with employment characteristics and finishing with market income. Analyzing the effects of income sources before checking impacts of different household and individual characteristics might be illogical.

## 7. DISCUSSION AND CONCLUSION

This paper documents and explains trends in inequality and poverty in Russia since 1994. The evidence shows that income inequality and poverty decreased over the period, but the levels of income increased. To understand which factors were responsible for this fall, we define three groups of possible determinants: socio-demographic characteristics, labour market participation and labour market returns. In

the analysis of possible determinants, we include only those factors that changed over the examined period. The dynamics of possible determinants shows that changes in socio-demographic characteristics should have resulted in increase in inequality and poverty. Dynamics of labour market outcomes and labour market returns show ambiguous impacts.

Using a semi-parametric method introduced by DiNardo et al. (1996), we analyze how changes in these determinants can relate to changes in income inequality and poverty in Russia. The idea of this method is to construct counterfactual states of the world, where the distribution of possible determinant remained fixed in time, but everything else changes. In the final step, actual and counterfactual states are compared and the effect of the possible determinant is defined as the difference between two distributions.

We find that socio-demographic characteristics (family composition, family size, number of pensioners, number of children and number of individuals with tertiary education) together with labour market outcomes (share of employed and full-time employed individuals) had no effect on changes in income inequality and poverty. However, they have a negative impact on income growth: if socio-demographic characteristics would remain unchanged, then income growth of those below 70<sup>th</sup> percentile would be higher.

The evolution of labour market returns (wages, pensions and home-food production) shows that these factors contributed the most to the fall in inequality and poverty and increase in levels. If wages and pensions would not increase in real terms, then inequality and poverty would be higher and income levels - lower. We also find evidence for increase in levels of pensions and decrease in earnings dispersion. This dynamics had stronger effects on the lower part of income distribution. Therefore, we observe trends in falling income inequality and poverty and increasing income levels.

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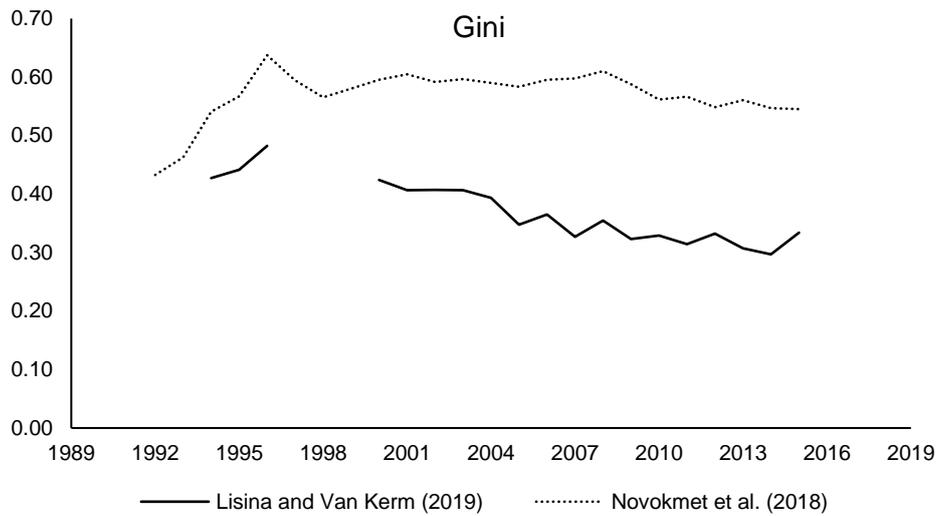
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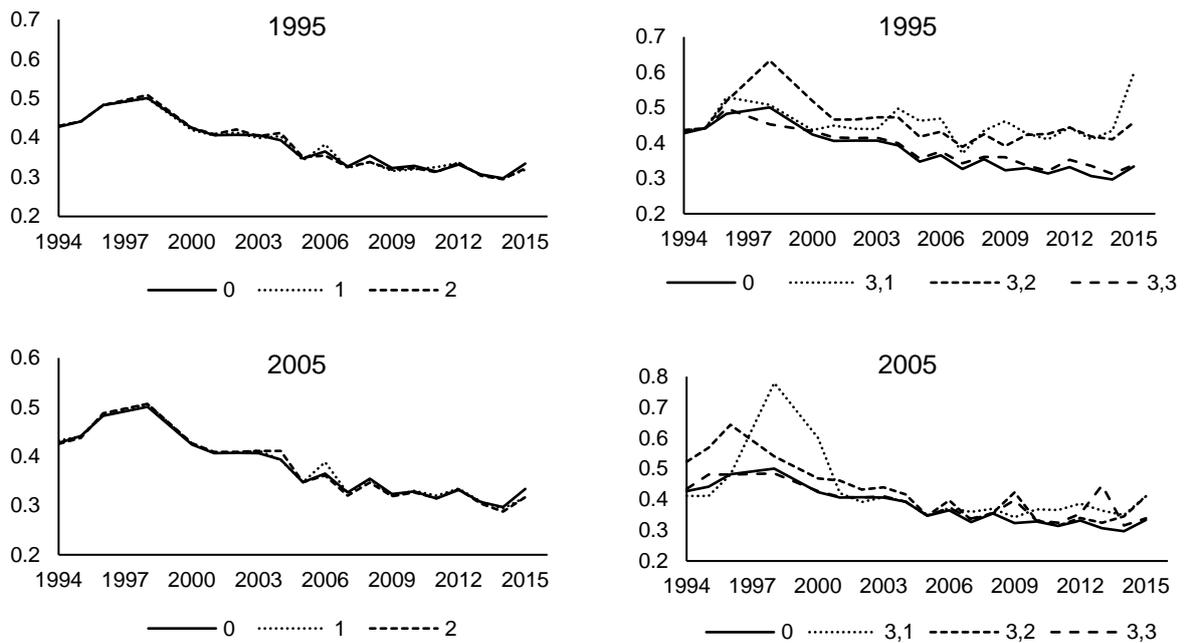
## 8. APPENDIX

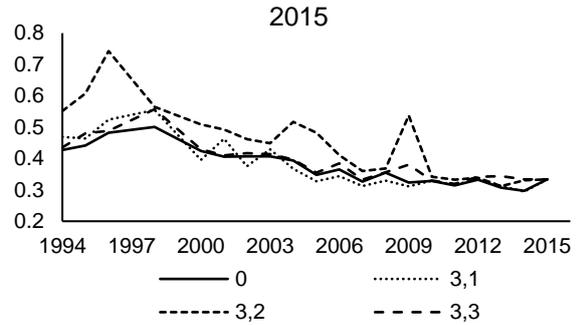
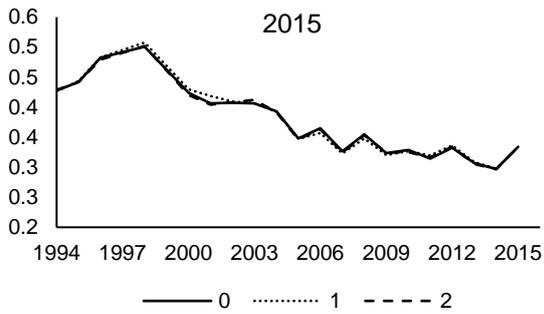
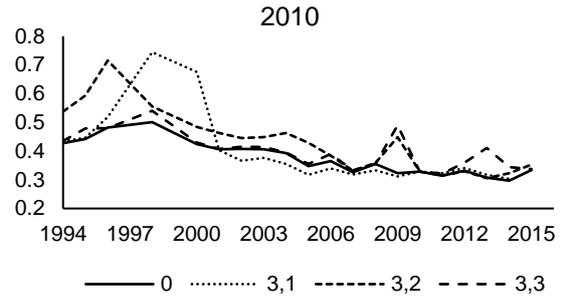
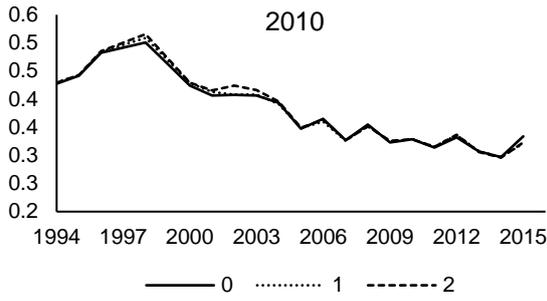
**Figure A.1** The Gini indices



**Source:** RLMS-HSE; “World Inequality Database,” 2019.

**Figure A.2** Sensitivity analysis: changes in the base year





Source: RLMS-HSE, own calculations.

**Note:** 0 stands for actual distribution, 1 – for distribution with constant socio-demographic characteristics, 2 – for distribution with constant labour market outcomes, 3.1 – for distribution with constant wages, 3.2 – for distribution with constant pensions, 3.3 – for distribution with constant home-food production. Income is measured as total net household monthly income adjusted to the household size and regional differences. Income is measured as total net household monthly income adjusted to the household size and regional differences.