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PUBLIC EXPENDITURE AND INCOME INEQUALITY IN PARANÁ: EVIDENCE FROM THE 2008-2009 AND 2017-2018 HOUSEHOLD BUDGET SURVEYS

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Abstract

The work sought to evaluate the distributional impact of the portions that make up the family budgets (income transfers, pensions, retirements and direct taxes) of formal and informal workers in Paraná, with the use of Lerman and Yitzhaki's (1985) Decomposition of the extended Gini coefficient using a "stage scheme". The data are from the 2008-2009 and 2017-2018 Household Budget Survey (POF). The results reinforce the role of the labor market, direct taxes, and transfer programs in reducing inequality. In general, public pensions and retirements are regressive, but benefits whose values are below the ceiling of the General Regime of Social Security (RGPS) are progressive. It was also observed that the degree of progressivity of this portion is higher than that of the Bolsa Família. The comparison with other states showed that redistributive policies are less effective in Paraná, reinforcing the importance of the labor market for a better distribution.

Keywords: Public expenditure; Income Inequality; Family Budgets.

JEL: D63; H31; H50

SUMMARY

1 INTRODUCTION

Inequality is a multidimensional problem that goes beyond the limits of approaches restricted to the distribution of monetary income and can affect the political and social fields (Cavalcante 2020). Ultimately, it can exert influence on poverty reduction, economic growth, and the very pace of development of a country. In a capitalist economy, some level of inequality is acceptable because it can bring economic benefits (Mirrlees 1971; Okun 1975). The return to education and differentiation in labor income, for instance, may stimulate the accumulation of human capital and increased efficiency. Inequality can also provide incentives for innovation by allowing at least some individuals to accumulate the minimum necessary to start businesses and undertake entrepreneurship (Bourguignon 2017).

However, an excessive level of income concentration can negatively impact the economic (by producing an inefficient allocation of human resources/inhibiting investment); political (concentrating powers in the hands of a minority group/promoting instabilities) and social (promoting an inequality of opportunities for citizens/hindering social mobility) fields (Cavalcante 2020).

Although its causes and consequences have been explored even before the very existence of economic theory, the debate on inequality has received a great deal of attention in recent years, particularly considering the rapid growth of income concentration indicators in developed countries over the past thirty years (Stiglitz 2012; Higgins and Pereira 2014; Piketty 2014; Atkinson, 2015; Bourguignon 2017).

To address this problem, governments consider fiscal policy a powerful tool to promote income redistribution, either through cash transfer programs, direct taxation, or provision of services such as health and education (Inchauste and Lustig 2017). Some policies, however, can distort incentives, reduce economic efficiency, and even worsen distribution. Policymakers should therefore minimize these effects. Thus, understanding the influence of government spending is extremely important for policymaking aimed at solving the distributional problem and mitigating the negative effects that excessively unequal income exerts on the economy (Clements et al. 2015; Silveira et al. 2019).

The issue related to the effectiveness of public policies is particularly important in Brazil, which has historically held one of the highest income concentrations in the world. While there has been an increase in income inequality in developed countries until 2018, Brazil (as well as Latin America) has shown a consistent reduction in the Gini coefficient from the beginning of this century until 2014, when evidence began to point to a further increase in income concentration (Lustig et al. 2011; OECD 2015, Hoffmann et al. 2020; World Bank 2021).

Paraná has stood out in Brazil, for among the eight states with the highest Gross Domestic Product, it showed the largest reduction in the Gini coefficient between 2004 and 2013 (17.0%). Among the 26 states plus the Federal District, only Pernambuco and Acre performed better than Paraná (IBGE, 2021). Although many works have sought to understand the determinants for this occurrence at the national level, evidence at the state level is scarce.

In this context, the main objective of this paper is to assess the distributional impact of the

items that make up household budgets, focusing on income transfers, pensions and retirements, and direct taxes (which are levied on the income of formal and informal workers in Paraná. The purpose is to evaluate public expenditure as to its distributive aspect, weighing the progressive portions, such as income transfers, and the regressive ones, such as the salaries of public servants, for example. This type of analysis is useful to support better management of public resources, after all "good policies must be based on accurate diagnoses" (Bourguignon 2017, 2).

For this purpose, the study made use of two methods. The first is the extended (or generalized) Gini coefficient decomposition of Lerman and Yitzhaki (1985), which allows us to assess the marginal effect of each source on the total Gini coefficient of the distribution at different degrees of inequality aversion. The second method is known as the "stage scheme", which allows one to compare the level of income concentration at different stages of household budget formation.

We will use data from the Household Budget Survey (POF) conducted in the years 2008-2009 and 2017-2018, a period that covers the interval of strong reduction in income inequality in Brazil until 2014 and subsequent increase witnessed in the following years, between 2014 and 2018[1] (Hoffmann et al., 2020). The justification for using this database is related to the greater wealth of information that is made available in this survey, which makes it possible to differentiate the social security regime of the beneficiaries (general, own or private). It is also possible to obtain detailed information about direct taxes (income tax and social security contributions), in addition to capital income. Such detailing makes the POF to be considered, according to Medeiros and Souza (2013), the best source of data on income in Brazil[2].

This paper is divided into four sections in addition to this Introduction. The second section presents an overview of the recent increase in income concentration in the world, including a theoretical review of the effects that such a phenomenon can have on the economy. The section closes with data and a summary of the empirical literature on inequality in Paraná. The third section will present the origin of the data, the definitions and the criteria used for the composition of the groups of sources and income stages. Next, the methodological procedures for decom posing the extended Gini coefficient, as proposed by Lerman and Yitzhaki (1985). In the fourth section the results will be presented and finally the fifth and last section will bring the final considerations of the study.

1 Although the evolution of income inequality in the century has been emphasized, it was not possible to use data from the POF 2002-2003 because there is no breakdown in this research regarding the nature of the social security regime (public or private), which would seriously compromise the analysis of the distributional effects of pensions and retirements.

2 Although the National Continuous Household Sample Survey (PNAD - Continuous) also has detailed information that allows us to assess the evolution of the labor force and income, its results only began to be released in 2012 and, therefore, it would not have the necessary scope to assess the period of interest of this study. Furthermore, it should be noted that income is less detailed than in the POF.

2 THEORETICAL FRAMEWORK

This section presents data on the recent increase in income concentration in the world, and shows the main theoretical aspects related to the growing interest in inequality literature. In addition, empirical evidence of the distributional effects of fiscal policy, whether through direct transfers, pensions, or direct taxes, is shown. The section closes with an overview of income inequality in Paraná.

2.1 The Recent Increase in Income Inequality in the World

The problem of inequality has gained great space in academia, in the media and on the agenda of public policies around the world. This phenomenon is mainly due to the increase in income concentration rates in the United States and several European countries, which in some cases have reached historic levels (OECD 2011).

For example, Saez and Zucman (2016) show that the share of American household wealth that makes up the richest 1% of the distribution has been growing steadily in recent decades. About 30 years ago, the income of the 1% accounted for 12% of total income, and in 2012 that figure reached 42%.

Stiglitz (2012) argues that in the last 30 years, a scenario has been created in which "the rich are getting richer, the richest of the rich are getting even richer, the poor are getting poorer and more numerous." The author adds that the level of income inequality today is at levels close to the years before the Great Depression.

Piketty (2014) presents data that corroborate the thesis that the beginning of the 21st century is witnessing one of the highest levels of income and wealth inequality ever documented. Extending the historical series produced by Kuznets (1955), it is possible to see that the share of income appropriated by the richest 10% of the United States distribution showed, starting in the 1910s, a reduction from 50% to 35% in the late 1940s. After this period, there was a stabilization between 1950 and 1970 and rapid growth from 1970-1980 until, between 2000 and 2010, the inequality level returned to levels similar to the 1929 Crisis, the period of highest income concentration ever recorded in the United States[3].

Income inequality in the United States is present at all levels of the distribution, and is most evident within the "micro-universe of the 1%," in which the 0.1% gets the largest share of the income.

3 Although it is not the objective of this session, it is worth noting that Piketty (2014) proposes an explanation of the origin of inequalities by proposing a relationship between the distribution of income and wealth. The level of inequality is subject to two types of forces, which can be stabilizing (which mitigate inequalities) or destabilizing (which aggravate them). Among the stabilizing forces, Piketty (2014) cites that the diffusion of knowledge and investment in the qualification and training of the labor force are the main instruments to increase productivity and at the same time decrease inequality. Regarding the destabilizing forces, the author presents a relationship between capital and income, which can be summarized in the relationship r > gwhere r is the rate of return on capital and g represents the economic growth rate. When r > g capitalists would appropriate a larger share of the national income, while workers would get a smaller share. Since capital income is more unequally distributed than labor income, increasing the share of capital in national income would tend to increase income concentration, which, over time, would result in wealth inequality.

Analyzing the income behavior of the "0.1%" of the distribution is important from a macroeconomic perspective, as it owns a considerable share of total American wealth and accounts for a large fraction of its growth (Stiglitz 2012, 23). From 1986 to 2012, for example, almost half of the U.S. wealth accumulation was due to the "0.1%" alone (Saez and Zucman 2016).

Regarding European countries, data from OECD (2009) show that countries such as Finland, Norway, Austria, Denmark, Germany, Italy, Sweden, have shown a growth in income appropriated by the last quintile to the detriment of the bottom quintile of the distribution since the 1980s. In a more recent study, it was estimated that the ratio between the richest 10% and poorest 10% grew by about 7.0% in Poland, 4.3% in Hungary, and 3.13% in the Czech Republic between 1992 and 2008. Of the 16 European countries included in the sample, only three (France, Ireland and Spain) saw a reduction in income dispersion (OECD, 2015). Atkinson (2015) presents data showing that in the last 30 years there has been an increase in inequality in several European countries, with special emphasis on the United Kingdom, where the Gini coefficient grew by about 10 percentage points in that period.

In the opposite direction is Latin America, which, despite being considered the most unequal region in the world[4], has shown a continuous decline in income concentration rates, notably due to consistent economic growth and the adoption of income distribution policies (Tochetto 2019).

Clifton et al. (2019) relates this fact to the profound changes in the political cycle in Latin America. After the adoption of neoliberal policies, following the recommendations of international organizations in the Washington Consensus period as a response to the debt crisis of the 1980s, these countries were gradually replaced by governments with more progressive agendas, prioritizing, among other things, the reduction of inequalities.

Data presented by Székely and Mendoza (2016) show that from 1990 to 2000, there was an increase in inequality in 17 Latin American countries. The situation reversed from the beginning of the century, in which all countries (except Guatemala, Costa Rica and Panama) showed a sharp decline. Compared to the level of inequality observed in the year 2000, the average Gini index fell by 13% across Latin America. The largest falls were observed in the Dominican Republic, Paraguay, Uruguay and Argentina, all with a reduction rate of more than 20%. Brazil was no exception. Even with one of the most unequal economies in the world[5], economic stability and the resumption of growth at the beginning of the 21st century provided a considerable reduction in the levels of concentration. The Gini coefficient went from 0.596 in 2001 to 0.518 in 2014, a reduction of 13.0% (IPEA 2021).

4 According to Lustig et al. (2011), Latin America had a Gini coefficient of 0.53 in 2010, being 19% more unequal than Sub-Saharan Africa, 37% more unequal than East Asia, and 65% more unequal than developed countries.

5 With data from 147 countries, the World Bank (2021) shows that Brazil has the eighth worst income concentration.

2.2 The Income Inequality Problem

Why care about income inequality? Is this phenomenon actually a problem? Although it is not possible to exhaustively address the literature on the social and economic implications related to income inequality, we will try to present in this space some theoretical considerations on the subject. Despite the consensus that a high concentration of income is a problem, some theorists argue that some level of inequality is acceptable and even recommended for good economic performance. Aghion et al. (1999) present three arguments why income concentration can positively affect economic growth: the Kaldor hypothesis, indivisible costs of investment, and the trade-off between efficiency and equity.

Kaldor's (1956) hypothesis considers that the differential in the propensity to save between rich and poor can affect growth, since the growth rate of income is directly related to the proportion of national income that is saved. Therefore, economies that have a more concentrated income tend to grow faster than economies characterized by a more equitable income distribution.

The second argument in favor of inequality concerns the "indivisibility of investment". From this perspective, a higher concentration of income is necessary to promote large investments in industries or innovation projects that involve large sunk costs. If a large capital market does not exist, income would need to be sufficiently concentrated for an individual (or a household) to cover these large sunk costs (AGHION et al. 1999).

Finally, the trade-off between equality and efficiency thesis is based on incentive considerations, and is defended by authors such as Mirrlees (1971) and Okun (1975). Faced with a moral hazard context in which production depends on the unobservable effort of workers, rewarding (through some redistributive measure) employees regardless of their (observable) production performance would inhibit their effort. Thus, non-intervention is advocated, even in economies where income is highly concentrated, since policies aimed at equity tend to produce inefficiencies, by generating "disincentives" to work and, consequently, reducing the potential output of the economy.

Another theory is known as "trickle-down", which implies that, in a first moment, the accumulation of capital by the wealthy allows more funds to be made available for lending or investing in projects that will promote long-term economic growth, also benefiting the poor. In a second moment, income inequality will be reduced, allowing an even more expressive growth. From this perspective, policies that benefit the upper end of the income distribution will benefit the lower end of the income distribution in the long run (Aghion and Bolton 1997).

On the other hand, some theorists argue that, with respect to political and social aspects, inequalities can impose several problems, such as low social cohesion, higher crime, lower educational performance and life expectancy, restrictions on the exercise of citizenship, political polarization, and the fostering of nationalistic attitudes. In the strictly economic field, high concentration can imply the reduction of aggregate demand; create instabilities, decrease public investment; create distortions in the economy; negatively impact human capital formation affecting the efficiency of the economy and, therefore, inhibit sustainable and long-term growth (Perotti 1996; Bourguignon 2017; Cavalcante 2020).

For Bourguignon (2004), the most important effect of income inequality, as far as developing countries are concerned, refers to its influence on the intensity with which poverty is reduced because of economic growth[6]. According to the author, changes in poverty levels can be attributed to two factors. The first is economic growth, with proportional changes in all income deciles, which characterizes the so-called "pro-poor growth". The second is the distributional effect, with changes in income distribution. A high level of inequality reduces its ability to mitigate poverty, since the higher income brackets benefit proportionally more from economic growth.

From a broader perspective one can use the words of Stiglitz (2012) for which:

> "Widely unequal societies do not function efficiently and their economies are neither stable nor sustainable in the long run. When one interest group holds too much power, it can get policies that benefit itself, rather than policies that benefit society. When the wealthiest use their political power to excessively benefit the corporations they control, much-needed revenues are diverted into the pockets of a few rather than benefiting society at large" (Stiglitz 2012, 123).

For Berg et al. (2018), while there are theoretical currents that argue for a positive association between inequality and growth, more recent empirical evidence contradicts this relationship[7]. In general, the literature, especially since the 1990s, points to an "unambiguous" negative relationship between growth and inequality (Aghion et al. 1999).

Perotti (1996), for example, conducted a cross section study with data from several countries between 1960 and 1985. Based on the estimation of a two-stage least squares growth regression, he found that redistribution has a positive and significant impact on economic growth. Overall, it is concluded that highly unequal societies tend to be politically and socially unstable, which is reflected in lower rates of investment and thus growth[8].

Results found by Ostry et al. (2014) show that redistribution has a positive effect on overall growth, meeting the trade-off theory between redistribution and growth, as suggested by Mirrlees (1971) and Okun (1975). The authors point out that there is mixed evidence that excessively redistributive policies can have direct negative effects on the duration of growth. However, for the case of "non-excessive policies," there is no evidence of any direct adverse effect. Moderate redistributive policies would therefore be associated with higher and more durable growth. On the other hand, a

6 This relationship is known in the literature as the "poverty-growth-inequality triangle" (Bourguignon 2004).

7 Benabou (1996) compiled results from 23 studies that point to a negative relationship between income inequality and economic growth or investment level.

8 However the converse is not true for the author, as the data do not support the idea that "more egalitarian societies, especially those with democratic institutions, grow faster because they generate rate demands for redistribution and thus less distortion" (PerottI 1996, 182).

high level of inequality constrains both the medium-term pace of growth and the duration of growth periods.

Berg et al. (2018) investigated the relationship between inequality, redistribution, and medium- and long-term economic growth using data from different stages of gross income (before taxes and transfers) and net income (after taxes and transfers) for advanced and developing countries. The authors reached two important conclusions. The first is that inequality is indeed a robust and powerful determinant of both the pace of medium-term growth and the duration of periods of growth. In general, more equal societies grow faster and more sustainably than less equal societies. Second, the idea of a trade-off between growth and redistributive policies is refuted, if these are not excessive.

2.3 Inequality and Fiscal Policy in Brazil

Due to the adverse effects caused by inequality mentioned in the previous subsection, governments may adopt public policies aimed at better income distribution. According to Lustig et al. (2011), a redistributive policy refers to state actions that can result in a more equal distribution of income, whether this objective is explicit. From this perspective, policies linked to the minimum wage, employment expansion, health and education (basic, technical or higher) would be among the instruments through which governments can contribute to a more equal distribution.

Redistributive policies promoted by the state, especially regarding social security and direct transfers, have contributed to the decline of inequality in Brazil. Comparing the share of social spending with total spending in several developing countries, Inchauste and Lustig (2015) argue that Brazil is the country that most reduces social inequality through social security transfers (Social Security and Social Assistance), social spending (health and education) and direct taxes in Latin America. In 2011, because of these factors, the Brazilian Gini index reduced 0.16 points, a reduction higher than the Latin American average (0.9 points). This is largely due to the high proportion of GDP allocated to social spending (about 25%, the highest share among Latin American countries).

The main direct transfer programs in Brazil are Bolsa Família and the Benefício Prestação Continuada (BPC) (RIBEIRO et al. 2017). Although they are progressive, they represent only a small portion of social spending. Using data from the 2008-2009 Household Budget Survey, Higgins and Pereira (2014) evaluated the impact of direct taxes and social spending through the income stages method social spending on different poverty lines. The authors estimated that Bolsa Família accounted for 0.39% of GDP in 2009, while the share of BPC reached 0.53%. These figures are lower than the total spent on unemployment insurance, for example (0.58% of GDP). Despite being a well targeted expense to the poorest population (about 85% of low-income people live in households receiving some type of transfer program), its effect is reduced due to the low representativeness in household budgets.

The authors' estimates suggest that these transfers are responsible for a reduction in inequality

of between 0.9% and 1.67%, according to the scenario analyzed[9]. In general, the conclusion is that in terms of direct transfers, Brazil has a high level of tax burden and social spending (Brazil has the highest social spending rates among Latin American countries), but with low effectiveness, and that the Bolsa Família and the Benefício de Prestação Continuada (BPC) are exceptions, since they have high effectiveness and low fiscal impact (Higgins and Pereira 2014).

Cardoso (2016) argues that redistributive policies have the potential to affect the entire productive structure of the economy. Using computable General Equilibrium and Social Accounting Matrix models, the author evaluated how redistributive policies (taxation on profits and dividends and the Bolsa Família Program) can influence the Brazilian economy. Simulation results suggest that income redistribution would generate positive impacts on household consumption, depending on the propensity of households to consume. The income expansion would have the potential to modify the production structure through its effect on consumption, stimulating investment in the production of goods and services, expanding the domestic market.

For Neri (2017), Bolsa Família (Family Stipend) is by far the most efficiently targeted social program (i.e., the beneficiaries are generally appropriated by the lowest-income people), with a redistributive potential far superior to labor income and social security benefits. To reach this conclusion, the author uses the degree of targeting, a measure calculated from a social welfare function that is particularly sensitive to the lower tail of the statistical distribution.

Bolsa Família registered a degree of targeting of 3.12 in 2012. This result indicates that the transfer of R$ 1.00 by the program adds 3.22 times more social welfare. By way of comparison, the focalization indicator for labor income was 0.97 while the focalization degree for social security benefits was 1.01 in the same year. The author argues that, even with higher average values, the BPC and Social Security (especially regarding benefits linked to the minimum wage), are also efficient in targeting low-income families, but are not as targeted as Bolsa Família (Neri 2017).

In relation to pensions and retirements, it is denoted that despite representing the largest individual budget among public policies in Brazil, there is no consensus on their role in relation to income inequality (Rangel 2011). Studies such as those by Hoffmann (2010), Medeiros and Souza (2012; 2013), Silveira et al. (2013, 2019) that established controls by income bracket, show that the apparent controversy concerns the great heterogeneity of this group, which incorporates both progressive portions (benefits with values equal to the minimum wage, for example) and other regressive ones (pensions of public servants, military, etc.).

According to Hoffmann (2010) the resources of the General Regime of Social Security (RGPS) promote an improvement in income distribution, but the benefits from the Special Regime of Social Security (RPPS) are highly regressive and ended up being preponderant in this group, even though

9 The authors estimate established different scenarios depending on the inclusion of "pensions and retirements" in the "transfers" group.

the participation of this source is lower (4.7% against 10.2% of the RGPS). The progressivity (degree of intensity in reducing inequality) of the RGPS benefits was estimated at 0.0806, but the regressivity of the RPPS was 0.2609.

Similar conclusions were obtained in the study by Medeiros and Souza (2012) in which it was found that the portion of pensions linked to the private sector, the General Regime of Social Security (RGPS), is progressive (although less than direct taxes and social assistance spending), while the portion referring to public servants, the Special Regime of Social Security (RPPS) is regressive, contributing about 24% of all inequality in the year 2009.

In another study, Medeiros and Souza (2013) calculate the impact of each source of income on inequality considering, among others, the benefits from the RGPS and the RPPS. The latter was subdivided into two subgroups, taking as reference the value of the legal ceiling that limits the values of benefits paid to workers in the private sector (not applicable to public servants). The results show that the RGPS is progressive, with a marginal effect on the Gini index of -2.2%, while the RPPS is regressive, although with a considerable discrepancy among the subgroups. The total of benefits whose values are lower than the RGPS ceiling has a marginal effect of 0.3% and those with a value higher than the limit imposed on the private sector is 2.7%. Based on this analysis, we conclude that Social Welfare is regressive (net marginal effect of 0.8%).

Constanzi (2017) highlights another important point regarding the regressiveness of social security benefits: early retirements[10], which are considerably concentrated. In this group, the richest 10% of the distribution appropriates 46.8% of total benefits, while the richest 10% considering all retirees have a share of 40.4%. Based on these data, the author refutes the myth that the introduction of the minimum age, which is fundamental to guarantee the sustainability of Social Security, would be prejudicial to the poorest because they enter the job market earlier. In truth, the author argues that the lack of a minimum age not only generates early retirements with a regressive character that worsens the concentration but also compromises the sustainability of social security.

Kerstenetzky (2017) argues that pensions became an important tool for reducing inequality only after the indirect effect of the policy of increasing the minimum wage (which grew by more than 70% in real terms between 2004 and 2014), since 60% of pensions in the public system have the exact value of the minimum wage. When including the Continuous Cash Benefit (because it is a kind of non-contributory retirement), it results that welfare benefits were responsible for almost half of the reduction in inequality between 2004 and 2014. Jaccoud (2017) adds that, in addition to the policy of valuing the minimum wage, the importance of social security for poverty reduction and distributional improvement as of the 2000s was due to new regulations aimed at social security inclusion along with the process of economic growth, the formalization of labor relations and improvement in labor income, the strengthening of legal protections for labor, and the incentive for labor formalization.

10 Constanzi (2017) considered early retirements as those for women aged 46 to 54 and men aged 50 to 59.

Direct taxes represent another important tool for reducing inequalities, since they are levied on income and assets, affecting mainly the upper strata of the income distribution. In this sense, a progressive tax system[11] enables the financing of public policies aimed at greater horizontal and vertical equalization [12].

Introíni et al. (2018) highlights the importance of a progressive tax system:

> "State financing based primarily on progressive taxation of personal income reveals a social arrangement in which a certain political balance between classes prevails, the result of which is less economic inequality. Where the income tax on individuals has no relevance for the financing of public policies, does not present effective progressivity - sparing those who receive higher incomes and hold great wealth - and taxation is mainly extracted from the incidence on goods and services consumed by the population as a whole, we will certainly observe a strong political asymmetry between the segments of the base and the top of the social pyramid and, consequently, exacerbated economic inequality" (Introíni et al., 247).

According to the authors, the Brazilian case fits the second hypothesis, in which it is emphasized that the predominance of indirect taxation and the reduced incidence of direct taxes make the Brazilian tax system an instrument for aggravating economic and social inequalities[13].

Rocha (2002) evaluated the impact of the main income tax, the main direct tax[14], in the period from 1981 to 1998, comparing the Gini coefficient of family incomes before and after the tax. A modest reduction in the Gini was registered during the period (the minimum variation was 3.18% in 1992 and the maximum 5.66% in 1985). According to the author, this "weak" reduction indicates the inability of this instrument, as a distributive mechanism, to significantly reduce the large income inequality.

Using data from the POF 2002-2003, Silveira (2008) found that income tax is predominantly

11 In the words of Castro and Buragin (2017, p. 264): "A tax is said to be progressive if the average rate (also called the effective rate) assigned to a 'taxable unit' increases as its income grows. This means that a higher income unit not only pays more tax, but also loses a larger share of its income paying the tax.

12 Vertical equity is understood as fairness in the tax treatment of individuals with different levels of income; horizontal equity, as fairness in the treatment of individuals with equal incomes (Silveira and Passos 2018).

13 According to Gobetti and Orair (2015), the Brazilian tax burden was 33.4% of GDP in 2014, of which 8.1% were direct taxes (income and property), 9.6% on payroll (including social contributions) and 15.7% on indirect taxes (goods and services). The figures of Fagnani and Rossi (2018) indicate that in 2015, while in the set of OECD countries, the share of direct taxes (Income and Property) in total collection was 39.6%, on average, in Brazil, this share was 25.4%. Among indirect taxes, those levied on consumption represented 32% of the total in OECD countries and 49.6% in Brazil.

14 Castro and Bugarin (2017) state that in the context of any country's tax system, the Individual Income Tax (IRPF) is the tax that best enables the application of the principle of tax progressivity.

levied on wage income, employers and self-employed workers, while higher-income families, where non-labor income (such as capital investments, asset sales, profits and loans) predominate, pay little tax. Among the highest income earners, the average tax represents 4.97% of income, while for the lowest income earners, the deduction is around 5.73% and 6.55%. The work found evidence that the degree of progressiveness of direct taxation is insufficient to counterbalance the regressiveness of indirect taxation[15].

The study by Castro and Buragin (2017) makes a comparison between Brazil and 15 OECD countries regarding income tax progressivity, based on the Kakwani index[16] and PNAD data from 2006 to 2012. The results of the paper showed that there was a slight increase in the tax progressivity index for the period examined, mainly driven by the introduction of two new tax rates, of 7.5% and 22.5% in 2009. The authors conclude that the Brazilian income tax is considerably more progressive than in OECD countries[17]. However, regarding the distributional impact, Brazil is significantly less effective. The reason would be related to the low tax collection capacity and high Brazilian income inequality.

Based on this literature, it is possible to verify that redistributive policies present the most diverse levels of effectiveness. Income transfers have a highly progressive potential, but with reduced effects due to the low proportion of this type of expenditure in relation to the GDP. It is also possible to affirm that direct taxes contribute to a more balanced income, even if their effects are not sufficient to counterbalance the regressiveness of indirect taxes. On the other hand, there is no clarity about the nature of social security expenditures, since this group contains both progressive (such as benefits indexed to the minimum wage) and regressive (such as pensions for public servants) portions. This apparently conflicting relationship of public expenditure in relation to inequality further reinforces the need to verify the behavior of these variables from a regionalized perspective, such as the case of the state of Paraná.

2.4 Income Inequality in Paraná: Evolution and Empirical Evidence

In line with the country, Paraná has shown a continuous reduction in income inequality from the beginning of the 21st century. The top part of Figure 1 shows the evolution of the Gini index over the period between 2004 and 2013, including the eight states with the highest GDP in Brazil. The line in red represents Paraná. Based on data from the National Household Sample Survey (PNAD), in

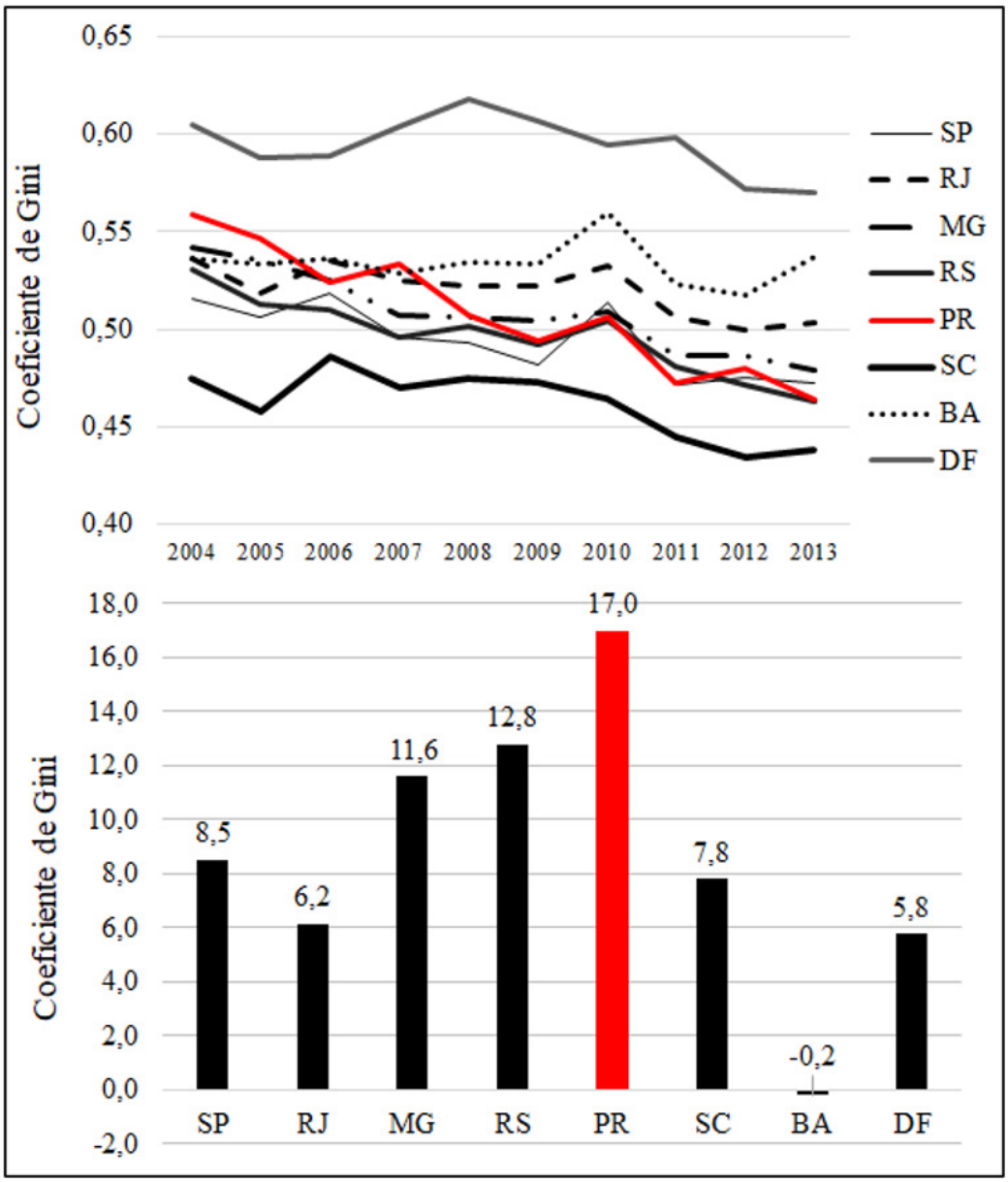
15 The author estimates that about 29.0% of the total income in the first quantile of the distribution (poorest 10%) is allocated with indirect taxes, while in the last quantile (richest 10%) this share is about 11.0%.

16 The Kakwani index is given by the difference between the Gini index for social intervention and the Gini index for incomes before the imposition of the intervention policy. It can range from -1 (regressive) to 1 (progressive) (KakwanI 1977).

17 The study estimates that Kakwani's rate was 0.458, with other countries' rates ranging from 0.0816 in Denmark to 0.3205 in Ireland.

2004 Paraná had the 19th best income distribution in the country, with a Gini index of 0.559[18], which is shown at the bottom of Figure 1. In 2013, the state reached an index of 0.464, which represents a reduction of 17.0%, the highest among the eight largest states. When considering all 27 federative units, the state had the third highest Gini reduction rate, behind only Pernambuco (20.7%) and Acre (19.0%)[19]. Due to this evolution, Paraná now has the fourth best income distribution, behind only Santa Catarina, Rondônia and Rio Grande do Sul (IBGE 2021).

Figure 1: Evolution of Income Inequality in Brazil: 2004 to 2013



Gini Coefficient

Source: IBGE (2021)

18 Gini index of the distribution of monthly nominal income from all jobs for people aged 10 or more, occupied in the PNAD reference week (IBGE 2021).

19 Detailed information by state can be seen in the appendix.

The importance of the topic has led authors such as Baptistella et al. (2007), Gabriel and Ferreira (2009), Gabriel et al. (2015), Souza et al., (2016), among others, to investigate the determinants of income inequality in Paraná.

Baptistella et al. (2007) analyzed the growth of income concentration in the South Region, focusing on the state of Paraná, using PNAD data from 1981 to 2003. First, the authors found that the income from the main labor force was the most representative component of household income, although with a declining share (from 82.4% in 1992 to 75.6% in 2003). In the present study, we found that the main labor income was the most representative component of household income, although with a declining share (82.4% in 1992 to 75.6% in 2003). This increase was due, among other factors, to the aging of the population, especially in Rio Grande do Sul and Santa Catarina.

In comparison with these states, Paraná had a smaller percentage share of pensions and retirements in the composition of household income: around 12.5%, while in Santa Catarina this share is 13.8% and in Rio Grande do Sul 18.3%. According to the authors, the category that includes social security benefits was the main responsible for the increase in income concentration in the South Region. Due to its lower representativeness in Paraná, this component collaborated during the entire period to reduce inequality in the distribution of per capita household income (Baptistella et al. 2007).

The influence of pensions and retirements was also studied by Gabriel and Ferreira (2009) who, using data from PNAD, analyzed the period from 1988 to 2008 through the decomposition of the Gini Index, proposed by Pyatt et al. (1980). Despite the reduction in the Gini coefficient in the period (from 0.571 to 0.499), the finding is that the increase in the share of social security benefits negatively affected income inequality in Paraná. In 1988, this portion corresponded to about 4.4% of total inequality, and in 2008 it rose to 7.9%. In the rural areas of Paraná, the variation was higher, from 1.0% to 7.8%, still far from Brazil as a whole (from 4.7% to 10.9%). This reduction was due to demographic variations, such as the increase in the proportion of adults in families, the expansion of employment levels, and income transfers through social programs such as Bolsa Família (Gabriel and Ferreira 2009).

Gabriel et al. (2015) analyzed the distributional behavior of ten parcels that make up the per capita household income in Paraná. Data from PNAD were also used, for the period from 2004 to 2012. The authors also used the Gini index decomposition methodology of Pyatt et al. (1980). The estimates showed that income inequality was higher in Paraná (-12.0%) than in the South region (-10.4%) and Brazil (-7.4%), and that most of this reduction was due to the growth in income of employees in the private sector because it is relatively little concentrated (the concentration ratio recorded 0.378 in 2004 and 0.341 in 2012) and has the largest share in household income among all sources of income (37.4% in 2004 and 42.7% in 2012).

The positive influence of the labor market was also noted by Souza et al. (2016), who identify the recovery of the Brazilian economy at the beginning of the 21st century as the predominant fac-

tor for the reduction of inequality in Paraná. This phenomenon became evident from the analysis of the participation of employees in relation to other labor categories. Using PNAD data for the period between 2002 and 2011 and using the Gini decomposition method presented by Hoffmann (1998), it was found that the percentage of employees in the composition of household income rose from 47.1% to 51.6% in Paraná, with a simultaneous fall in employers (from 14.0% to 11.4%) and self-employed (from 17.9% to 16.7%). The increase was particularly higher among workers with a signed labor contract, whose share rose from 25.9% to 33.6% in 2011, while the representativeness of informal workers fell from 8.6% to 6.3%.

Based on this literature, it is possible to draw some conclusions about the evolution of income inequality in Paraná since 2000. First, the data points to an unequivocal fall in income concentration in the state, in which the rate of reduction was higher than the average for the Southern Region and Brazil as a whole. Second, the labor market was pointed out as the main responsible for this event because of the increase in the participation of this group in household income. Income transfers were also progressive, although to a lesser extent than income from work. Finally, pensions and retirements have been shown to be regressive and have prevented a further reduction in the Gini coefficient (Baptistella et al. 2007; Gabriel and Ferreira 2009; Gabriel et al. 2015; Souza et al. 2016).

Despite the contribution of the studies cited, it should be noted that they used data from PNAD, without the detail level of the POF, such as tax deductions, asset variation, or the nature of the social security regimes (RGPS or RPPS). One of the limitations of PNAD, for example, is present in the estimation of the influence of Bolsa Família and the Continuous Cash Benefit on inequality. Until 2013 this effect could not be obtained in isolation, since these benefits were grouped with regressive incomes (such as interest and dividends) (Hoffmann 2013). Therefore, the use of the POF can bring a different perspective, by incorporating new elements for the analysis of the evolution of inequality and income in Paraná. This is precisely the contribution that this paper intends to offer.

3 METHODOLOGY AND DATA

This section will present the database used in the study, as well as the criteria for the composition of the income stages that make up the family budget. Next, the method for estimating the extended (or generalized) Gini coefficient, as proposed by Yitzhaki (1983), will be shown, as well as the Lerman and Yitzhaki (1985) Decomposition method, which allows the impact of each source of income appropriated by individuals on total income inequality to be evaluated.

3.1 Database

The data used in the paper come from the fifth and sixth Household Budget Surveys (POF), for the periods 2008-2009 and 2017-2018, respectively. Conducted by the Brazilian Institute of Geography and Statistics (IBGE), the goal of the POF is to provide information on household budget

composition and living conditions of the population. The option not to include data from previous surveys was taken because they do not discriminate on the nature of the social security system (public or private), which is what we intend to evaluate in this study.

The information present in this study refers to labor income and other income, which includes the values referring to transfers, pensions, retirements, rents, property appreciation, among others. Regarding taxes, we will consider those levied on the individuals' labor income, such as: social security contributions, income tax, and "other deductions". It should be emphasized that there is no transparency regarding the composition of the "other deductions" group. According to Silveira (2019), both in the dictionary of variables and in the collection instruments, the description cites that this group includes the deduction of the Tax on Services of Any Nature (ISS) and other taxes levied on the gross income of the informant, without further detailing.

Finally, taxes such as the Urban Territorial Tax (IPTU) and the Motor Vehicles Ownership Tax (IPVA) were not considered in the analysis, because their generating factor is property and not income, which is the central interest of the study's evaluation.

As for the treatment of the data, it was decided to consider only monetary income. A small number of observations with negative incomes or without sufficient information were excluded. The values were corrected to BRL of 2020 by means of the Broad Consumer Price Index (IPCA). In addition, the observations were weighted by the sample expansion factor, which is provided by the POF itself, which allows us to obtain estimates that for the entire population. Table 1 presents the composition of income sources.

Table1: Description of Variables Used

Group	Category	Description
Remunerations	Private Sector	Monetary compensation of workers in the private sector, including domestic servants and casual workers.
	Public Sector	Monetary compensation of workers in the public sector, including military personnel.
	Employer	Compensation of individuals who work for their own enterprise.
	Self-Employed	Compensation of workers who, individually or with a partner, without having an employee, carry out an economic activity or exercise a profession or trade on a permanent or casual basis.
Pensions and Retirement	General Regime of Social Security (RGPS)	Retirement and public pension from the General Regime of Social Security (RGPS).
	Special Social Security System (RPPS)	Retirement and pension from public social security received from the Special Social Security System (RPPS), (municipal, state and federal).
	Private Welfare Plan	Private pension plan retirement (retirement, supplementation and complementation of private pension plans, open or closed, received by the taxpayer in the form of savings and supplementation or complementation of retirement).
Transfers	Bolsa Família	Bolsa Família Program, created by Federal Law n' 10.836. of 09/01/2004.
	Continuous Cash Benefit (BPC)	Provided for in the Organic Law of Social Assistance LOAS). Federal Law n' 8.742. of 12/07/1993.
	Federal Social Programs	Income transfers from federal social programs: Child Labor Eradication Program - PETI, etc., except Family Stipend (Bolsa Familia) Continuous Cash Benefit of the Organic Law of Social Assistance - BPC-LOAS.
	Other	Refunded premiums and indemnities paid by insurance companies, gambling winnings, family allowance, birth allowance, state and municipal social programs, unemployment insurance, maternity allowance, funeral allowance and other similar transfers.
Other incomes	Other Income from Labor	Ticket/food card allowance; transportation and fuel allowance/vale, etc.
	Alimony	Alimony, pocket money, gift, interfamily transfer, etc.
	Rentals	Refers to monetary income derived from rental, occupation, use, or exploitation of real estate rights, including sublease of houses, apartments, rooms, sites, stores, parking spaces, farms, land, and others. It also includes the rental, use, or exploitation of rights to movable property, such as vehicles, party equipment, copyright exploitation, and inventions.
	Net Worth Variation	It includes sales of real estate, cars and other assets, inheritances and the positive balance of financial turnover (deposits and withdrawals from financial investments such as savings and investment fund shares).
	Other	Other income not classifiable in the other categories

Deductions	Social Security	Deduction with public social security that was levied on the income received by the informant in the reference period of the survey.
	Income Tax	Deduction with income tax levied on the income received by the informer
	Other	Deduction with ISS and other taxes levied on the income received by the informant during the reference period of the survey.

Source: Prepared by the author, based on the survey results

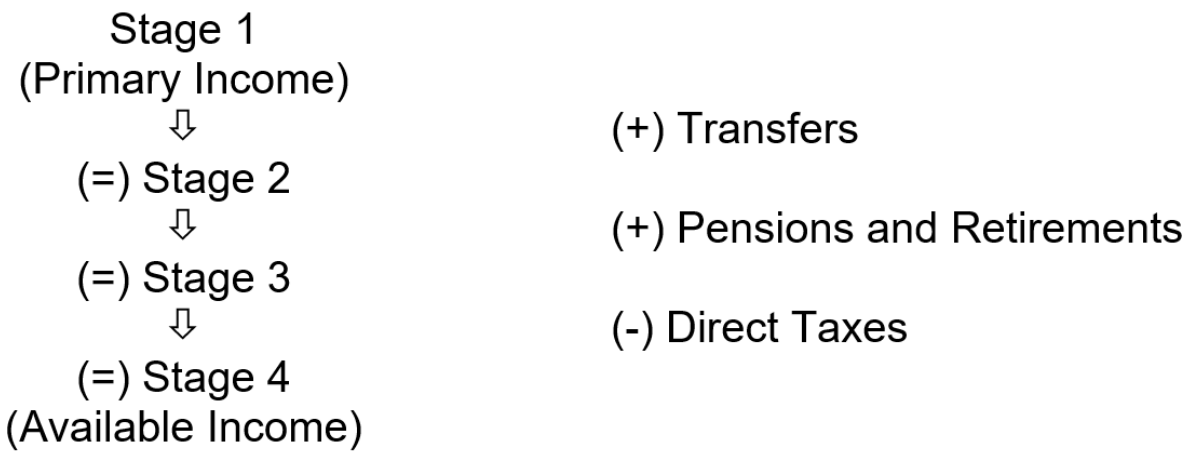
As can be seen, four income groups have been established: remuneration, pensions and retirement, transfers and other income. Based on the scheme presented, an attempt is made to assess the impact that each category has on income inequality.

3.2 Income Stage Scheme

One of the methods used in the literature to assess the impact of transfers and taxation on income inequality is the income-stage scheme, and the works of Jones (2008) Lustig et al. (2011), Covre (2014), Berg et al. (2018) and Silveira et al. (2013, 2020) can be cited as examples of the use of this methodology.

As shown in Figure 2, the first stage is Primary Income, comprising all income from work, alimony, donations, rents, and changes in assets.

Figure 2: Stages of Income



Source: Prepared by the author based on Silveira et al. (2019)

Stage 2 is defined by the sum of the Primary Income plus the amount received from all cash transfer programs. After the addition of pensions and retirements, we have Stage 3. Finally, the last stage is called Disposable Income, which is obtained from the previous stage after the deductions related to income tax, social security contributions and other deductions on the workers' income. After the

establishment of the income stages, the evaluation of the impact of transfers and taxation is performed the estimation of the Gini coefficient in each stage.

3.3 Decomposition of the Extended Gini coefficient

There are numerous ways to estimate the Gini coefficient[20]. Lerman and Yitzhaki (1984) developed a method based on the calculation of the covariance between the variable of interest and its cumulative distribution function:

$$G(x) = -2\, cov\left(\frac{x}{\mu(x)}, (1 - F(x))\right) \qquad (1)$$

The expression above shows that the Gini coefficient of the distribution of x is related to its mean and cumulative distribution function F(x). This formula does not, however, establish any association between the level of inequality and the level of social welfare. To this end, Yitzhaki (1983) developed an extended version of the Gini that incorporates different degrees of inequality aversion. The extended (or generalized) Gini coefficient can also be described from the covariance between the variable of interest and the power function of its cumulative distribution:

$$G(x, \upsilon) = -\upsilon\, cov\left(\frac{x}{\mu(x)}, (1 - F(x))^{\upsilon - 1}\right) \qquad (2)$$

In this expression, the parameter υ represents the degree of inequality aversion. When $0 < \upsilon < 1$, there is a preference for inequality. In this hypothetical case, it is society's desire that income is concentrated at the top of the distribution. When $\upsilon = 1$, there is indifference to inequality. This criterion would imply that an additional R$ 1 increases the social welfare of the population in the same proportion, regardless of who receives it, that is, there is no concern at all with inequality (BARROS et al., 2006). The "conventional" Gini coefficient is obtained when $\upsilon = 2$. Finally, when $\upsilon \to \infty$, one has the corresponding Rawlsian criterion, in which any welfare gain would only be obtained if income is transferred to the poorest individual in the entire distribution (MEDEIROS 2012).

Despite the welfare-related analysis that can be obtained from the extended Gini coefficient, Lerman and Yitzhaki (1994) state that the method can also provide relevant information about the influence of each source of income on different strata of the distribution, depending on the variation of the marginal effect at different weighting levels.

When the weighting gives more weight to one of the extremes of the distribution (when $\upsilon \neq 2$) the marginal effect of each income source can be altered. Thus, when the degree of aversion is high ($\upsilon > 2$) a larger marginal effect (in modulus) compared to the estimate for the "conventional" Gini (when $\upsilon = 2$) implies that the income source in question has a larger impact on the bottom of the distribution.

20 Schechtman and Yitzhaki (2013) present several alternative methodologies for calculating the Gini coefficient.

This type of analysis is very useful when seeking to ascertain, for example, which category of public expenditure has the greatest ability to reduce income inequality among the lowest income groups (LERMAN and YITZHAKI 1994).

In its essence, the extended Gini coefficient shares the same properties as the Atkinson Index (1970), including regarding the theoretical aspects about the different degrees of aversion to inequality. However, the option to use the methodology proposed by Yitzhaki (1983) is related to the convenience of using the same measure (the Gini coefficient) in all the analyses, allowing a direct comparison between the results of the study and the empirical evidence found in the literature.

How to define the appropriate degree of aversion? Despite the efforts of some studies to estimate a parameter of "real" inequality aversion (Hoffmann et al. 2006; Pintos-Payeras 2009), there is no consensus in the literature on what value would be adequate, and it is often up to the researcher to define the value to be set[21]. For Neri and Souza (2012), the parameter is chosen in an explicitly normative way, in which each researcher can choose the degree of sensitivity to inequality. Medeiros (2012, 124) argues that there is no technical answer to this, because "it requires a normative positioning on the relations between well-being and inequality, which bears relation not only to facts, but also to value judgments."

In view of this, the paper proposes the use of $\upsilon = 2$, which is equivalent to the conventional Gini coefficient, in addition to producing estimates for five different levels of aversion. The estimates will be compared to evaluate the behavior of income shares in relation to their influence on inequality, emphasizing those that mainly affect the bottom of the distribution.

As stated, the extended Gini can be decom posed. In the present study, total income is defined as the aggregate of incomes from labor, transfers, pensions, retirements, and other sources. The method of Lerman and Yitzhaki (1985) shows that the extended Gini coefficient is defined by:

$$G(\upsilon) = \sum_{k=1}^{K} S_k(\upsilon) G_k(\upsilon) R_k(\upsilon) \qquad (3)$$

S_k represents the share of the source k in total income; G_k measures the inequality of the group kand is calculated by:

$$G_k(\upsilon) = -\upsilon \, cov\left(\frac{x}{\mu(k)}, \left(1 - F(x)\right)^{\upsilon - 1}\right) \qquad (4)$$

So that μ(k) represents the average source income k. R_k is the correlation of the Gini of the group k with the total distribution, such that:

21 Figueiredo (2009) presents a review of different theoretical conceptions about different levels of inequality aversion.

$$R_k = \frac{cov\left[y_k, \left(1 - F(y)\right)^{\upsilon - 1}\right]}{cov\left[y_k, \left(1 - F(k)\right)^{\upsilon - 1}\right]} \quad (5)$$

Where F(y) is the cumulative distribution function of total income and F(y_k) is the cumulative distribution function of group income k. We can infer, therefore, that the relationship between S_k, G_k e R_k indicates the influence of any group k on total inequality, such that all components are weighted by the aversion parameter (υ).

The marginal effect is understood as the change in the Gini coefficient of total income if the source group k was increased by 1%, keeping the rest constant. Considering a small change in the source income k equal to ey_k, where e is close to 1 and y_k represents the source income k, Lerman and Yitzhaki (1985) show that the partial derivative of the Gini coefficient with respect to a percentage change e in the source k is equal to:

$$\frac{\partial G}{\partial e} = S_k(G_k R_k - G) \quad (6)$$

G is the Gini coefficient of total income inequality before the income change. The percentage change in inequality resulting from a small percentage change in group income k is equal to the original contribution of the group k to inequality minus the share of the group k in totalincome:

$$\frac{\partial G / \partial e}{G} = \frac{S_k G_k R_k}{G} - S_k \quad (7)$$

Therefore, a negative marginal effect indicates that the source in question is “progressive”. Otherwise, it will be considered “regressive”.

Another measure of particular interest for the analysis of the inequality of a distribution is the concentration coefficient, which can be expressed by means of the following expression:

$$C(x) = -2\, cov\left(\frac{x}{\mu(x)}, (1 - G(y))\right) \quad (8)$$

Where G(y) is the cumulative distribution function of y. The concentration coefficient measures how one source of income is distributed relative to the others. Its value lies between -1 (when the income source x is appropriated only by the poorest individual in the distribution) and +1 (when all the income from that factor is received by the richest individual in the total distribution).

While the marginal effect is influenced by the distribution and share of a source relative to total income, the analysis of the concentration coefficient allows an assessment of how favorable the income

in question is to the poorest, which in this case would be indicated by a coefficient whose value is close to -1 (Medeiros et al., 2007).

3.4 Descriptive Statistics

Table 1 presents the descriptive statistics for POF 2008-2009 and POF 2017-2018, in 2020 values, corrected by the National Wide Consumer Price Index (IPCA). The last column shows the percentage change between the averages. Regarding the compensation group, real growth can be seen in all groups, especially for private sector workers, whose average income grew 25.1% in the period. The income of public servants had a slightly lower real increase, 23.1%. Next are the self-employed, with 19.8%, and in last place is the group of employers, whose income varied by only 5.2%. These results indicate that the "cake" grew for all workers in Paraná.

When comparing the public and private sectors, POF 2008-2009 data show that the average income of public sector workers was R$ 2,937.59. In the private sector the average was R$ 1,582.64, a difference of approximately 85.6% in favor of public administration workers. In the POF 2007-2018, the average remuneration of this group became R$ 3,614.96, while that of workers in the private sector recorded R$ 1,979.69, implying a difference of 82.6%. In this respect, it is already possible to note a slight reduction in the wage differential.

The income linked to the General Social Security System (RGPS) grew 31.0%, going from R$ 1,193.86 to R$ 1,563.89. On the other hand, the average value of pensions and retirements from the Special Social Security Systems (RPPS) decreased 21.3%, from R$ 5,612.14 to R$ 4,414.48. Even with this reduction, a still very high discrepancy is noted in relation to the benefits granted by the RGPS. The difference between the average social security benefits went from 370.1% to 182.3%. We can see that the inequality between the public and private sectors is more evident in the income from pensions and retirements than in labor remuneration.

Another point worth noting in Table 1, refers to the growth of income transfers in the period, in a magnitude higher than labor income. The average value of the Bolsa Família Program grew 33.1% and the Continuous Cash Benefit, 36.2%. The item Federal Social Programs had an even more expressive increase: 215.0%. These are evidences of a more effective action of the State, based on the expansion of programs aimed at reducing income inequalities in the country.

Table 1: Descriptive Statistics, Paraná

	POF 2008-2009						POF 2017-2018						
Source of Income	**Obs.**	**Expansion**	**Average**	**Standard Deviation**	**Mini-mum**	**Maximum**	**Obs.**	**Expansion**	**Average**	**Standard Deviation.**	**Mini-mum**	**Maximum**	**Variation % (Average)**
Remunerations													
Private Sector	4.602	6.262.188	1.582,64	1.609,88	19,79	47.322,29	5.570	8.392.615	1.979,70	1.958,86	6,46	33.605,74	25,1
Public Sector	865	1.250.735	2.937,59	3.197,15	96,25	32.387,66	1.228	1.943.891	3.614,96	3.347,71	157,95	27.269,14	23,1
Employer	301	472.827	6.283,62	6.440,47	187,05	68.010,59	236	355.419	6.607,42	6.566,91	31,18	66.859,11	5,2
Own Account	1.433	1.736.730	2.177,40	4.164,60	1,92	76.273,55	1.789	2.171.741	2.607,95	5.378,98	1,36	112.890,00	19,8
Pensions and Retirement													
RGPS	1.306	1.739.137	1.193,86	918,35	272,41	7.351,32	1.599	1.900.860	1.563,89	1.129,54	448,19	13.155,18	31,0
RPPS	111	198.222	5.612,14	7.091,13	363,21	27.240,55	187	272.992	4.414,48	3.946,42	519,29	18.011,17	-21,3
Prev. Prev.	7	15.872	8.076,36	8.255,35	581,13	21.756,12	56	89.254	2.530,42	2.275,95	662,98	9.144,77	-68,7
Transfers													
Bolsa Família	38	50.795	145,85	69,29	32,69	276,04	34	50.839	194,19	129,89	42,76	637,65	33,1
Benefits Provided Continuously	25	39.710	769,35	34,84	753,66	844,46	61	73.675	1.048,16	18,45	1.003,04	1.097,79	36,2
Social Programs	2	1.349	221,43	370,29	92,62	753,66	3	3.669	697,41	411,99	392,07	1.068,00	215,0
Other	52	57.482	1.214,09	915,43	27,24	4.521,93	92	127.765	2.019,80	3.485,29	60,96	32.809,64	66,4
Other Rents													
Other Labor Income	104	199.019	3.157,97	6.651,15	21,79	51.938,66	116	146.837	2.478,86	4.207,98	64,74	37.335,10	-21,5
Alimony	88	129.110	1.319,12	3.701,19	36,32	28.330,18	51	76.740	914,15	1.314,18	110,69	5.534,32	-30,7
Rentals	68	106.443	2.341,01	3.738,55	90,80	25.424,52	72	98.438	4.056,33	11.075,90	164,44	79.786,97	73,3
Variation. Variation	158	231.967	17.384,80	33.330,92	54,48	217.924,50	330	433.697	15.052,03	34.399,45	33,20	334.891,80	-13,4
Other	20	27.676	7.950,88	8.770,47	36,32	27.240,56	28	37.516	2.903,77	3.096,61	774,80	13.282,36	-63,5
Deductions													
Welfare	3.468	4.816.617	177,64	193,76	7,26	3.497,14	5.352	8.048.134	266,71	302,25	5,60	4.665,43	50,1
IRRF	354	564.656	687,48	1.129,90	8,92	5.886,79	1.311	2.261.841	690,24	1.181,48	4,21	11.456,24	0,4
Other	1.563	2.093.534	238,51	672,29	1,85	12.712,26	1.556	2.389.846	354,79	722,50	1,08	6.920,74	48,8

Fonte: Pesquisa de Orçamentos Familiares (POF)

Finally, the deductions show that despite an increase in the amounts of social security and other deductions, the average for income tax remained practically stable. Although it is not the objective of this study to investigate the causes of this fact, it is important to highlight that this represents a limitation of the State's capacity to finance social programs, since the income tax is one of the main instruments for the reduction of inequalities and poverty, even though in Brazil its potential is reduced in comparison with other countries (Rocha 2002).

4 RESULTS

In this section we present the main results of the study. First, w e w ill present the estimates for the decom position of the Gini coefficient in each of the income stages established in the methodological section. The next step is to analyze the Gini coefficient under different scenarios of inequality aversion. Finally, some considerations are made about the results found, contextualizing them with those found in the literature.

4.1 Gini coefficient decomposition results

As shown in the methodological section, this paper makes use of the income-stages scheme, considering labor remuneration, transfers, pensions and retirem ents, and finally, direct taxes. The Gini coefficient is estimated for each income stage to verify how each income share influences the pre-existing level of inequality. The results for Stage 1 are shown in Table 2. In this stage w e consider the resources coming from remunerat ion and other types of income such as alim inalities, rents and changes in net worth.

Table 2: Income Inequality (Stage 1 or Primary Income)

	2009			2018			Variation (p.p.)		
Income Source	**Partici-pation**	**Coef. Conc.**	**Effect Marq.**	**Partici-pation**	**Coef. Conc.**	**Effect Marq.**	**Partici-pation**	**Coef. Conc.**	**Effect Marq.**
Remunerations									
Private Sector	38,65	0,4147	-13,93	42,90	0,4037	-14,75	4,25	-0,0110	-0,82
Public Sector	14,33	0,7059	1,27	20,74	0,7547	4,70	6,41	0,0488	3,43
Employer	11,59	0,8900	4,32	5,81	0,8554	2,27	-5,78	-0,0346	-2,05
Self-Employed	14,75	0,6460	-0,05	13,36	0,6051	-0,22	-1,39	-0,0409	-0,17
Other Income									
Other labor income	2,46	0,7529	0,40	0,87	0,5058	-0,15	-1,59	-0,2471	-0,55
Alimony	0,66	0,4969	-0,16	0,16	0,2644	-0,09	-0,50	-0,2325	0,07
Rentals	0,97	0,7109	0,09	0,92	0,7450	0,19	-0,05	0,0341	0,10
Asset Variation	15,73	0,9659	7,70	14,99	0,9467	8,08	-0,74	-0,0192	0,38
Others	0,86	0,9177	0,36	0,25	0,5606	-0,02	-0,61	-0,3571	-0,38
	Gini	0,6484		Gini	0,6152		Gini (%)	-5,1%	

Source: Produced by the author based on the survey results

Table 2 shows the percentage share of each income source, its concentration coefficient, and marginal effect (variation in percentage terms of the total Gini index if that source were to increase by 1%, keeping the rest constant). The last part shows the variation that occurred in the period, in percentage points. The total Gini coefficient showed a reduction of 5.1%, going from 0.6484 in 2009 to 0.6152 in 2018.

The estimates show that, among the sources that compose the remunerations group, the private sector was the most representative in the composition of primary income, including a growth of 4.25 percentage points in its participation (from 38.65% to 42.90%). The remunerations of the public sector presented the largest expansion in terms of representativeness, about 6.41 percentage points. The income of employers and self-employed workers, on the other hand, contracted in the period (5.78 and 1.36 percentage points, respectively). It is also noteworthy that the employers' remuneration is the most unequal, registering the highest concentration coefficient in both periods: 0.8900 in 2009 and 0.8554 in 2018.

Among the sources belonging to the group of "other income", the category with the highest representativeness is the asset variation, whose participation was around 15.0% in the period. We can also observe that it is an extremely concentrated source of income (0.9659 and 0.9467). The reason for this is that this category includes the amounts appropriated through capital gains, savings, shares, and other financial investments, income classes that are normally related to higher income individuals.

We now proceed to the analysis of the marginal effects of each source that composes the primary income. If we consider that negative values indicate a reduction in the Gini coefficient for the total distribution if this income was increased by 1%, when the rest was held constant, we observe that during the analyzed period, the marginal effect went from -13.93% to -14.75%. This implies, among other things, that the incomes coming from the private sector represent the source of income that has contributed most to the reduction in inequality, and that its influence increased during the period[22]. On the other hand, the compensation of public servants has become considerably more regressive over time, registering a marginal effect three times higher in 2018 (1.27% in 2009 to 4.70% in 2018).

Table 3 shows the results of the decom position of the Gini coefficient for Stage 2, that is, the income appropriated by workers after government transfers, such as the Bolsa Família Program, the Continuous Cash Benefit, Federal Social Programs and other transfers. It is possible to verify that the transfers do contribute to the reduction of income inequality, since all the sources of income in this group registered a negative marginal effect, in addition to maintaining the level of progressivity in the period.

22 One of the factors that would explain this is the increase in the minimum wage during this period, as described above.

Table 3: Income Inequality (Stage 2)

	2009			2018			Variation (p.p.)		
Income Source	**Participation**	**Coef. Conc.**	**Effect Marq.**	**Participation**	**Coef. Conc.**	**Effect Marq.**	**Participation**	**Coef. Conc.**	**Effect Marq.**
Transfers									
Bolsa Familia	0,03	-0,5501	-0,05	0,02	-0,6373	-0,05	-0,01	-0,0872	0,00
Benefits Provided Continuously	0,12	-0,3316	-0,18	0,18	-0,4108	-0,29	0,06	-0,0792	-0,11
Social Programs	0,00	-0,4294	0,00	0,01	0,0789	-0,01	0,01	0,5083	-0,01
Others	0,27	0,2312	-0,17	0,59	0,3663	-0,24	0,32	0,1351	-0,07
	Gini	0,6445		Gini	0,6094		Gini (%)	-5,4	

Source: Produced by the author based on the survey results

The Benefit of Continuous Rendering is the cash transfer program that most reduces income inequality in Paraná. Although it is not as well targeted as Bolsa Família, whose concentration coefficient is closer to -1, the greater share in total income is (4 times greater in 2008 and 9 times in 2019) makes the BPC exert greater influence in reducing the Gini coefficient.

The total effect of transfers on income inequality registered 0.6% (the Gini coefficient of stages 1 and 2 went from 0.6484 to 0.6445) in 2009 and 0.9% in 2018 (from 0.6152 to 0.6094). Despite indicating an advance of this type of social program, its effect is still very small when compared to the labor market effect, for example.

Table 4 shows the results of the estimates for Stage 3, in which pensions and retirements are incorporated into income. In this group are included the portions referring to the General Regime of Social Security (RGPS), the regimes referring to public workers in the three spheres of government, the Special Regime of Social Security (RPPS) and other private regimes.

Table 4: Income Inequality (Stage 3)

	2009			2018			Variation (p.p.)		
Income Source	**Participation**	**Coef. Conc.**	**Effect Marq.**	**Participation**	**Coef. Conc.**	**Effect Marq.**	**Participation**	**Coef. Conc.**	**Effect Marq.**
Pensions and Retirements									
RGPS (> SM)	7,12	0,0811	-6,12	6,02	0,0215	-5,78	-1,10	-0,0596	0,34
RGPS (= SM)	0,07	-0,7297	-0,15	0,23	-0,7171	-0,53	0,16	0,0126	-0,38
RGPS	7,19	0,0735	-6,27	6,25	-0,0052	-6,31	-0,94	-0,0787	-0,04
RPPS (> RGPS)	3,23	0,9663	2,20	1,52	0,9270	1,10	-1,71	-0,0393	-1,10
RPPS (<=RGPS)	0,84	0,4267	-0,22	1,10	0,4516	-0,18	0,26	0,0249	0,04
RPPS	4,07	0,8553	1,98	2,63	0,7271	0,92	-1,44	-0,1282	-1,06

Private Social Security	0,44	0,9096	0,26	0,48	0,6510	0,10	0,04	-0,2586	-0,16
	Gini	0,5757		Gini	0,5381		Gini (%)	-6,5	

Source: Produced by the author based on the survey results

To analyze in detail the impact of these benefits on inequality, we disaggregated the incomes of the RGPS and RPPS into two subgroups. In the first, the reference is given by the incomes whose value is equal to the minimum wage. In the second group, the reference will be the ceiling established by the RGPS, which is not applicable to the private sector, but is useful for allowing the evaluation of the direct impact of this differential. The estimates show a remarkable heterogeneity of these groups. In the first place, the incomes coming from private social security regimes have shown relative neutrality regarding their impact on total inequality. Despite the high concentration (the concentration coefficient is 0.9096 in 2009 and 0.6510 in 2018), the low share in total income (0.4% and 0.5%), made its marginal effect small.

Income from the public servants' social security system (RPPS) is regressive. However, the division of this group based on the value of the RGPS cap shows a very distinct behavior regarding representativeness and effect on income inequality. The lower group has a smaller but growing share in total income: 0.84% in 2009 and 1.1% in 2018. The upper group, on the other hand, showed a large reduction in its share: from 3.23% to 1.52%. Although it is not the goal of this paper to explain the causes of this phenomenon, this fact may be a reflection of changes in the social security regime of Brazilian civil servants. Several Constitutional Amendments were approved (No. 20 of 1998, No. 41 of 2003, No. 47 of 2005 and No. 70 of 2012), which created several restrictions, such as the end of the full retirement and the parity with active servants, besides instituting a social security contribution for retired servants. It is natural to assume, therefore, that these events may have reduced the share of this income differential in the household budget (Rafanhim, 2013).

Regarding the influence on inequality, the lower limit is progressive, with a marginal effect that showed a slight reduction in the period (from 0.22% in 2009 to 0.18% in 2018). The upper limit of the RPPS is regressive, but at a decreasing rate: it went from 2.20% to 1.10%. This fact is due to the reduction in the participation of this source, as shown above. Despite the regressive impact of RPPS benefits on the Gini coefficient, in general, pensions and retirements play their role in reducing total inequality. In 2009 pension benefits promoted a 10.6% reduction in the Gini coefficient and in 2018, 11.7%.

Finally, Table 5 compares Stage 4 between the two years of the research. This stage comprises the households' disposable income, given by the aggregation of labor market income, transfers, pensions, and retirements after the deduction of income tax, social security contributions, and other deductions. The theoretical expectation is that direct taxes would provide an improvement in income

distribution. Although there is indeed a reduction in the Gini coefficient, it is relatively small. The variation between stages 3 and 4 in 2009 is only 0.1% and in 2018, 1.8%. This increase in progressivity in the period was an expected result, due to the introduction of two new income tax rates, of 7.5% and 22.5% in 2009 (Castro and Buragin 2017).

Table 5 also provides a detailed analysis by income groups. The first category, which includes labor compensation, is the one that showed the highest rate of progressivity in the period (total marginal effect of the group was -5.58% in 2009 and -6.53% in 2018) followed by pensions and retirements (-4.25% and -4.99%). Transfers are also progressive, but to a lesser extent (-0.44% in both years). The "other income" group (which includes revenues from refunds, labor actions, among others not classified in the other categories) boasts considerable regressivity (10.31% and 11.96%).

The variation between 2009 and 2018 shown in the last part of Table 5 indicates that remunerations, pensions and retirements, also started to exert a greater influence on inequality. The growth of 2.18 percentage points in the share of labor income explains the increase in the marginal effect of this group. The same can be said about transfers, which have a negligible share in the family budget, even though it has more than doubled (0.38% in 2009 to 0.80% in 2018). Finally, there is a reduction in the representativity of pensions and retirements (-1.37 percentage points).

In the comparison between the periods, it is observed that the Gini coefficient has reduced from 0.5749 in 2009 to 0.5282 in 2018, which indicates a reduction of 8.1%[23].

23 The calculated Gini coefficient is considerably higher than the data presented in Figure 4.1. For the sake of clarification, the reason for this apparent inconsistency stems from two main factors: i) those results were obtained using data from PNAD, which has different sampling criteria and detailing of the information collected compared to POF; ii) the estimate refers to the years 2000 and 2013, while this study evaluates the years 2009 and 2018 (as can be seen in the data per state, attached, there is great variation between the years.

Table 5: Income Inequality (Stage 4 or Available Income), 2009 and 2018

	2009			2018			Variação (p.p.)		
Income Source	**Partici-pation**	**Coef. Conc.**	**Effect Marq.**	**Partici-pation**	**Coef. Conc.**	**Effect Marq.**	**Partici-pation**	**Coef. Conc.**	**Effect Marq.**
Remuneration	**69,97**		**-5,58**	**72,15**		**-6,53**	**2,18**		**-0,95**
Private Sector	34,10	0,3446	-13,66	37,87	0,3102	-15,63	3,77	-0,0344	-1,97
Public Sector	12,64	0,6727	2,15	16,02	0,6754	4,46	3,38	0,0027	2,31
Employer	10,22	0,8766	5,37	5,35	0,8527	3,29	-4,87	-0,0239	-2,08
Self-Employed	13,01	0,5996	0,56	12,91	0,5837	1,35	-0,10	-0,0159	0,79
Other Income	**18,25**		**10,31**	**17,03**		**11,96**	**-1,22**		**1,65**
Other labor income	2,16	0,7205	0,55	0,83	0,4631	-0,10	-1,33	-0,2574	-0,65
Alimony	0,59	0,4162	-0,16	0,16	0,2030	-0,10	-0,43	-0,2132	0,06
Rentals	0,86	0,6671	0,14	0,91	0,7324	0,35	0,05	0,0653	0,21
Asset Variation	13,88	0,9618	9,34	14,88	0,9472	11,80	1,00	-0,0146	2,46
Others	0,76	0,9077	0,44	0,25	0,5470	0,01	-0,51	-0,3607	-0,43
Transfers	**0,38**		**-0,44**	**0,80**		**-0,44**	**0,42**		**0,00**
Bolsa Familia	0,03	-0,8461	-0,06	0,02	-0,9014	-0,06	-0,01	-0,0553	0,00
Benefits Provided Continuously	0,11	-0,5169	-0,20	0,18	-0,5558	-0,36	0,07	-0,0389	-0,16
Social Programs	0,00	-0,6651	0,00	0,01	0,0138	-0,01	0,01	0,6789	-0,01
Others	0,24	0,1339	-0,18	0,59	0,5222	-0,01	0,35	0,3883	0,17
Pensions and Retirements	**11,41**		**-4,25**	**10,04**		**-4,99**	**-1,37**		**-0,74**
RGPS (> SM)	7,05	0,0765	-6,11	6,48	0,0736	-5,57	-0,57	-0,0029	0,54
RGPS (= SM)	0,09	-0,7236	-0,21	0,30	-0,6734	-0,68	0,21	0,0502	-0,47
RGPS Total	7,14	0,0660	-6,32	6,78	0,0407	-6,25	-0,36	-0,0253	0,07
RPPS (> RGPS)	2,93	0,9665	2,00	1,51	0,9376	1,17	-1,42	-0,0289	-0,83
RPPS (<=RGPS)	0,90	0,4501	-0,19	1,24	0,5029	-0,06	0,34	0,0528	0,13
RPPS Total	3,83	0,8454	1,81	2,75	0,7414	1,11	-1,08	-0,1040	-0,70
Private Social Security	0,44	0,9098	0,26	0,51	0,6798	0,15	0,07	-0,2300	-0,11
	Gini	0,5749		Gini	0,5282		Gini (%)	-8,1	

Source: Produced by the author based on the survey results

Table 6 shows the variation of inequality across and between the stages of household budget formation. From the analysis across stages, the greatest variation in the Gini coefficient is obtained when income from pensions and retirements is included (Stage 3). In 2009, this implied a reduction in inequality of 10.7% and in 2018, 11.7%. It is noted that in 2018, all income stages showed a greater variation from the previous stage when compared to 2009. Overall, the change in inequality between primary income and disposable income was -11.3% in 2009 and 14.1% in 2018.

Table 6: Comparatives – Income Stages

	2009		2018		Var. (%)
Stage	**Gini**	**Var. (%)**	**Gini**	**Var. (%)**	
1	**0,6484**	-	**0,6152**	-	**-5,1**
2	0,6445	-0,6	0,6094	-0,9	-5,4
3	0,5757	-10,7	0,5381	-11,7	-6,5
4	0,5749	-0,1	0,5282	-1,8	-8,1
	Total	-11,3	Total	-14,1	

Source: Produced by the author based on the survey results

The comparison among stages indicates that most of the change in Gini occurred in the last two stages. Pensions and retirements (Stage 3) and the deduction of direct taxes and social security contributions (Stage 4) started to reduce inequality more intensely in 2018, by about 6.5% and 8.1%, respectively.

4.2 Income Inequality at Different Degrees of Inequality Aversion

Tables 7 and 7.1 show the results of the decomposition of the extended Gini coefficient for six different degrees of inequality aversion. In addition to the "conventional" coefficient (v = 2) which is shown for comparison purposes, estimates are presented for v = 1.5, 1.75, 2.25, 2.5 and 3. As described in the methodology section, a degree of inequality aversion greater than 2 implies giving greater weight to the bottom of the distribution. Thus, increases in the marginal effect indicate greater influence of inequality from a certain source when there is an increase in the lower groups of the distribution.

As shown above, the Gini coefficient increases considerably the higher the value of the parameter v. The difference between the extreme scenarios is greater in 2009 than in 2018. In the first year the difference is 0.2515, given between the Gini is 0.4375 when v=1,5and 0.6890 when v=3. In the second survey this difference is smaller, at 0.2361. In principle, this result implies a smaller amplitude of the distribution, in which individuals with lower income had a lower weight in the Gini in the analyzed period.

The estimates also show that when inequality aversion is higher, in general, income sources become less influential. Taking for example the remuneration of workers in the private sector, in 2009 there is a marginal effect of -18.13% when v =1.5. When more weight is given to the base of the distribution, this influence loses strength, until it reaches -8.11% when v = 3. Sources of a regressive character also present a smaller marginal effect, such as the category "asset variation" which in 2009 registered a reduction from 14.09% to 5.93 in 2018.

Table 7: Income Inequality (Different Aversion Degrees), 2009

Income Source	v = 1,5	v = 1,75	v = 2,0	v = 2,25	v = 2,5	v = 3,0
Remunerations						
Private Sector	-18,13	-15,70	-13,66	-11,93	-10,46	-8,11
Public Sector	0,98	1,73	2,15	2,37	2,48	2,52
Employer	5,97	5,75	5,37	4,96	4,58	3,94
Self-Employed	0,28	0,49	0,56	0,55	0,49	0,33
Other Income						
Other Labor Income	0,68	0,61	0,55	0,50	0,46	0,39
Alimony	-0,10	-0,13	-0,16	-0,19	-0,20	-0,24
Rentals	0,13	0,14	0,14	0,12	0,10	0,07
Asset Variation	14,09	11,18	9,34	8,08	7,17	5,93
Others	0,56	0,50	0,44	0,39	0,35	0,29
Tranfers						
Bolsa Família	-0,05	-0,06	-0,06	-0,07	-0,07	-0,08
Benefits Provided Continuously	-0,18	-0,19	-0,20	-0,21	-0,21	-0,22
Social Programs	0,00	0,00	0,00	0,00	0,00	0,00
Others	-0,20	-0,19	-0,18	-0,18	-0,17	-0,16
Pensions and Retirements						
RGPS (> SM)	-6,39	-6,23	-6,11	-6,02	-5,95	-5,81
RGPS (= SM)	-0,18	-0,20	-0,21	-0,23	-0,24	-0,26
RGPS Total	-6,56	-6,43	-0,06	-6,25	-6,19	-6,07
RPPS (> RGPS)	2,57	2,27	2,00	1,77	1,58	1,32
RPPS (<=RGPS)	-0,34	-0,26	-0,19	-0,15	-0,12	-0,09
RPPS Total	2,23	2,02	0,02	1,61	1,46	1,23
Private Social Security	0,31	0,28	0,26	0,23	0,21	0,18
	0,4375	0,5202	0,5749	0,6143	0,6446	0,6890

Source: Produced by the author based on the survey results

Table 7.1: Income Inequality (Different Aversion Degrees), 2009

Income Source	v = 1,5	v = 1,75	v = 2,0	v = 2,25	v = 2,5	v = 3,0
	Effect Marq.	Effect Marq.	Effect Marq.	Effect Marq.	Effect Marq.	Effect Marq.
Remunerations						
Private Sector	-20,04	-17,64	-15,63	-13,93	-12,46	-10,05
Public Sector	2,97	3,96	4,46	4,69	4,76	4,67
Employer	3,63	3,50	3,29	3,08	2,88	2,56
Self-Employed	1,51	1,48	1,35	1,20	1,03	0,69
Other Income						
Other Labor Income	-0,09	-0,09	-0,10	-0,11	-0,12	-0,13
Alimony	-0,11	-0,10	-0,10	-0,10	-0,10	-0,11
Rentals	0,52	0,42	0,35	0,30	0,26	0,20
Asset Variation	17,29	13,96	11,80	10,31	9,22	7,71
Others	-0,01	0,00	0,01	0,01	0,01	0,01
Tranfers						
Bolsa Família	-0,05	-0,05	-0,06	-0,07	-0,07	-0,08
Benefits Provided Continuously	-0,32	-0,34	-0,36	-0,38	-0,39	-0,40
Social Programs	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01
Others	-0,02	-0,01	-0,01	-0,01	-0,01	-0,01
Pensions and Retirements						
RGPS (> SM)	-5,81	-5,67	-5,57	-5,49	-5,42	-5,28
RGPS (= SM)	-0,58	-0,63	-0,68	-0,72	-0,76	-0,82
RGPS Total	-6,39	-6,31	-0,06	-6,21	-6,18	-6,09
RPPS (> RGPS)	1,29	1,25	1,17	1,08	0,99	0,85
RPPS (<=RGPS)	-0,26	-0,14	-0,06	-0,01	0,01	0,03
RPPS Total	1,03	1,11	0,01	1,06	1,00	0,88
Private Social Security	0,07	0,12	0,15	0,16	0,17	0,17
	0,4006	0,4771	0,5282	0,5655	0,5943	0,6367

Source: Produced by the author based on the survey results

But what conclusions can be drawn from these results? The analysis of the variation of marginal effects in the different scenarios allows us to conclude that despite the great potential that labor compensation performs on total inequality, this source of income exerts less influence at the extremes of the distribution. The analysis of the variation in the marginal effects in the different scenarios allows us to conclude that despite the great potential that labor compensation has on total inequality, this

source of income has less influence at the extremes of the distribution. In this case, a considerable part of the individuals who receive this income are in the middle of the distribution (Lerman and Yitzhaki 1994).

Thus, the interest is to identify which income sources have their progressivity intensified the higher the degree of aversion. The Bolsa Família (the degree of progressivity increases by 0.03 percentage points in 2009 and 0.04 in 2018), Continuous Cash Benefit (increases by 0.04 percentage points in 2009 and 0.08 in 2018), and pensions equal to the minimum wage (0.08 in 2009 and 0.24 in 2018) are the portions of total income that meet this requirement in both 2009 and 2018.

The "alimony" category, which also includes gift amounts, also has its degree of progressivity increased in 2009 (the effect is increased by 0.14 percentage points), but is stable in 2018 (-0.11%). On the other hand, the "Other Employment Income" group also has its progressivity increased only in 2018 (0.04 percentage points).

These results indicate that while labor income has a high potential for reducing inequality on average, smaller welfare transfers and benefits have more weight for the poorest individuals in the distribution, generating greater effectiveness.

4.3 Comparison with Other States

The results presented so far indicate that Paraná has redistributive policies that do reduce income inequality. In total, the reduction is 14.1%. However, it is not possible to infer, a priori, that this is a significant rate. Thus, it is appropriate to establish a comparative picture with other states in the country, as shown in Table 8:

Table 8: Comparison of Gini in Income Stages, By Federative Unit, 2018

Class. PIB 2018	State	Variation by Income Stage (%)									
		1		1 → 2		2 → 3		3 → 4		1 → 4	
		(Trab.)		(Transfer)		(Retirement)		(Tax)		(Final)	
-	Brazil	0,659	Class.	-2,1	Class.	-13,6	Class.	-3,1	Class.	-18,0	Class.
1	SP	0,672	16	-0,6	26	-11,4	21	-1,5	23	-13,3	23
2	RJ	0,644	10	-0,9	25	-16,0	7	-4,0	7	-20,1	8
3	MG	0,644	11	-1,4	20	-14,9	10	-5,0	4	-20,3	7
4	RS	0,663	14	-1,2	21	-13,3	15	-2,0	21	-15,9	19
5	PR	0,615	5	-0,9	24	-11,7	17	-1,8	22	-14,1	22
6	SC	0,625	7	-1,1	22	-16,3	6	0,1	26	-17,1	16
7	BA	0,693	23	-2,8	7	-15,9	8	-1,2	25	-19,3	11
8	DF	0,700	24	-0,5	27	-5,2	27	-2,0	20	-7,6	27
9	GO	0,651	13	-1,6	16	-8,9	24	-3,1	12	-13,2	24

10	PE	0,672	17	-2,7	8	-14,2	11	-3,4	9	-19,4	10
11	PA	0,673	18	-2,9	6	-11,7	18	-4,2	6	-17,9	14
12	CE	0,731	26	-2,3	11	-15,3	9	-3,1	11	-19,8	9
13	MT	0,600	2	-1,6	17	-11,3	22	-2,8	14	-15,1	21
14	ES	0,684	21	-1,0	23	-12,3	16	1,1	27	-12,2	26
15	MS	0,631	8	-1,6	18	-8,8	25	-7,8	2	-17,2	15
16	AM	0,651	12	-2,6	9	-7,6	26	-3,1	10	-12,8	25
17	MA	0,664	15	-3,5	3	-21,6	1	-2,5	17	-26,2	1
18	RN	0,678	19	-2,3	12	-14,0	12	-2,5	16	-18,1	13
19	PB	0,732	27	-3,0	5	-18,4	4	-3,9	8	-24,0	3
20	AL	0,716	25	-3,8	2	-21,0	2	-2,5	15	-25,9	2
21	PI	0,684	20	-3,2	4	-19,0	3	-2,3	18	-23,5	4
22	RO	0,605	3	-1,5	19	-13,6	14	-4,2	5	-18,4	12
23	SE	0,692	22	-2,6	10	-11,4	20	-2,9	13	-16,2	18
24	TO	0,613	4	-1,7	15	-16,3	5	-5,8	3	-22,6	6
25	AP	0,595	1	-4,4	1	-10,0	23	-2,1	19	-15,7	20
26	AC	0,643	9	-2,3	13	-13,7	13	-1,2	24	-16,7	17
27	RR	0,621	6	-2,1	14	-11,6	19	-10,7	1	-22,8	5

Source: Produced by the author based on the survey results

Table 8 shows the degree of reduction of the Gini coefficient for each of the income stages in 2018, classified according to the 2018 GDP (IBGE, 2021). Based on this information, redistributive policies have relatively less effectiveness in Paraná compared to the national average at all stages[24].

In the first stage, for example, transfers reduce inequality by about 0.9%, but the average for the country is -2.1%. This is to some extent expected because of the assumption that cash transfers have greater redistributive potential in lower income states. However, the average for Paraná is also lower when we consider the addition of pensions and retirements (11.7% in Paraná and 13.6% in Brazil) and direct taxes (1.8% in Paraná and 3.1% in Brazil). In total, the rate of 14.1% is only the 22nd among all the 26 states and the Federal District, indicating, therefore, a low effectiveness of the redistributive policies.

This becomes more evident when a stage-by-stage evaluation is done. In relation to Stage 1, which considers labor income, Paraná has the fifth lowest Gini coefficient in the country, 0.6152. In Stage 3, after the addition of transfers, the state becomes the sixth best distributed (0.6094). In Stage

24 It is not possible to infer that "the redistributive policies in Paraná have low effectiveness", because we are not evaluating only the actions of the state initiative, but the set of policies carried out by different entities (federal, state, and municipal) operating in this state.

3, it is only tenth (0.5381), until it reaches the twelfth best income distribution in Stage 4 (0.5282). Overall, the effectiveness rate of redistributive policies acting in Paraná ranks 22nd among those that most reduce income inequality in 2018, with 14.1%. Only in São Paulo (13.3%), Goiás (13.2%), Amazonas (12.8%), Espírito Santo (12.2%) and Distrito Federal (7.6%) redistributive policies have a lower effectiveness rate.

Table 9, in turn, presents the estimates of the participation, concentration coefficient and marginal effect of the income sources that make up the household budgets of the eight largest states in the country referring to Stage 4 for the year 2018.

Tabela 9: Breakdown of Income Inequality, by Income Source (Stage 4 or Disposable Income), By Federative Unit, 2018

	Participation									
Income Source	**Brazil**	**G8 Average**	**SP**	**RJ**	**MG**	**RS**	**PR**	**SC**	**BA**	**GO**
Private Sector	0,30	0,35	0,39	0,34	0,37	0,32	0,38	0,35	0,30	0,32
Public Sector	0,23	0,17	0,11	0,20	0,18	0,14	0,16	0,13	0,18	0,23
Employer	0,05	0,05	0,08	0,03	0,06	0,03	0,05	0,04	0,07	0,02
Self-Employed	0,12	0,11	0,11	0,10	0,11	0,11	0,13	0,12	0,11	0,09
Other Labor Income	0,01	0,01	0,01	0,02	0,01	0,01	0,01	0,01	0,01	0,01
Alimony	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Rentals	0,00	0,01	0,01	0,00	0,01	0,00	0,01	0,01	0,01	0,01
Asset Variation	0,13	0,16	0,19	0,09	0,10	0,23	0,15	0,20	0,13	0,23
Others	0,01	0,00	0,00	0,00	0,00	0,01	0,00	0,01	0,00	0,00
Tranfers	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Bolsa Família	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,00
Social Programs	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Others	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01
RGPS (> SM)	0,08	0,08	0,07	0,10	0,09	0,08	0,06	0,09	0,10	0,05
RGPS (= SM)	0,01	0,01	0,00	0,01	0,01	0,00	0,00	0,01	0,02	0,00
RPPS (> RGPS)	0,02	0,02	0,01	0,05	0,02	0,03	0,02	0,02	0,01	0,01
RPPS (<=RGPS)	0,02	0,02	0,01	0,03	0,02	0,02	0,01	0,01	0,02	0,01
Private Social Security	0,01	0,01	0,01	0,01	0,00	0,01	0,01	0,01	0,01	0,00

Concentration Coefficient										
Income Source	**Brazil**	**G8 Average**	**SP**	**RJ**	**MG**	**RS**	**PR**	**SC**	**BA**	**GO**
Private Sector	0,3219	0,3300	0,4010	0,3195	0,3463	0,2988	0,3102	0,2973	0,4027	0,2640
Public Sector	0,7170	0,7122	0,6127	0,7428	0,7265	0,7163	0,6754	0,7248	0,7308	0,7682
Employer	0,8513	0,8256	0,8989	0,8345	0,8355	0,7693	0,8527	0,7220	0,9181	0,7736
Self-Employed	0,4217	0,4768	0,5848	0,4289	0,4570	0,4792	0,5837	0,5376	0,3624	0,3804
Other Labor Income	0,5489	0,5539	0,6494	0,6440	0,7809	0,4364	0,4631	0,3057	0,7593	0,3921
Alimony	-0,1158	-0,0779	0,1096	-0,2930	-0,1347	-0,0552	0,2030	-0,1673	-0,0412	-0,2442
Rentals	0,4642	0,5650	0,6330	0,4070	0,5683	0,5053	0,7324	0,6044	0,6857	0,3841
Asset Variation	0,9335	0,9485	0,9609	0,9332	0,9181	0,9597	0,9472	0,9542	0,9386	0,9757
Other Income	0,5231	0,5669	0,3591	0,4307	0,5178	0,8697	0,5470	0,8531	0,6020	0,3558
Bolsa Família	-0,7890	-0,8727	-0,9238	-0,9010	-0,8400	-0,8868	-0,9014	-0,9176	-0,7090	-0,9021
Benefits Provided Continuously	-0,1975	-0,4142	-0,5938	-0,5180	-0,2041	-0,5123	-0,5558	-0,6020	0,0535	-0,3811
Social Programs	0,0885	0,1597	-0,0799	0,5305	0,5618	0,2126	0,0138	0,3215	0,3010	-0,5836
Others Tranfers	0,4776	0,4922	0,6874	0,5147	0,5933	0,4187	0,5222	0,2518	0,6753	0,2740
RGPS (> SM)	0,1927	0,1148	0,1656	0,1803	0,1801	0,0378	0,0736	-0,0430	0,2752	0,0491
RGPS (= SM)	-0,4069	-0,5859	-0,6953	-0,6900	-0,3931	-0,6362	-0,6734	-0,7638	-0,1808	-0,6547
RPPS (> RGPS)	0,9239	0,9503	0,9337	0,9389	0,9665	0,9522	0,9376	0,9452	0,9732	0,9552
RPPS (<=RGPS)	0,5848	0,5522	0,4777	0,5045	0,5880	0,5610	0,5029	0,5293	0,7553	0,4991
Private Social Security	0,6809	0,6989	0,7106	0,7470	0,7385	0,6467	0,6798	0,6710	0,8122	0,5855

Marginal Effect										
Income Source	**Brazil**	**G8 Average**	**SP**	**RJ**	**MG**	**RS**	**PR**	**SC**	**BA**	**GO**
Private Sector	-11,77	-13,53	-12,23	-13,07	-12,08	-14,77	-15,63	-14,77	-8,49	-17,22
Public Sector	7,70	5,58	0,57	8,69	7,44	4,10	4,46	5,39	5,55	8,43
Employer	2,82	2,68	4,22	1,85	3,81	1,19	3,29	1,60	4,54	0,90
Self-Employed	-2,29	-1,17	0,05	-1,73	-1,20	-1,48	1,35	0,45	-3,89	-2,89
Other Labor Income	0,19	0,11	0,07	0,55	0,56	-0,14	-0,10	-0,38	0,48	-0,15
Alimony	-0,35	-0,25	-0,20	-0,34	-0,36	-0,24	-0,10	-0,25	-0,32	-0,16
Rentals	-0,01	0,05	0,04	-0,05	0,06	-0,04	0,35	0,11	0,11	-0,18
Asset Variation	9,27	12,28	12,32	7,59	7,63	16,90	11,80	16,54	8,55	16,94
Other Income	0,13	0,12	-0,04	-0,05	0,00	0,41	0,01	0,73	0,03	-0,12
Bolsa Família	-0,58	-0,18	-0,04	-0,21	-0,18	-0,07	-0,06	-0,03	-0,79	-0,09
Benefits Provided Continuously	-0,52	-0,43	-0,27	-0,20	-0,66	-0,27	-0,36	-0,13	-1,03	-0,48
Social Programs	-0,01	-0,01	0,00	0,00	0,00	-0,01	-0,01	0,00	-0,02	-0,01
Others Tranfers	0,00	-0,05	0,16	0,00	0,09	-0,17	-0,01	-0,30	0,17	-0,35

RGPS (> SM)	-5,02	-6,13	-4,84	-6,48	-6,00	-7,46	-5,57	-9,44	-5,05	-4,17
RGPS (= SM)	-1,42	-1,08	-0,49	-1,25	-1,69	-0,39	-0,68	-1,28	-2,06	-0,78
RPPS (> RGPS)	1,34	1,71	0,76	4,26	2,12	2,33	1,17	1,53	1,09	0,45
RPPS (<=RGPS)	0,31	0,08	-0,21	-0,05	0,24	0,01	-0,06	0,03	0,76	-0,12
Private Social Security	0,21	0,21	0,14	0,49	0,21	0,09	0,15	0,24	0,35	0,02

Source: Produced by the author based on the survey results

The results related to the participation of each source of income show that the representativity of the private sector in Paraná is higher than the national average (38.0% in Paraná and 30.0% in Brazil) and the average of the eight largest states (35.0%), being lower only than the state of São Paulo (39.0%). In relation to the concentration coefficient, which measures the degree of inequality of the source of income itself, it can be observed that Paraná has a relatively more balanced distribution than the average for Brazil and the eight largest states (0.3102 and 0.3300, respectively). The combination of high participation and low concentration is responsible for a high degree of progressivity of the Paraná private sector, which registers a marginal effect of -15.63. This effect is higher (in module) than the one verified in Brazil, -11.77. Among the eight largest GDPs in the country, only Goiás has a higher marginal effect, -17.22.

These results allow us to infer that the redistributive policies analyzed have proven to be relatively less effective in Paraná when compared to the other states. Therefore, income inequality in the state is not higher mainly because of the distribution of labor income, which is much less concentrated than the other states, both in the private and public sectors.

4.4 Considerations about the Results

Some of the findings in this paper reinforce the understanding that the incomes of employees in the private sector hold the greatest impact with respect to reducing income inequality. Moreover, this category has seen an increase in its degree of progressivity. In 2009, the marginal effect on Stage 4 was estimated at -13.66%, and in 2018 this increased to -15.63%.

On the other hand, the incomes of public sector workers and the self-employed were more regressive in the period. Similar evidence was found in studies such as those by Barros et al. (2006), Rocha (2012) and Hoffmann (2009, 2010), at the national level, and in the studies by Baptistella et al. (2007), Gabriel and Ferreira (2009) and Gabriel et al. (2012) for Paraná. Despite being regressive, the effect of employee income was reduced: from 5.37% to 3.29%.

It was also possible to verify the progressive nature of cash transfer programs, such as Bolsa Família and the Continuous Cash Benefit, whose effects are already widely known in the literature (Souza et al., 2016; Medeiros, 2007; Cardoso, 2016). However, the total effect of this group on inequality was reduced, remaining at -0.44% in the two years of the survey.

Despite the lack of consensus in the literature regarding the total effect of pensions and retirements on income inequality in Brazil, as cited by Hoffmann (2009), the results for Paraná indicated that, in general, these resources hold great capacity to reduce income inequality: -4.25% in 2009 and -4.99% in 2018. These results are supported by works such as those of Ferreira and Souza (2008), Rangel (2011).

The influence of direct taxes is in line with the results of Medeiros and Souza (2013, 2013), Silveira (2008), Silveira et al. (2019) and Castro and Buragin (2017). It is possible to verify that these are progressive, but that they do not reduce inequality in an expressive way. In 2009 income tax, social security contributions and other deductions reduced income concentration by only 0.1% in 2009, and 1.8% in 2018.

Other findings bring a different view from that already established in the literature. Adopting the criterion of dividing the group of pensions and retirements into two income ranges (the income from the RGPS was divided with reference to the value of the minimum wage in force at the time, and those from the RPPS were classified based on the value of the RGPS benefit ceiling), it was observed that not all benefits received by public servants are regressive.

Although the portion whose values are greater than the RPGS ceiling is indeed regressive (the marginal effect was estimated at 2.0% in 2009 and 1.17% in 2018), the portion whose values are lower than the established limit are progressive (the marginal effect registered -0.19% in 2008 and -0.06%). Although the marginal effect is small, such magnitude is comparable to that of the Bolsa Família Program (the estimated marginal effect remained constant over the period, -0.06%).

The estimates for different degrees of aversion show that when the weighting increases (that is, when v is greater than 2, implying a large aversion to inequality) most of the income com ponents have less influence on total inequality. The only transfers that began to exert a greater effect in the two years studied are Bolsa Família, the Continuous Cash Benefit, and pensions equal to the minimum wage. We conclude, therefore, that if the judgment about the is greater (implying a greater aversion to inequality), cash transfer programs are the best redistributive policy option, since they are resources that are being allocated among lower income individuals, and have a greater relative effect on reducing inequality.

Although not surprising, the results found reinforce the existing notion in the literature presented that the labor market is the component that has the most influence on income inequality and that transfers also contribute to a better distribution, although with reduced effect.

However, in comparison with other states, the labor market has a greater importance in Paraná, due to a low effectiveness of redistributive policies, which place Paraná only in 22nd place among Brazilian states that most reduce inequalities through these instruments. The high participation and reduced concentration of income coming from the private sector is what allows Paraná's income distribution to be no more unequal. Besides, it is denoted that only part of the public sector social secu-

rity benefits is regressive in Paraná. The portion whose values are lower than the RGPS ceiling are as progressive as the Bolsa Família Program transfers.

5 FINAL CONSIDERATIONS

According to IBGE data, Paraná had the highest rate of reduction of the Gini coefficient among the eight largest economies in the country, with a 17.0% drop. Through data from the 2008-2009 and 2017-2018 Family Budget Survey, this study found that the coefficient went from 0.5749 to 0.5282, implying a reduction of 8.1%. Even though Paraná has an income inequality lower than the national average, it is still a highly concentrated income when compared to countries in Europe and Asia and even the United States[25]. Given this context of high concentration, what can be done?

To mitigate the effects that an excessively unequal income can exert on the economy, governments can promote redistributive policies, such as resource transfers or a progressive allocation of taxes. However, it is possible that not all policies are effective, thus motivating studies that promote a detailed analysis of these actions (Clements et al. 2015).

In this sense, the main objective of this essay was to provide an understanding of how the shares that make up the household budgets contributed to the evolution of income inequality in Paraná between 2009 and 2018. The intention was to evaluate government spending as to its distributional aspects, weighting the progressive and regressive portions, contributing to the "new generation" of studies on income inequality, which is essentially concerned with the quality of public expenditure (Medeiros and Souza 2013, p. 9).

Some of the results found are in line with those found for Brazil, especially regarding the importance of the labor market, direct taxes, and the role of cash transfer programs. However, some of the findings revealed that, as far as Paraná is concerned, some income sources presented an unusual behavior in relation to the results found in national level studies.

First, it was verified that the payment of pensions and retirements to public servants are regressive. However, the benefits whose values are lower than the ceiling of the General Regime of Social Security (RGPS) are progressive, i.e., they contribute to the reduction of income inequality. Second, it is important to note that this portion exerts a greater effect on income inequality than the Bolsa Família Program. Although it is not necessarily focused on the low-income population, this income has a much higher participation in the budget composition, which reinforces its progressivity.

The study naturally has limitations. One of them concerns the fact that the POF does not provide information on the payment of indirect taxes, which are known in the literature for their regressive character (Silveira 2008). A comparison between the effect between direct and indirect taxes could

25 According to World Bank data (2021), the European country with the highest Ginicoefficient is Turkey (0.412 in 2016) and the most unequal Asian country is the Philippines (0.444 in 2015). The Gini coefficient of the United States is 0.411 in 2016).

have enriched the research. Furthermore, the provision of public services related to health, education, public safety, etc., another important redistributive policy instrument, was not taken into account.

In general terms this essay provides evidence that despite the fall in income inequality, there was not a uniform contribution on the part of fiscal policy in Paraná, understood as the totality of the three levels of government. There was an expansion in transfers (the share of this group grew 0.42 percentage points) and an increase in the influence on inequality in stages 3 (which includes pensions and retirement) and 4 (tax deduction) during the period. However, the remuneration of public servants had an increase in the participation in family budgets (increase of 3.38 percentage points) and became more concentrated (the concentration coefficient grew 0.4%), which implied an increase in regressiveness (2.31 percentage points). Moreover, the comparison with other states showed that redistributive policies are less effective in Paraná than in other states, reinforcing the importance of the labor market for a less unequal distribution.

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ANNEX 1: Composition of Income Sources, by POF Item Code 2008-2009 and 2017-2018

Grupo	Categoria	Descrição	Códigos/Variáveis utilizadas	
			POF 2008-2009	POF 2017-2018
Remunerations	Private Sector	Monetary compensation of workers in the private sector, including domestic servants and casual workers.	53001, 53004, 53008, 53003	53003, 53001, 53007
	Public Sector	Monetary compensation of workers in the public sector, including military personnel.	53002	53002, 53004
	Employer	Compensation of individuals who work for their own enterprise.	53005, 55003	53005
	Self-Employed	Compensation of workers who, individually or with a partner, without having an employee, carry out an economic activity or exercise a profession or trade on a permanent or casual basis.	53006, 53009	53006
Pensions and Retirement	General Regime of Social Security (RGPS)	Retirement and public pension from the General Regime of Social Security (RGPS).	54001, 54002, 55022, 55023, 55064	54004, 54005, 55003, 55004, 55050
	Special Social Security System (RPPS)	Retirement and pension from public social security received from the Special Social Security System (RPPS), (municipal, state and federal).	54003, 54004, 55065	54006, 54007, 54031, 55005, 55006, 55064
	Private Welfare Plan	Private pension plan retirement (retirement, supplementation and complementation of private pension plans, open or closed, received by the taxpayer in the form of savings and supplementation or complementation of retirement).	54005, 54023, 55025, 55033, 55066	54008, 54029, 55007, 55033, 55047, 54009
Transfers	Bolsa Família	Bolsa Família Program, created by Federal Law n' 10.836. of 09/01/2004.	54010	5400101
	Continuous Cash Benefit (BPC)	Provided for in the Organic Law of Social Assistance LOAS). Federal Law n' 8.742. of 12/07/1993.	54011	5400102
	Federal Social Programs	Income transfers from federal social programs: Child Labor Eradication Program - PETI, etc., except Family Stipend (Bolsa Familia) Continuous Cash Benefit of the Organic Law of Social Assistance - BPC-LOAS.	54012, 54024	54003, 5400103, 5400104, 5400105, 5400106, 5400107, 5400108
	Other	Refunded premiums and indemnities paid by insurance companies, gambling winnings, Bolsa Famílias, birth allowance, state and municipal social programs, unemployment insurance, maternity allowance, funeral allowance and other similar transfers.	54006, 54013, 54014, 54019, 54021, 54022, 54025, 54027, 54028, 54029, 54030, 54031, 54035, 55017, 55018, 55029, 55031, 55055, 55059	54003, 54009, 54010, 54023, 54027, 54030, 55009, 55017, 55018, 55019, 55027, 55028, 55029, 55030, 55031, 55032, 55034, 55036, 55045, 55049, 55051, 55052, 55054, 55055, 55059, 55062, 55065, 55066

ANNEX 1: Composition of Income Sources, by POF Item Code 2008-2009 and 2017-2018 (continued)

Grupo	Categoria	Descrição	Códigos/Variáveis utilizadas	
			POF 2008-2009	POF 2017-2018
Other incomes	Other Income from Labor	Ticket/food card allowance; transportation and fuel allowance/vale, etc.	54015, 54016, 54017, 54018, 54020, 54036, 54037, 54038, 55001, 55002, 55011, 55026, 55035, 55037, 55038, 55039, 55040, 55041, 55042, 55043, 55045, 55062, 55063	54016, 54017, 54020, 54021, 54022, 54025, 54026, 54028, 54032, 54033, 54034, 55001, 55002, 55011, 55012, 55013, 55014, 55015, 55038, 55039, 55040, 55042, 55043, 55058
	Alimony	Alimony, pocket money, gift, interfamily transfer, etc.	54007, 54026, 54032, 55030	54011, 54012, 54013, 55057, 55063
	Rentals	Refers to monetary income derived from rental, occupation, use, or exploitation of real estate rights, including sublease of houses, apartments, rooms, sites, stores, parking spaces, farms, land, and others. It also includes the rental, use, or exploitation of rights to movable property, such as vehicles, party equipment, copyright exploitation, and inventions.	54008, 54009	54014, 54015
	Net Worth Variation	It includes sales of real estate, cars and other assets, inheritances and the positive balance of financial turnover (deposits and withdrawals from financial investments such as savings and investment fund shares).	55005, 55006, 55008, 55010, 55014, 55044, 57001, 57002, 57003, 57004, 56001, 56002, 56003, 56004	55008, 55010, 55016, 55020, 55026, 55035, 55037, 55044, 55053, 55061, 57001, 57002, 57003, 57004, 56001, 56002, 56003, 56004, 53007, 55021, 55022, 55023, 55024, 55025
	Other	Other income not classifiable in the other categories	54033, 54034, 55004, 55007, 55009, 55012, 55013, 55015, 55016, 55019, 55020, 55021, 55024, 55027, 55028, 55032, 55034, 55036, 55046, 55052, 55054	54018, 54019, 54035, 55041, 55046, 55048, 55060, 55067
Deductions	Social Security	Deduction with public social security that was levied on the income received by the informant in the reference period of the survey.	val_deducao_prev_corrigido	V531112_DEFLA
	Income Tax	Deduction with income tax levied on the income received by the informer	val_deducao_ir_corrigido	V531122_DEFLA
	Other	Deduction with ISS and other taxes levied on the income received by the informant during the reference period of the survey.	val_deducao_outra_corrigido	V531132_DEFLA

Source: POF 2008-2009 and 2017-2018

ANNEX 2: Gini index of the distribution of nominal monthly income from all jobs for people 10 years old and older, employed in the PNAD's reference week

State	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Var (%) 2004-2018
AC	0,574	0,574	0,560	0,562	0,525	0,572	0,533	0,503	0,498	0,465	-19,0
AL	0,539	0,539	0,592	0,569	0,544	0,532	0,548	0,478	0,462	0,466	-13,5
AM	0,483	0,483	0,472	0,479	0,489	0,485	0,539	0,492	0,470	0,494	2,3
AP	0,537	0,537	0,448	0,485	0,442	0,488	0,546	0,479	0,493	0,476	-11,4
BA	0,536	0,536	0,536	0,529	0,534	0,533	0,560	0,523	0,517	0,537	0,2
CE	0,568	0,568	0,536	0,523	0,533	0,528	0,556	0,504	0,502	0,478	-15,8
DF	0,605	0,605	0,589	0,604	0,618	0,607	0,594	0,598	0,572	0,570	-5,8
ES	0,546	0,546	0,525	0,511	0,511	0,506	0,523	0,494	0,481	0,466	-14,7
GO	0,543	0,543	0,511	0,514	0,512	0,508	0,512	0,476	0,471	0,469	-13,6
MA	0,609	0,609	0,587	0,525	0,507	0,517	0,555	0,505	0,577	0,515	-15,4
MG	0,542	0,542	0,525	0,507	0,506	0,504	0,509	0,486	0,486	0,479	-11,6
MS	0,531	0,531	0,531	0,561	0,530	0,517	0,526	0,513	0,485	0,498	-6,2
MT	0,525	0,525	0,520	0,495	0,543	0,490	0,503	0,485	0,516	0,479	-8,8
PA	0,530	0,530	0,504	0,511	0,495	0,491	0,541	0,514	0,484	0,478	-9,8
PB	0,589	0,589	0,559	0,582	0,570	0,562	0,563	0,527	0,515	0,508	-13,8
PE	0,588	0,588	0,559	0,523	0,538	0,522	0,553	0,482	0,474	0,466	-20,7
PI	0,606	0,606	0,607	0,599	0,579	0,558	0,569	0,515	0,546	0,516	-14,9
PR	0,559	0,559	0,524	0,533	0,507	0,494	0,506	0,472	0,480	0,464	-17,0
RJ	0,536	0,536	0,535	0,525	0,522	0,522	0,532	0,506	0,500	0,503	-6,2
RN	0,566	0,566	0,549	0,550	0,543	0,547	0,543	0,535	0,526	0,524	-7,4
RO	0,519	0,519	0,536	0,474	0,484	0,493	0,521	0,476	0,471	0,451	-13,1
RR	0,512	0,512	0,560	0,507	0,520	0,512	0,546	0,520	0,504	0,500	-2,3
RS	0,531	0,531	0,510	0,496	0,501	0,492	0,504	0,481	0,471	0,463	-12,8
SC	0,475	0,475	0,486	0,470	0,475	0,473	0,464	0,445	0,434	0,438	-7,8
SE	0,552	0,552	0,542	0,524	0,522	0,552	0,564	0,544	0,533	0,554	0,4
SP	0,516	0,516	0,518	0,496	0,493	0,482	0,514	0,471	0,475	0,472	-8,5
TO	0,553	0,553	0,527	0,545	0,540	0,521	0,543	0,508	0,510	0,501	-9,4

Source: IBGE (2021)

ANNEX 3: Ranking of UFs by GDP and GDP per capita, 2018

Class.	GDP (in Millions R$)		GDP Per Capita (In R$)	
1	São Paulo	2.210.562	Distrito Federal	85.661,39
2	Rio de Janeiro	758.859	São Paulo	48.542,24
3	Minas Gerais	614.876	Rio de Janeiro	44.222,66
4	Rio Grande do Sul	457.294	Santa Catarina	42.149,30
5	Paraná	440.029	Rio Grande do Sul	40.362,75
6	Santa Catarina	298.227	Mato Grosso	39.931,13
7	Bahia	286.240	Mato Grosso do Sul	38.925,85
8	Distrito Federal	254.817	Paraná	38.772,74
9	Goiás	195.682	Espírito Santo	34.493,12
10	Pernambuco	186.352	Minas Gerais	29.223,22
11	Pará	161.350	Goiás	28.272,96
12	Ceará	155.904	Rondônia	25.554,31
13	Mato Grosso	137.443	Amazonas	24.532,90
14	Espírito Santo	137.020	Roraima	23.188,92
15	Mato Grosso do Sul	106.969	Tocantins	22.933,07
16	Amazonas	100.109	Amapá	20.247,53
17	Maranhão	98.179	Pernambuco	19.623,65
18	Rio Grande do Norte	66.970	Bahia	19.324,04
19	Paraíba	64.374	Rio Grande do Norte	19.249,60
20	Alagoas	54.413	Pará	18.952,21
21	Piauí	50.378	Sergipe	18.442,63
22	Rondônia	44.914	Acre	17.636,88
23	Sergipe	42.018	Ceará	17.178,26
24	Tocantins	35.666	Alagoas	16.375,56
25	Amapá	16.795	Paraíba	16.107,51
26	Acre	15.331	Piauí	15.432,05
27	Roraima	13.370	Maranhão	13.955,75
	Brazil	7.004.141		33.593,82

Source: IBGE (2021)