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# INCOME DISTRIBUTION IN BRAZIL DURING THE 2010S: A LOST DECADE IN THE STRUGGLE AGAINST INEQUALITY AND POVERTY

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## ABSTRACT

In this paper we analyze Pesquisa Nacional por Amostra de Domicílios Contínua (PNAD Contínua) Microdata from 2012 to 2018 to document how the mid-decade economic recession reversed the trend of pro-poor growth that dated back to the early 2000s. Since the recession, there was a rise in inequality and poverty levels and aggregate welfare decreased. While average incomes surged from 2017 to 2018, they were still below their peak in 2014. More than 80% of all income growth between 2015 and 2018 accrued to the top 5%. Most distributional statistics suggest Brazil in 2018 was either back at the same levels or even worse-off than in 2012. This paper also relies on decomposition techniques to investigate the immediate causes behind this reversal of fortune. We find that the effects of the recession on the labor market explain a lot of the recent changes, but public transfers also played a role in distributional dynamics – either by action or inaction. Social assistance transfers and unemployment compensation failed to address rising inequality and poverty in any significant way. At the same time, Social Security contributed to surprisingly large increases in inequality due to the rise in pensions to the well-off. Finally, we show that in the past few years poverty rates were much more sensitive to changes in inequality than in average incomes. Indeed, if there were no increase inequality Brazil would have made further progress in reducing poverty even amid the recession.

**JEL codes:** I3, I32, D31, I38

**Keywords:** Inequality, Poverty, Welfare, Income, Income Transfers

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# Income Distribution in Brazil during the 2010s: A Lost Decade in the Struggle Against Inequality and Poverty

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## 1. Introduction: Another lost decade?

Ten years ago, Brazil stepped into the second decade of the new century full of hope. The early years of the 21<sup>st</sup> century had been the best the country ever lived in distributive terms, at least according to household surveys. Between 2001 and 2011, average household income grew by more than 30%, inequality – as measured by the Gini Coefficient – fell by more than 10%, and extreme poverty and poverty rates fell by 4 and 12 points, respectively (Souza *et al.*, 2019). The 2000s were a golden decade, and many of us believed the good news would keep coming in during the years between 2011 and 2020. We were foolishly mistaken.

The general story is well known. Instead of another golden decade, Brazil endured a perfect storm. The end of the commodity boom and macroeconomic mismanagement meant public finances ran amok. Recurring primary surpluses started shrinking in 2012 and finally turned into growing deficits from 2014 onwards. Meanwhile, numerous corruption charges against top-level officials and politicians embroiled the country in political crisis as well. As a result, Brazil was hit by the worst recession in decades. Between 2014 and 2016, GDP dropped by 6.7%, the worst three-year plunge since at least the mid-20<sup>th</sup> Century. President Dilma Rousseff was found guilty of breaking budget laws and impeached in a tumultuous inquiry, and her successor, Michel Temer, was equally plagued by corruption scandals. Increasing political polarization with a widely discredited Worker's Party at one extreme and a new radical right at the other led to the most polarized election in the country's history in 2018.

This paper describes trends in income inequality, poverty, and welfare amidst these multiple crises, and investigates the immediate causes behind each trend. We rely on recently

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released annual microdata for 2012-2018 from Brazil's new flagship household survey, the Pesquisa Nacional por Amostra de Domicílios Contínua (henceforth, PNADC), carried out by the Instituto Brasileiro de Geografia e Estatística (IBGE), Brazil's central statistics office.

Our results show that the period of economic instability starting in late 2014 did not hurt all income strata with the same intensity or even at the same time. The bottom half of the income distribution suffered more from the recession and their fortunes have yet to turn around. More specifically, the poorest deciles lost much of what they had gained in earlier years and reaped no benefits from the fledgling economic recovery. Rising unemployment is part of the story, but social protection policies did not provide enough cushion. In fact, some social policies were even cut back during the recession. For the wealthy, the recession was mostly a short-term shock, and robust income growth resumed afterwards. Thus, by 2018, the income distribution in Brazil had become a tale of two halves: while the bottom half was still mired in recession, the recovery was already progressing at full steam for the upper half.

In short, economic recessions and recoveries are not always alike and they do not impact all households similarly. In Brazil – and likely elsewhere – their effects were strongly conditional on the position of each person or household in the distribution of income. Hence, central tendency measures such as means, and medians fail to tell the whole story. Consequently, we provide in this paper a detailed description of distributive changes over the years 2012-2018, and assess several inequality, poverty and welfare indicators.

This paper is organized as follows: section 2 briefly describes the data sources; section 3 analyzes income growth across the full distribution; sections 4 and 5 discuss trends in income inequality and welfare, respectively; section 6 applies decomposition techniques to determine immediate causes of income growth and rising inequality; section 7 assesses the evolution of poverty indices; and section 8 summarizes our main results.

## **2. Data**

We use data from the PNADC, a nationally representative household sample survey carried out by IBGE, which has a rotating panel design where each household is surveyed once every quarter for five consecutive quarters. Households are continuously entering and exiting the study, so in any given quarter there are respondents for each of the five waves. Every interview collects data on labor market incomes, while other income sources – such as pensions, transfers etc. – are only assessed in the first and last interviews. Consequently, the quarterly

microdata only covers labor market incomes. Complete income records are available solely from the annualized microdata published by IBGE for each year with recalculated weights.

Our analysis is based exclusively upon the annualized microdata of the first interviews from 2012 to 2018 released by IBGE in October, 2019. Thus, our data is strictly cross-sectional. We follow IBGE in considering that the first interview provides more accurate income information than the last interview.

We also follow standard practice in Brazil and in Latin America and focus on the distribution of household income per capita, that is, the sum of incomes from all sources divided by the number of dwellers in each household. No equivalence scales are applied. As usual, we ignore household members whose relation to the household head implies they are not pooling resources, such as non-relatives who do not share expenses, domestic workers and their relatives, as well as boarders and pensioners.

We aggregated incomes into seven categories. Since IBGE changed the enumeration form in the fourth quarter of 2015 (2015.Q4), Box 1 lists the variables assigned to each income category – labor market incomes, BPC-LOAS (targeted social assistance transfers to persons with disabilities and elderly individuals who do not receive public pensions), Bolsa Família (targeted cash transfer to poor families), unemployment compensation, pensions indexed to the minimum wage (allowing for rounding errors), pensions higher than the minimum wage, and other sources.

All income sources were deflated to 2018 using the deflators provided by IBGE itself. For labor incomes, we used the CO2 deflator; for all the others we used the CO2e deflator. Both CO2 and CO2e are regional deflators.

**Box 1. Components of household income**

<b>Income Source</b>	<b>Description</b>	<b>PNADC Variable Names</b>
Labor market	Labor market incomes from all jobs	vd4019
BPC-LOAS	BPC-LOAS social assistance income	v500911 (until 2015/3); v5001a2 (from 2015/4)
Bolsa Família	Programa Bolsa Família and PETI social assistance income	v501011 (until 2015/3); v5002a2 (from 2015/4)
Unemployment compensation	Income from unemployment insurance and seguro defeso	v500811 (until 2015/3); v5005a2 (from 2015/4)

1MW Pensions	Public pension income whose benefits are equal to or less than 105% of the minimum wage.	v500111 and v500211 (until 2015.Q3); v5004a2 (from 2015.Q4)
Pensions above 1 MW	Public pension income whose benefits are greater than 105% of the minimum wage	
Other sources	Income from state and municipal social programs; Donations and alimony; Rents; Private pensions; Profits and interest payments as well as intellectual property payments.	v501111, v500511, v500711, v500611, v500311, v500411, v501211, v501311 (until 2015.Q3); v5003a2, v5004a2, v5007a2, v5008a2 (from 2015.Q4)

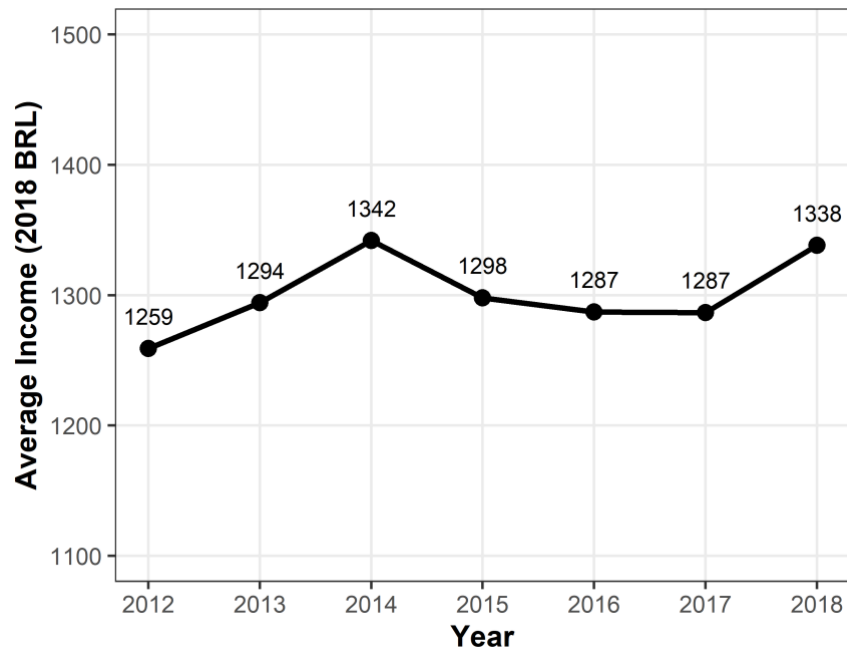
N.B.: “1MW” stands for 1 minimum wage.

### 3. Patterns of income growth

The economic downturn simultaneously hit Brazilian households in all income deciles in 2015, as shown in Figure 1. Prior to the recession, average per capita income followed the same growth trajectory seen in previous national surveys (such the old, now-discontinued annual PNAD series), rising 6,6% in real terms from 2012 to 2014. In 2015, it all came apart and real income fell by 3,3%, the most significant drop of the decade, and remained stagnant between 2015 and 2017. Robust growth only resumed three years later, in 2018. Average income increased by 4% in real terms, though this was not enough to match the 2014 peak of \$1,342 per capita (in 2018 BRL\$).

As bleak as they look, the PNADC figures are far less dramatic than official macroeconomic data. According to the National Accounts, real GDP per capita hit its peak earlier, in 2013, and collapsed by a whopping 9% between 2013-2016. In comparison, average income in the PNADC fell by just 1% over the same period. In addition, the 4% real income growth recorded by the 2018 PNADC was nowhere to be seen in the official macro figures: real GDP per capita grew by only 1%. In any case, such contrasting trends are not new, as household surveys and National Accounts rely on different concepts and sources and do not always move in tandem (see Bacha & Hoffmann, 2005).

Figure 1. Average household income *per capita* (in 2018 BRL\$) – Brazil, 2012-2018



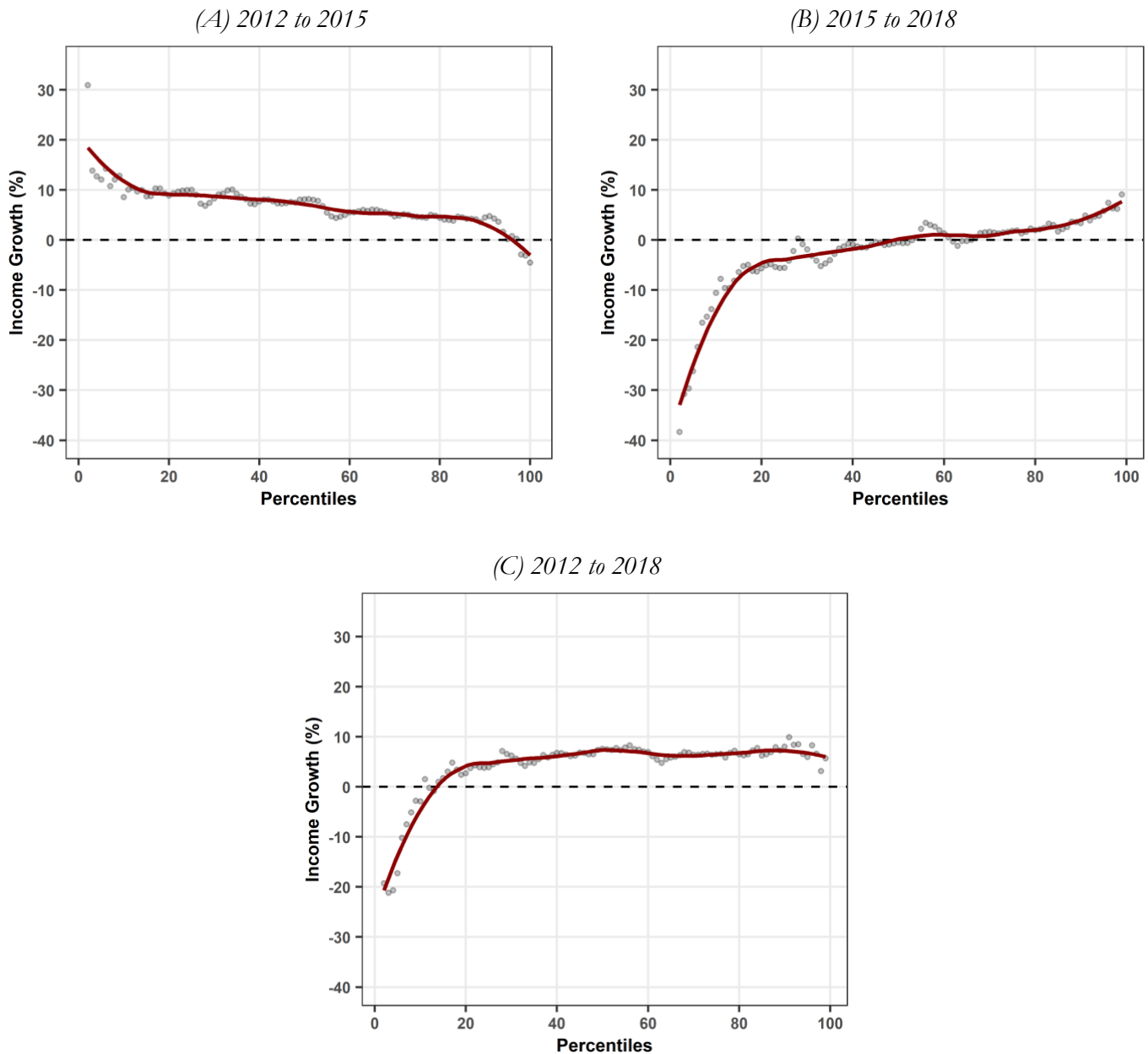
Source: Authors' calculations based on PNADC microdata.

Average incomes do not tell us how losses and gains were distributed. Growth Incidence Curves, presented in Figure 2, allow us to visualize how income growth rates vary across the income distribution, that is, they show the percentage change in real income by percentile over time. Naturally, each percentile does not correspond to the same set of families over the years. As explained above, the PNADC data is cross-sectional, so Growth Incidence Curves do not have anything to say about social mobility of well-defined units such as families or households.

Negatively inclined curves indicate pro-poor growth, which leads to decreases in inequality. This is exactly what happened between 2015 and 2015, as shown in Panel A of Figure 2. Growth rates were above average for the poorest percentiles and below average for the rich. In contrast, Panel B shows exactly the opposite trend for 2015-2018, that is, a positive correlation between growth rates and income percentile. Furthermore, the bottom half of the income distribution had either negative or zero growth, while the incomes of the upper half of the distribution had positive, though modest, growth.



**Figure 2. Growth Incidence Curves (%) – Brazil, 2012-2018**



Source: Authors' calculations based on PNADC microdata.

Note: data points denoted the observed change in real income by percentile (P02-P99). The smoothed line was calculated by non-parametric local regression to highlight trends.

In other words, the poor got poorer while the rich got richer. The poorest 10% suffered more than any other decile, with income losses in excess of 10%. At the same time, the top 50% experienced rising incomes, and relative growth rates as one moves up towards the top of the income distribution.

The net results of such contrasting periods is shown in Panel C of Figure 2. Pro-poor growth from 2012 to 2015 was almost cancelled out by pro-rich growth between 2015 and 2018, so by 2018 the poorest 10% were actually worse off than in 2012, while the top 80% had somewhat uniform growth rates around 7-8%.

Thus, the catch-all term “economic recession” hardly describes the Brazilian experience adequately. While the 2015 recession did cause an across the board drop in real incomes, subsequent shocks and the fledging economic recovery were far more selective. From 2016 onwards the top 10% were already on the road to recovery and by 2018 the recession was in the rearview mirror for the richest half of Brazilians. Indeed, the recovery was so biased towards the top that the increase in incomes was essentially driven by the top 5%.

Table 1 illustrates this by showing, for each period, the percentage of real income growth accruing to different income strata, from the first to the last quartile. For any given period, the percentages sum to 100%.

**Table 1. Share of cumulative real income growth accruing to different income strata (%) – Brazil, 2012-2018**

Stratum	Periods		
	2012-2015	2015-2018	2012-2018
P0-P25 (25% poorest)	15.5	-15.2	-0.1
P25-P50	29.1	-6.9	10.8
P50-P75	35.9	6.6	21.0
P75-P100 (25% richest)	19.5	115.5	68.3
<i>P75-P90</i>	<i>29.5</i>	<i>17.6</i>	<i>23.4</i>
<i>P90-P95</i>	<i>13.0</i>	<i>17.6</i>	<i>15.3</i>
<i>P95-P100 (5% richest)</i>	<i>-23.0</i>	<i>80.3</i>	<i>29.5</i>
<b>Brazil</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

Source: Authors’ calculations based on PNADC microdata.

From 2012 to 2015, two-thirds of all income growth benefitted the middle of the income distribution (that is, the second and third quartiles – from P25 to P75). The third quartile – individuals whose income was higher than the median and lower than the 75<sup>th</sup> percentile – fared especially well, capturing 36% of total growth, thanks to a booming labor market and hefty minimum wage hikes. Figures for the top quartile were slightly higher than for the poorest

quartile, but this was mostly driven by the “not so rich” among the rich, that is, those between the 75<sup>th</sup> and 90<sup>th</sup> percentiles. Real income for the top 5% decreased. Also, the income share of the poorest 25% in 2012 was below 5%, so it is indeed quite noteworthy that almost 16% of total income growth accrued to this group.

Everything changed over the new years. Incomes dropped across the board in 2015, but the recovery was tilted towards the rich, even in 2018, when average income surged. Between 2015 and 2018 the bottom half of the income distribution got poorer, so all income gains accrued to the top half. The real winners were the top 5%, as more than 80% of total growth wound up in the deep pockets of this small group.

The figures for the full period retain this regressive pattern, albeit less markedly. More than two-thirds of all growth between 2012 and 2018 accrued to the top quartile. If we lump this figure together with the results for the third quartile, then the upper half of the income distribution accounts for almost 90% of all growth.

## 4. The Great Reversal in Inequality Trends

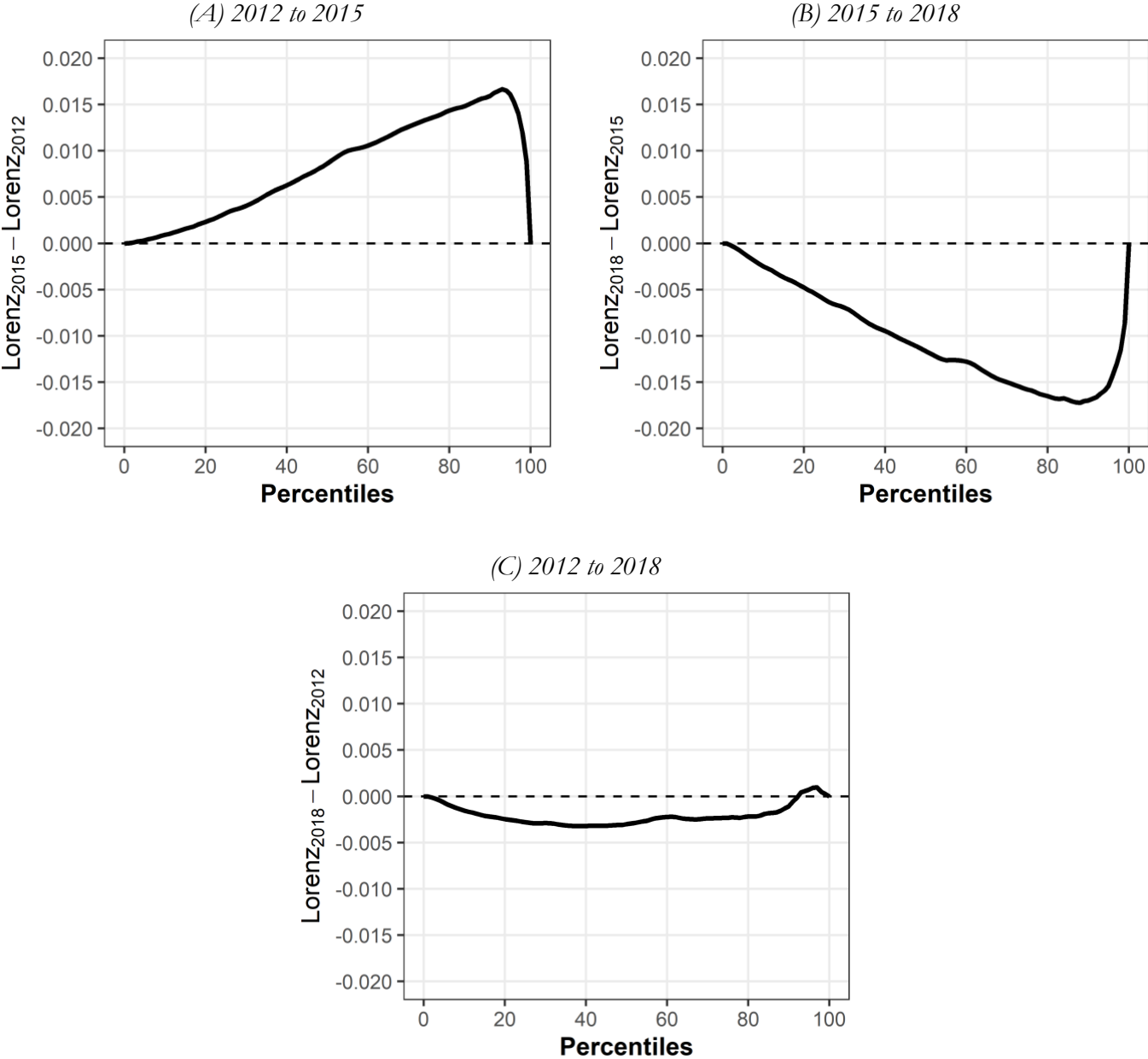
As the preceding discussion suggests, inequality followed a V-shaped path. The best way to communicate this visually is by analyzing the evolution of the Lorenz Curve over time. Lorenz Curves are graphical representations of the distribution of income which relate cumulative income shares with cumulative population shares, that is, each data point plots the proportion of total income accruing to the bottom  $x\%$  of the population, where  $x$  ranges from 0 to 100.

Lorenz Curves allow for complete comparisons between any two arbitrary income distributions. Lorenz Dominance happens when one distribution lies entirely above (or “inside”) the other and the two curves do not cross. In such cases, the proportion of income of the bottom  $x\%$ , for any given  $x\%$ , will always be equal or higher in the dominant distribution. Moreover, Lorenz Dominance means all axiomatic inequality measures will rank the dominant distribution as less unequal of the two. If the two Lorenz Curves intersect, then there is no dominance, and it is always possible to find two axiomatic scalar indices which rank the two distributions differently. Therefore, the analysis of Lorenz Dominance is a better starting point than any arbitrary scalar measure of inequality.

The panels on Figure 3 show the difference between Lorenz Curves for 2012-2015, 2015-2018, and 2012-2018. Both non-negative and non-positive curves indicate Lorenz

dominance of one distribution over the other. Indeed, Panels A and B show 2015 dominates both 2012 and 2018: the proportion of income accruing to the bottom  $x\%$  is always higher in 2015 than in either 2012 or 2018, so all Lorenz-consistent inequality measures will rank 2015 as the most egalitarian year. In other words, inequality unequivocally fell from 2012 to 2015 and then unequivocally rose during the next three years.

**Figure 3. Lorenz Dominance Analysis – Brazil, 2012-2018**



Source: Authors' calculations based on PNADC microdata.

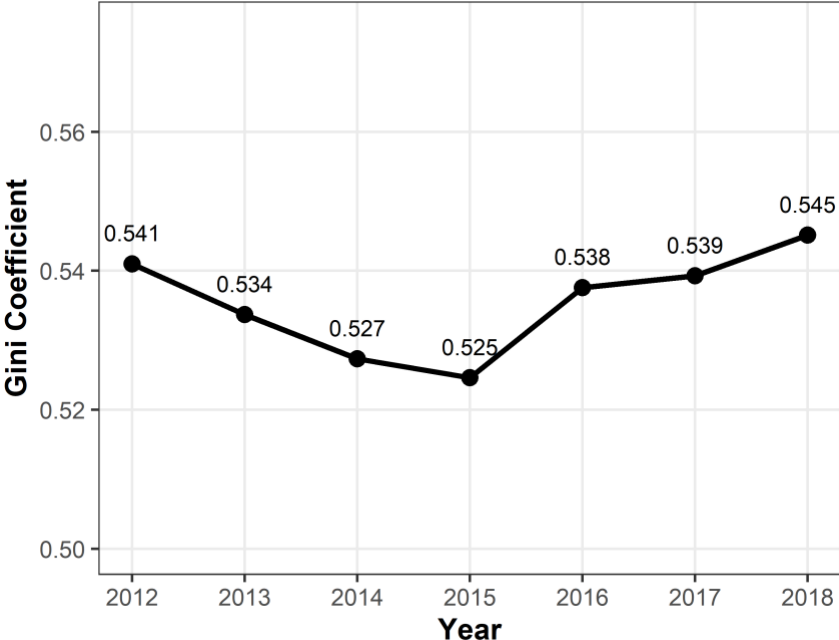
However, neither 2012 nor 2018 dominate one another, that is, it is not possible to ascertain in general terms which year had lower inequality. The cumulative income held by any percentile up to the 92% is lower in 2012, but from the point onwards the difference between Lorenz curves becomes positive.

Conventional scalar measures of inequality may not allow for the all-encompassing conclusions of Lorenz analysis, but they remain useful because former can get quite unwieldy. Figure 4 depicts the evolution of the Gini coefficient, the most popular scalar measure. Table 2 lists results for other measures of inequality.

As expected from the previous discussion, all inequality measures show falling inequality from 2012 to 2015 and a subsequent increase from 2015 to 2018. The selected measures show higher inequality in 2018 than in 2012, but, in principle, it is possible to find indices that contradict this result.

Prior to 2015, the Gini coefficient was falling 0.005 points per year, that is, a slight deceleration compared to the 0.007 pace of the previous decade. The Gini then jumped in 2016, remained roughly constant in 2017 and then increased again in 2018.

**Figure 4. Gini Coefficient for Per capita Household Income - Brazil, 2012/2018**



Source: Authors' calculations based on PNADC microdata.

Other inequality measures uphold the verdict. Since many of the most dramatic changes happened at the tails of the income distribution, inequality measures most sensitive to the upper or lower ends, such as the 90/10 and 50/10 ratios, show the most intense oscillations during the period. For instance, the P90/P10 ratio fell by almost 4% between 2012 and 2015, and surged by 16% between 2015 and 2018.

**Table 2. Selected Inequality Indicators for Household Income Per Capita - Brazil, 2012-2018**

	Years							Change (%)		
	2012	2013	2014	2015	2016	2017	2018	2012-2015	2015-2018	2012-2018
Gini	0.541	0.534	0.527	0.525	0.538	0.539	0.545	-3.0	3.9	0.8
Theil L*	0.529	0.512	0.498	0.494	0.524	0.531	0.547	-6.7	10.8	3.3
Theil T*	0.584	0.559	0.544	0.539	0.566	0.574	0.590	-7.7	9.6	1.1
P90/P10	11.6	11.6	10.9	11.2	12.2	12.4	12.9	-3.7	15.6	11.3
P90/P50	3.4	3.3	3.2	3.2	3.4	3.3	3.4	-3.3	3.9	0.4
P50/P10	3.5	3.5	3.4	3.5	3.6	3.7	3.8	-0.4	11.3	10.8
Palma Ratio	4.1	3.9	3.8	3.7	4.0	4.1	4.3	-9.2	13.8	3.4

Source: Authors' calculations based on PNADC microdata.

\* Considering only non-zero incomes.

In sum, the 2010s were a lost decade in the struggle against inequality in Brazil. After 2015, inequality rose both during the peak of the recession and the onset of the economic recovery. At this point, it is too early to say whether the data is still reflecting late effects of the recession or the beginning of a new lost decade associated to post-recession structural changes yet to be unveiled.

## 5. The Evolution of Social Welfare

Social well-being is a tricky concept. At a minimum, the more resources a society has, the better. However, given a fixed amount of resources, is there an optimal distribution that maximizes the aggregate welfare? Individuals may have different preferences and different opinions about what the best social state would be like. Most common operational accounts are based in a simple principle: the same amount of resources given to a “have-not” should cause larger increase in well-being than if given to a “have”. This prioritarian rule is simply derived

from the law of diminishing returns. Thus, social welfare would be positively correlated to the income level and negatively correlated (or inversely related) to inequality.

Perhaps the best-known empirical measure of social welfare is the product of the complement of the Gini Coefficient and the mean income, that is,  $\mu(1 - Gini)$  (Sen, 1982; Kakwani, 2000). In the absence of inequality, average welfare is the same as average income. Any increase in the Gini Coefficient lowers welfare.

Table 3 shows the average welfare of the Brazilian population from 2012 to 2018. Falling inequality and rising incomes led to an increase of almost 7% in welfare over the first three-year period followed by a 1% reduction thereafter. Welfare increased by 5% over the full six years.

**Table 3. Social welfare and its components - Brazil, 2012-2018**

	Years							Change (%)		
	2012	2013	2014	2015	2016	2017	2018	2012-2015	2015-2018	2012-2018
Average Income (2018 BRL)	1,259	1,294	1,342	1,298	1,287	1,287	1,338	3.1	3.1	6.3
Distribution (1 - Gini)	0.459	0.466	0.473	0.475	0.462	0.461	0.455	3.6	-4.2	-0.9
<b>Welfare</b>	<b>578</b>	<b>603</b>	<b>634</b>	<b>617</b>	<b>595</b>	<b>593</b>	<b>609</b>	<b>6.7</b>	<b>-1.3</b>	<b>5.4</b>

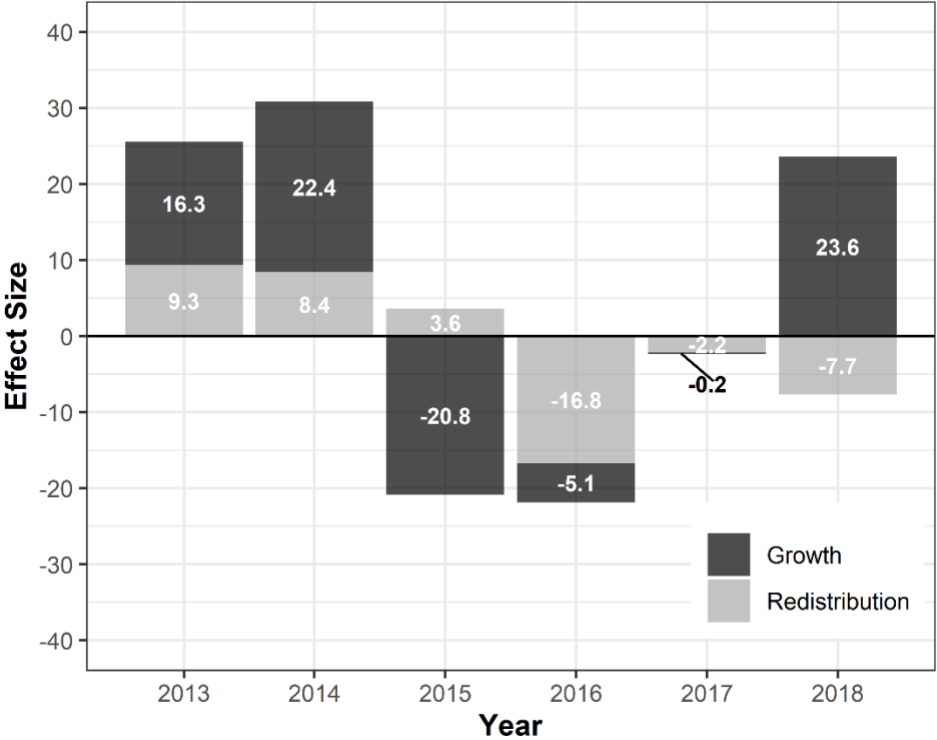
Source: Authors' calculations based on PNADC microdata.

Figure 5 reports year-to-year dynamic decompositions of social welfare in its two core components: redistribution and growth. The decomposition is calculated by  $\Delta W = \Delta\mu(1 - \bar{G}) + \bar{\mu}\Delta G$ , where the first term expresses the contribution to changes in welfare given by growth (fall) in real incomes and the second term yields the contribution given by redistribution. The symbol  $\Delta$  denotes changes between periods  $t$  and  $t + 1$  and the overbar denotes the mean across the two periods.

Up to 2014, both redistribution and growth contributed to rising social welfare. Growth was the main effect, falling inequality also played its part. The recession reversed this pattern. Average income fell sharply in 2015, swamping the very small reduction in the Gini coefficient. Both rising inequality and lower incomes acted in tandem to reduce social welfare in 2016-2017. Finally, social welfare rose again in 2018 pushed by increase in real incomes – which was mostly

driven by the top decile of the income distribution, as mentioned. Still, this late surge entailed higher social welfare in 2018 than in 2012.

**Figure 5. Dynamic Decomposition of the Social Welfare - Brazil, 2012-2018**



Source: Authors’ calculations based on PNADC microdata.

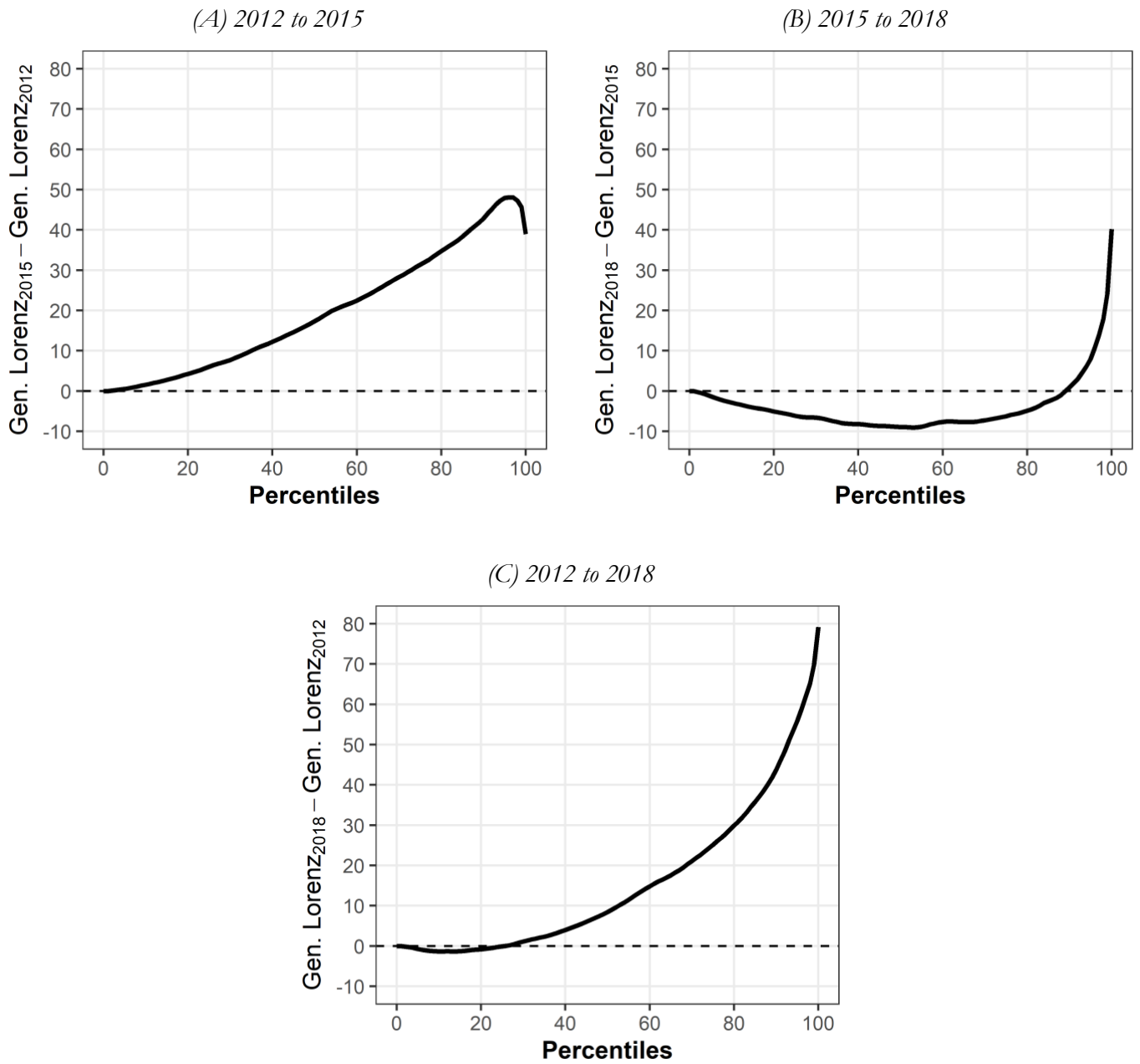
A quick methodological reminder is in order. Welfare changes shown in Figure 5 depend on how inequality is “penalized” in the formula, that is, they depend on the inequality measure we choose. Different results would result had we used any inequality measure more sensitive to the tails of the distribution.

Fortunately, we can examine the full distribution in order to bypass arbitrary choices. In this case, Generalized Lorenz Curves (GLC) are helpful. The GLC is just the Lorenz curve multiplied by the average income, so it represents absolute incomes, not income shares. In other words, the GLC does not normalize away the size of the pie whose distribution is being analyzed. When the GLC of a given distribution dominates the GLC of another distribution we have the so-called “second order dominance”, that is, welfare is unambiguously higher in the dominating distribution.



Figure 6 displays the difference between GLCs for 2012-2015, 2015-2018, and 2012-2018. Again, strictly non-negative or strictly non-positive values denote second order dominance.

**Figure 6. Generalized Lorenz Curve Dominance Analysis (Second Order Dominance) – Brazil, 2012-2018**



Source: Authors' calculations based on PNADC microdata.

According to Panel A, welfare increased for all percentiles from 2012 to 2015, though the top 5% lost ground in relative terms. Over the next three years, there was an inversion. The 90% poorest were worse off in 2018 than in 2015 (Panel 6B). For the 2012-2018 period, there is no Generalized Lorenz Dominance, but apart from the 30% poorest the rest of the population appears to have made some progress. The poorest third, however, stagnated. We will look at their plight further ahead.

## 6. Explaining trends in income and inequality

Average income ( $y$ ) at any moment in time is a weighted sum given by  $\sum_{k=1}^K r_k y_k^*$ , where  $r_k$  is the share of the population receiving income source  $k$  and  $y_k^*$  is the average income from source  $k$  among recipients. Consequently, changes in average income between two periods can also be decomposed by:

$$\Delta y = \sum_{k=1}^K \bar{r}_k \Delta y_k^* + \Delta r_k \bar{y}_k^*$$

For each income source  $k$ , the first term is the “mean effect”, which measures the contribution of changes in mean incomes among recipients, while the second is the “recipients effect”, which measures the contribution of changes in the share of the population who benefits from that source.

Figure 7 presents results for this dynamic decomposition of changes in average income between 2012 and 2018. The vertical axes show absolute changes in 2018 Brazilian Reais (2018 BRL\$). The top row displays the “mean effect”, the second row shows the “recipients effect”, and the third row presents the total effect, given by the sum of the two components, for each income source. Each data point in each panel depicts the cumulative variation since 2012.

The labor market was the main driver of changes in household income per capita before and after the recession. The three panels on the first column show that until 2014 wages and labor earnings were on the rise (positive “mean effect”), and unemployment was stable (“recipients effect” around zero). The labor market thus accounted for about 90% of the increase of income per capita between 2012 and 2014 (roughly BRL\$ 75 out of BRL\$ 83). Likewise, the labor market was also dominant between 2015 and 2017, but in the opposite direction. During this period, both effects contributed to lower living standards, though the fall in labor earnings among the working population was concentrated in 2015 and the decline in the share of

recipients due to higher unemployment was more pronounced in 2016-2017. The upsurge in 2018 was due exclusively to increases in wages and labor earnings, as employment trends did not improve.

Given such dire conditions, one could reasonably expect that programs that should act as automatic stabilizers would at least offset part of the shock. Our data includes information three major programs: BPC-LOAS; Programa Bolsa Família; and unemployment compensation. The first two are welfare transfers targeted to persons with disabilities and uninsured elderly (BPC-LOAS) and families and children (Programa Bolsa Família), whereas unemployment compensation provides benefits to formal private sector workers upon dismissal. These are exactly the types of public transfers that one would expect to increase in a time of crisis.

From the point of view of household income per capita, neither of the three programs played any significant role, that is, none worked as automatic stabilizers that kept average income from plunging further. In fact, the recession highlighted design flaws recognized long ago. For instance, Bolsa Família is not an entitlement, so benefits are only granted to newly eligible families if the government allocates enough funds in the federal budget. This was not a priority during the recession due to both political choices and fiscal constraints. Bolsa Família's budget shrunk in real terms between 2014 and 2017 as inflation outpaced modest benefit adjustments: annual outlays increased by 6,8%, but the cumulative inflation rate was over 23%. Both the number of recipient families and the average benefit per family (in constant 2018 BRL\$) diminished.

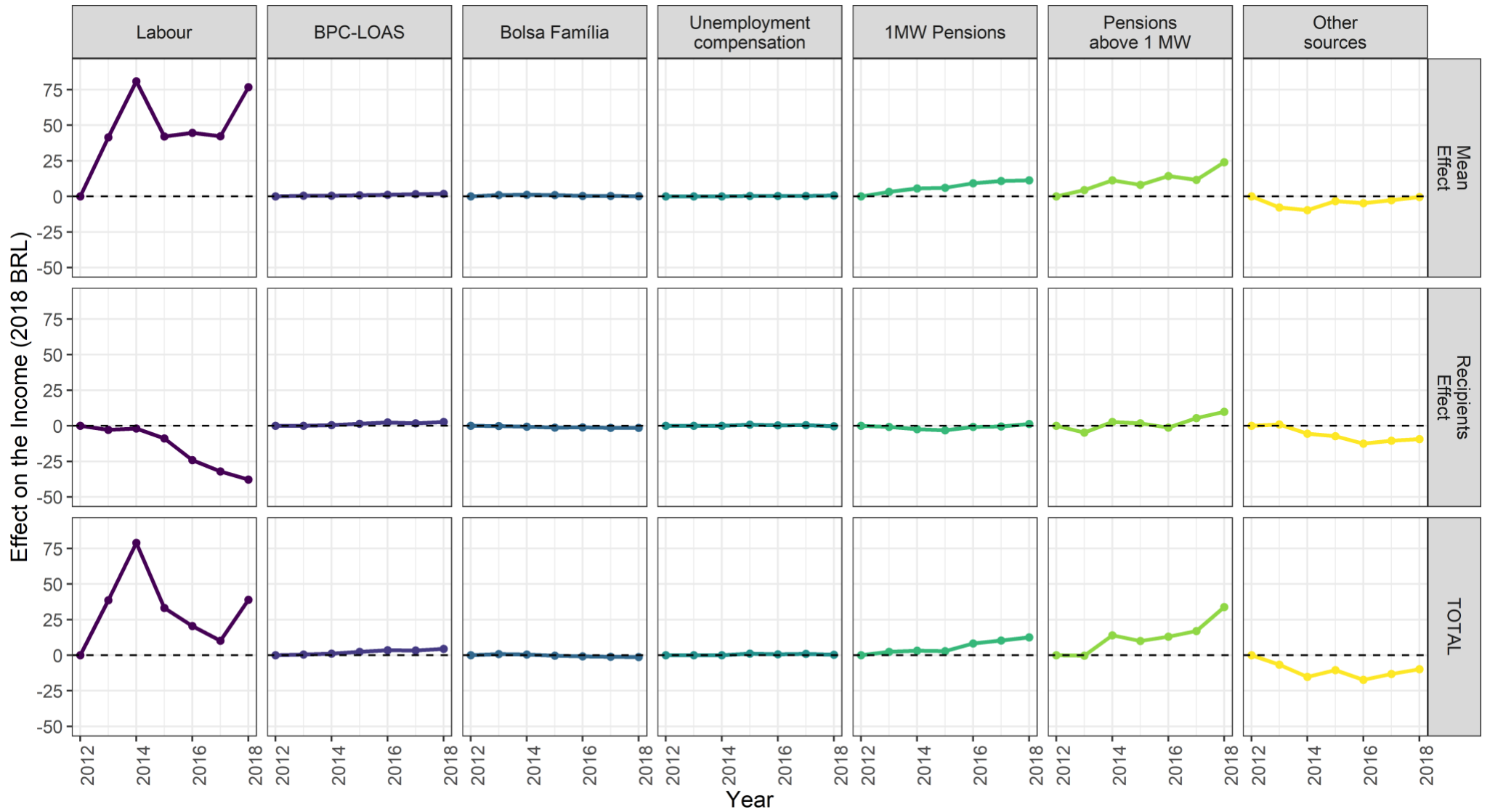
Unemployment compensation also failed to offset falling incomes as eligibility requirements have become more stringent over time and its coverage is limited to the formal sector of the labor market, leaving over 40% of all workers unprotected. Finally, the BPC-LOAS the least likely of the three to show any countercyclical effects because benefit coverage among the elderly is already near universal, considering both non-contributory transfers and Social Security pensions.

In turn, pensions did contribute to higher living standards. Pensions indexed to the minimum wage, and even more those whose value exceeds the minimum wage, had a hefty contribution to total incomes, always positive. This contribution was driven both by increases in average benefits and number of recipients due to demographic changes.

Finally, "other incomes" is a residual category that bundles together heterogenous sources: rental incomes, profits and interest payments, donations, alimony, fellowships, etc. We

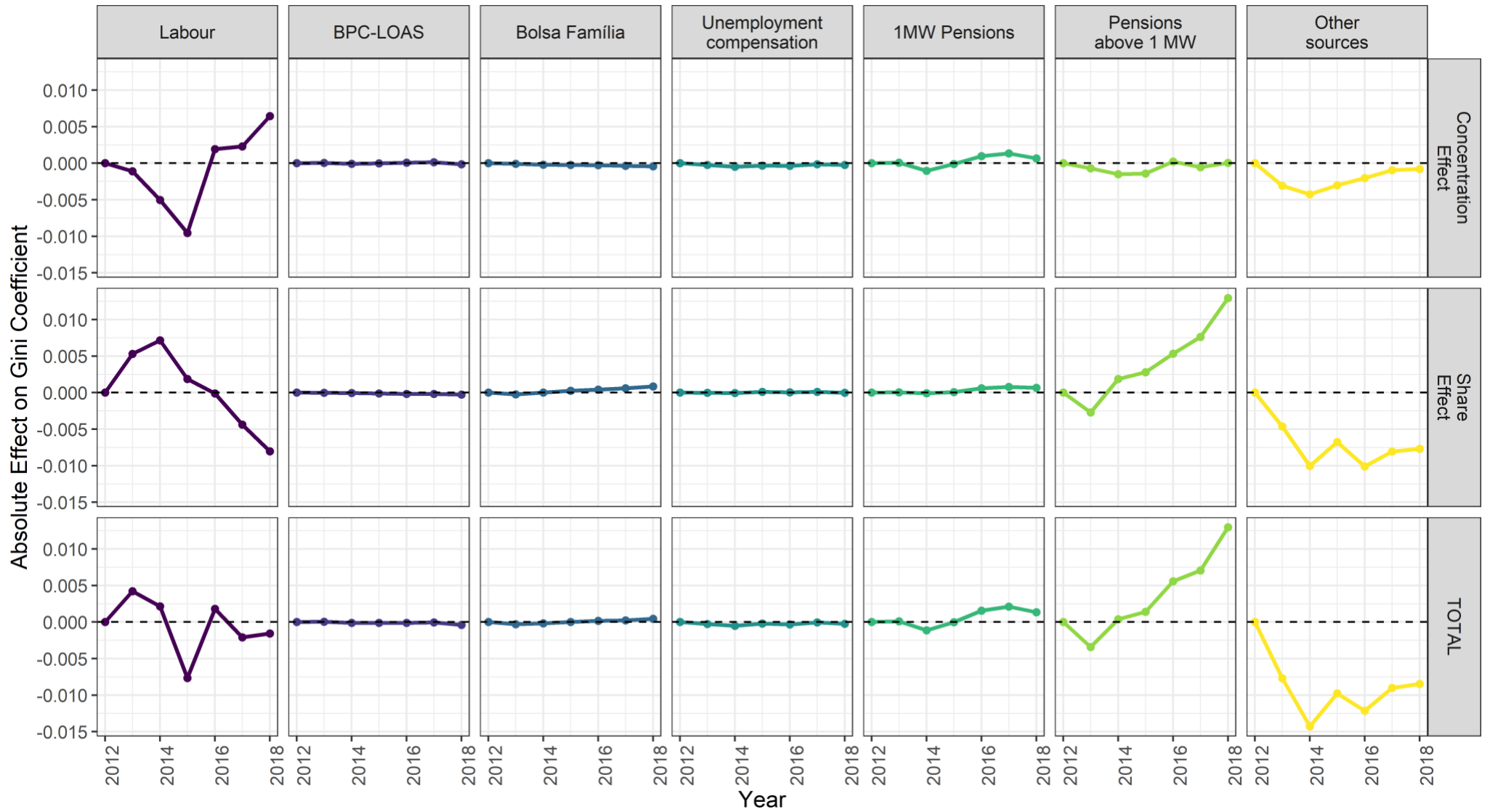
are aware that some of these sources are of analytical interest – especially those derived from capital. However, as usual, capital incomes are severely underreported in our data, and all “other incomes” are a very small share of total income even when grouped together.

Figure 7. Dynamic Decomposition of the Average Household Income Per Capita (Reference: 2012) – Brazil, 2012-2018



Source: Authors' calculations based on PNADC microdata.

Graph 8. Dynamic Decomposition of the Gini Coefficient for the Household per capita Income (Reference: 2012) – Brazil, 2012-2018



Source: Authors' calculations based on PNADC microdata.

Changes in the Gini coefficient can be decomposed analogously. The Gini for period  $t$  is given by  $G = \sum_{k=1}^K C_k S_k$ , where  $C_k$  is the concentration coefficient and  $S_k$  is the income share of source  $k$  (e.g., Rao, 1969). The concentration coefficient ranges from -1 (when all income from a given source accrues to the poorest individual in the population) to +1 (when all income from a given source accrues to the richest individual). An income source that is uniformly distributed across the population has a concentration coefficient of zero.

Following Soares (2006) and Hoffmann (2006, 2013), changes in the Gini coefficient between two periods may be decomposed as:

$$\Delta G = \sum_{k=1}^K \bar{S}_k \Delta C_k + (\bar{C}_k - \bar{G}) \Delta S_k$$

The first term is dubbed the “concentration effect”: it indicates changes in total inequality caused by changes in the concentration coefficient of source  $k$ . *Ceteris paribus*, if an income source becomes more (less) concentrated over time then total inequality will also rise (fall). The second term is the “income share effect” caused by changes in the composition of total incomes. If more (less) evenly distributed income sources increase their participation in total income, then inequality falls (rises).

Figure 8 presents results for the dynamic decomposition of the Gini coefficient. As before, each panel shows the cumulative impact taking 2012 as the reference year. The first and second rows exhibit the concentration and income share effects, respectively. The bottom row plots the total net effect for each income source. Columns list the same income sources as above.

The results for inequality are even more telling than those for the mean. Wages and labor earnings are slightly more concentrated than total household income per capita, so the Gini should rise when the labor income share increases, as it did from 2012 to 2014. Yet, this increase happened alongside a marked decrease in the labor market inequality, that is, the concentration effect counteracted the income share effect. The net result was a very small positive contribution to higher inequality until 2014 and a more sizeable contribution to lower inequality in 2015. From 2015 onwards, both trends reversed: the labor income share dropped substantially as unemployment soared, and the concentration coefficient of labor incomes climbed precipitously due to higher inequality in the labor market. The newly unemployed were mostly low skilled workers in the bottom half of the distribution (Barbosa, 2019). The net result was again very small.

BPC-LOAS, Programa Bolsa Família and unemployment compensation also failed in curbing the post-recession uptick in inequality. As shown in columns 2-5 of Figure 8, both their concentration and income share effects flatlined during the whole period for the same reasons discussed above: Bolsa Família was cutback when it should have been expanded to mitigate poverty; unemployment compensation is by design incapable of dealing with informality and long-term unemployment; and BPC-LOAS is more narrowly targeted at individuals who are poor and permanently unable to work either due to disability or to age.

Bolsa Família is not indexed at all, so adjustments are imposed at the government's discretion. Unemployment compensation and BPC-LOAS, in turn, are tied to the minimum wage, which by law is adjusted every year to recoup losses from inflation. Until 2019, official wage policy was generous: minimum wage hikes in year  $t$  were equal to the cumulated inflation since  $t - 1$  plus real GDP growth in year  $t - 2$ . Though important in reducing inequality in the 2000s, this policy was largely ineffective once growth slowed down considerably.

The fact that three major government transfers did not respond to falling incomes and higher inequality bespeaks of serious design problems in the Brazilian social protection system. And it gets worse: Social Security pensions were responsible for the lion's share of the increase in inequality from 2012 to 2018

Pensions tied to the minimum wage are about two-thirds of all benefits. They are relatively egalitarian as their concentration coefficient hovers close to 0.1. Pensions higher than the minimum wage encompass both better-off former private sector workers whose benefits are capped at a relatively low level and former civil servants whose benefits are largely uncapped and may reach very high levels. Unsurprisingly, these pensions are highly regressive, considering their concentration coefficient is around 0.72.

Neither of the two concentration coefficients changed substantively from 2012 to 2018, but the income shares of high-paying pensions did, escalating from 12.7% to 13.1% from 2012 to 2015 and then from 13.1% to 14.5% from 2015 to 2018. This continuous growth explains most of the variation in the Gini during this period.

There are at least three non-competing explanations for this. First, Law 13.183, enacted in 2015, effectively extinguished the *Fator Previdenciário*, which is the formula created in 1999 to penalize early retirements when calculating benefit values. This was done through the so called 85/95 rule, which allows individuals who have fulfilled their contribution requirements (30 years for women and 35 for men) to bypass the *Fator Previdenciário* and to retire with full benefits when



the sum of their contribution time plus age is equal to 85 (women) or 95 (men). Hence, prospective retirees as young as 55 (women) or 60 (men) no longer suffer reductions in benefits due to early retirement. The effects of Law 13.183/2015 were widely foreseen by specialists in social security who warned that it would increase benefits for a demographic group – workers with steady formal jobs who earn far more than the minimum wage – concentrated in the upper echelons of the income distribution (e.g. Caetano *et al.*, 2016; Constanzi, Fernandes e Ansiliero, 2018).

Second, mounting public debate on the need for a broad reform of the Social Security system might have spurred a wave of claims for benefits. Multiple legislative proposals were under consideration in Congress during this period, and uncertainty over the future probably might have worked as an incentive for families to look for financial security, preventing losses that could eventually be provoked by a new system.

Third, demographic changes among civil servants might also have played a significant role. In Brazil, prospective civil servants must pass an entrance examination and are granted tenure after three years on the job. Given all the economic woes that have plagued the country since the 1980s, federal, state, and local governments tended to concentrate new hires in the rare years of robust growth, so the age distribution of current civil servants is skewing increasingly older. Schettini, Pires, and Santos (2018) estimated that 28% of federal civil servants would already be eligible to retire by the end of 2017. If this figure is correct, then part of the rise in pensions above the minimum wage might be explained by the influx of the older cohorts of civil servants.

Finally, from 2012 to 2015, the residual category of “Other Sources” had an equalizing contribution due its income share effect. Nevertheless, that equalizing trend appears to have been interrupted after 2015. Once this is a very aggregate and heterogenous category, the causes are also a mix of several different processes that are hard to disentangle at present.

## **7. The Fall and Rise of Poverty**

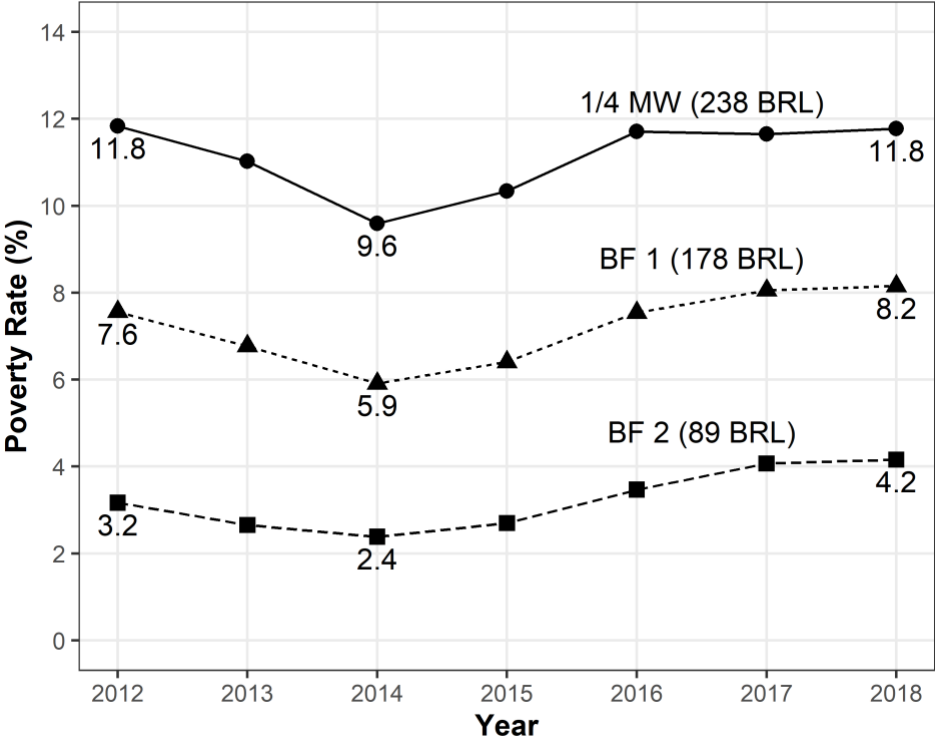
Poverty is one of the most dismal consequences of high inequality in middle-income countries such as Brazil. Figure 9 depicts the evolution of the poverty rate (P0) according to three different national poverty lines: the two Bolsa Família eligibility lines (\$89 and \$179, in 2018 BRL\$) and the eligibility line for the BPC-LOAS, which is equal to 1/4 of the minimum

wage (\$238.50 in 2018 BRL\$).<sup>1</sup> These administrative poverty lines are widely used insofar as they anchor the most important targeted cash transfers in Brazil. The thresholds are applied to household income per capita.

No matter where we set the line, poverty fell from 2012 to 2014, spiked back up amid the recession in 2015-2016, and then increased at a much slower pace afterwards. Lower poverty lines yield the worst results: from 2012 to 2018, the poverty rate rose by 1 percentage point (p.p.) according to the BRL\$ 89 line; 0.6 p.p. according to the BRL\$ 178 line; and remained stable according to the BRL\$ 238.50 line.

Therefore, poverty reached its nadir in 2014 and then backtracked to levels last seen in the very early 2010s. This pattern is in line with the preceding discussion. The very poorest have suffered the most in relative terms: they were the hardest hit by the recession and missed out entirely on the recovery.

**Figure 9. Poverty Rates for Three Poverty Lines – Brazil, 2012-2018**



Source: Authors’ calculations based on PNADC microdata.  
 N.B.: “1/4 MW” is the poverty line of 1/4 of the minimum wage (BRL\$ 238.50) used by the BPC-LOAS cash transfer; “BF 1” is the upper poverty line (BRL\$ 178) and “BF 2” is the lower

<sup>1</sup> The minimum wage in 2018 was BRL\$ 954. We used 1/4 of the minimum wage in 2018 for all years.

(extreme) poverty line (BRL\$ 89) of Bolsa Família, Brazil's flagship cash transfer to poor families. The three poverty lines refer to monthly household income per capita.

Table 4 complements the analysis by showing additional poverty measure, such as the poverty gap (P1), the FGT P2 index, and the Sen Poverty index. For the sake of completeness, we also list precise figures for poverty rates and the headcount of the poor.

The trends noted in Figure 9 apply to the other poverty measures as well. Almost all indicators point to higher poverty in 2018 than in 2012; the sole exception was discussed above (the poverty rate for the BRL\$ 238.50 poverty line). The most conspicuous results are related to the number of poor people. According to the lower Bolsa Família poverty line, there were 8.6 million poor individuals in 2018 – 2.4 million more than in 2012, and 3.8 million more than in 2014. The figures for the highest poverty line of the three are equally bleak: the poverty headcount was 24.4 million in 2018, which is 1.1 million more than in 2012 and 5.2 million more than in 2014.

**Table 4. Additional Poverty Measures for Three Poverty Lines – Brazil, 2012-2018**

	2012	2013	2014	2015	2016	2017	2018	2012-2015	2015-2018	2012-2018
<b>A. Poverty Line 1: ¼ minimum wage per capita (238.50 BRL)</b>										
N (millions)	23,3	21,9	19,2	20,9	23,9	24,0	24,4	-10,4%	16,7%	4,6%
P0 (%)	11,8	11,0	9,6	10,3	11,7	11,6	11,8	-1,5 p.p.	1,4 p.p.	-0,1 p.p.
P1 (%)	5,0	4,5	4,0	4,3	5,1	5,5	5,6	-0,8 p.p.	1,3 p.p.	0,5 p.p.
P2 (%)	3,2	2,8	2,5	2,7	3,3	3,7	3,8	-0,5 p.p.	1,1 p.p.	0,6 p.p.
Sen Poverty Index (%)	3,9	3,5	3,0	3,3	4,0	4,3	4,4	-0,6 p.p.	1,1 p.p.	0,5 p.p.
<b>B. Poverty Line 2: Bolsa Família Poverty Line (178 BRL per capita)</b>										
N (millions)	14,9	13,5	11,9	13,0	15,4	16,6	16,9	-1,9%	3,9%	2,0%
P0 (%)	7,6	6,8	5,9	6,4	7,5	8,1	8,2	-1,2 p.p.	1,7 p.p.	0,6 p.p.
P1 (%)	3,5	3,1	2,7	3,0	3,6	4,1	4,1	-0,5 p.p.	1,2 p.p.	0,7 p.p.
P2 (%)	2,3	2,0	1,8	2,0	2,5	2,8	2,9	-0,4 p.p.	0,9 p.p.	0,5 p.p.
Sen Poverty Index (%)	2,7	2,3	2,0	2,2	2,8	3,1	3,2	-0,4 p.p.	0,9 p.p.	0,5 p.p.
<b>C. Poverty Line 3: Bolsa Família Extreme Poverty Line (89 BRL per capita)</b>										
N (millions)	6,2	5,3	4,8	5,5	7,1	8,4	8,6	-0,8%	3,2%	2,4%

P0 (%)	3,2	2,7	2,4	2,7	3,5	4,1	4,2	-0,5 p.p.	1,5 p.p.	1,0 p.p.
P1 (%)	1,8	1,5	1,3	1,5	1,9	2,2	2,2	-0,3 p.p.	0,8 p.p.	0,5 p.p.
P2 (%)	1,3	1,2	1,1	1,2	1,5	1,7	1,7	-0,2 p.p.	0,5 p.p.	0,3 p.p.
Sen Poverty Index (%)	1,4	1,2	1,1	1,2	1,6	1,8	1,8	-0,2 p.p.	0,6 p.p.	0,4 p.p.

Source: Authors' calculations based on PNADC microdata.

N.B.: "1/4 MW" is the poverty line of 1/4 of the minimum wage (BRL\$ 238.50) used by the BPC-LOAS cash transfer; "BF 1" is the upper poverty line (BRL\$ 178) and "BF 2" is the lower (extreme) poverty line (BRL\$ 89) of Bolsa Família, Brazil's flagship cash transfer to poor families. The three poverty lines refer to monthly household income per capita.

Following Datt & Ravallion (1992) and Kakwani (2000), we can break down changes in poverty into two components: economic growth and redistribution. The former captures how changes in mean income augment or reduce poverty, holding inequality constant. The latter measures the effects of changes in income inequality, holding the mean constant.

Table 5 shows results for the same three lines as before, comparing the same subperiods (2012-2015, 2015-2018, and 2012-2018). The main finding is that the redistribution effect was always the main cause of changes in poverty. This conclusion holds both for the years when the poverty rate was falling (2012-2015) and for the years when it increased (2015-2018). The lower the poverty line, the more dominant the redistribution effect.

**Table 5. Datt & Ravallion Decomposition of Changes in the Poverty Rate for Three Poverty Lines – Brazil, 2012-2018**

	Effect Size (p.p.)		
	2012-2015	2015-2018	2012-2018
<b>A. Poverty Line 1: 1/4 minimum wage per capita (BRL\$ 238.50)</b>			
Growth Effect	-0.4	-0.7	-1.2
Redistribution Effect	-1.0	2.1	1.1
<b>Total Change</b>	<b>-1.5</b>	<b>1.4</b>	<b>-0.1</b>
<b>B. Poverty Line 2: Bolsa Família Program Poverty Line (BRL\$ 178)</b>			
Growth Effect	-0.4	-0.3	-0.6
Redistribution Effect	-0.8	2.0	1.2
<b>Total Change</b>	<b>-1.2</b>	<b>1.8</b>	<b>0.6</b>

<b>C. Poverty Line 3: Bolsa Família Program Extreme Poverty Line (BRL\$ 89)</b>			
Growth Effect	-0.1	-0.1	-0.2
Redistribution Effect	-0.3	1.6	1.2
<b>Total Change</b>	<b>-0.5</b>	<b>1.5</b>	<b>1.0</b>

Source: Authors' calculations based on PNADC microdata.

N.B.: “1/4 MW” is the poverty line of 1/4 of the minimum wage (BRL\$ 238.50) used by the BPC-LOAS cash transfer; “BF 1” is the upper poverty line (BRL\$ 178) and “BF 2” is the lower (extreme) poverty line (BRL\$ 89) of Bolsa Família, Brazil’s flagship cash transfer to poor families. The three poverty lines refer to monthly household income per capita.

In other words, poverty rates responded much more forcefully to changes in inequality than in average incomes. Despite the recession, poverty would have been lower in 2018 than in 2012 had inequality stayed the same after 2015.

Once again, this trajectory reminds us how ineffective the Brazilian social protection system was. Previous cross-sectional studies showed that welfare transfers – such as BPC-LOAS and Bolsa Família – reduce poverty by 3 p.p. in each year. However, as discussed, the system did not respond adequately to the economic shock.

Ultimately, our results reinforce the synergy between the fight against poverty and the reduction of inequality. In countries like Brazil, the eradication of poverty will not be achieved quickly unless we succeed in lowering inequality, as Barros, Henriques & Mendonça (2000) pointed out almost twenty years ago.

## **8. Final Thoughts**

This paper documents the end of a prolonged equalization period in Brazil that lasted from the early 2000s until the mid-2010s. During this period, income inequality fell continuously, while poverty rates plunged after growth resumed in 2004. However, the years of pro-poor growth came to a halt as economic mismanagement and political scandals caused one of the deepest recessions in Brazilian history. Nothing was ever the same after 2015, though it is too early to say whether this turning point signaled a temporary setback or if it heralded the beginning of a new, durable trend. In any case, our survey data paints a dismal picture of what happened to the income distribution since then.

The 2010s were a lost decade in the fight against poverty and inequality. By 2018, most indicators were at levels close to or even worse than those seen at the start of the decade. Average income grew in real terms by almost 7% between 2012-2014, then dropped 3% in 2015. Growth resumed only in 2018, but the annual increase of 4% benefitted mostly the top of the income distribution. Indeed, more than 80% of all income growth from 2015 to 2018 accrued to the richest 5% of the population, who saw their mean (real) income rise by 9% over that span. In contrast, the bottom half of the population experienced a 4% drop in mean income.

Such diverging fortunes during the recession and the fledging recovery reversed previous inequality trends. The Gini coefficient of household income per capita fell 3% between 2015 and 2018, but then increased by 4% between 2015 and 2018. Other inequality measures more responsive to the tails of the income distribution paint an even bleaker picture. Poverty trends were very similar, except for a slight difference in timing. A range of poverty indicators computed for three different poverty lines overwhelmingly suggest that poverty declined considerably between 2012 and 2014, and then soared afterwards.

Our social welfare indicator, defined by  $\mu(1 - G)$ , is the one exception to this general pattern, insofar as its level was 5% higher in 2018 than in 2012. Still, this reflects mostly the surprisingly strong growth seen in 2018 in the PNADC survey. Official National Accounts figures show much slower growth. Though not entirely unexpected, such sharp contrast between survey and National Accounts data needs to be further investigated.

What lies behind this catastrophic reversal of fortune?

Obviously, the labor market was severely hit by the recession. The economic shock meant higher unemployment especially for unskilled workers, interrupting the previous egalitarian trends. As such, wage and labor earnings were one of the main drivers of distributional changes from 2015 to 2018.

Pensions above one minimum wage also played a large role. Demographics and pension reform are likely to be major explanation here, but the regressive nature of the Brazilian pension system is on full display in the decomposition results above.

More surprisingly, unemployment compensation and welfare transfers failed completely in sheltering the poor from the storm. Their effects on income, poverty, and inequality during the economic crisis were negligible. The social protection safety net was compromised by fiscal constraints and design flaws. The case of Bolsa Família was the most egregious of all: instead of expanding to alleviate the increase in poverty, the program was cut back.

Our decompositions show that runaway poverty was not an inevitable outcome of the recession. Poverty rates have been much more sensitive to changes in inequality than to changes in mean (average) income. Had the recession lowered incomes proportionally, inequality would not have increased and poverty would be lower in 2018 than in 2012.

These conclusions shed new light on the inner workings of the Brazilian social protection system and lead to a grim assessment of its redistributive role. Programs that benefit the poor were hobbled by budget cuts and ineffective design and thus did not do much to offset the deleterious impacts of the recession. Meanwhile, expenditures on pensions that mostly accrue to the rich increased during the period, regardless of fiscal constraints.

In short, Brazilian social policy over the past few years provided a textbook example of how economic and political power walk hand in hand.

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