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## Inequality in Brazil from 2016 to 2017: A decomposition exercise and labor market analysis of virtually no change (which is good news)

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**INEQUALITY IN BRAZIL FROM  
2016 TO 2017: A DECOMPOSITION  
EXERCISE AND LABOR MARKET  
ANALYSIS OF VIRTUALLY NO CHANGE  
(WHICH IS GOOD NEWS)**

**Sergei Soares**

**DISCUSSION** PAPER





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EXERCISE AND LABOR MARKET ANALYSIS OF VIRTUALLY NO CHANGE  
(WHICH IS GOOD NEWS)<sup>1</sup>**

Sergei Soares<sup>2</sup>

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2. Researcher at Ipea.

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## ABSTRACT

This article uses recently released data from the *Pesquisa Nacional por Amostra de Domicílios Contínua* (PNAD *Contínua*), Brazilian household survey to calculate changes in inequality as measured by the Gini coefficient from 2016 to 2017. A Shorrocks decomposition by factor components is also undertaken, as well as a limited analysis of the wage inequality and the labor market contribution to household inequality. The main results are: *i*) the Gini coefficient fell 0.18 point from 2016 to 2017, going from 54.1 to 53.8, which is a very small reduction in inequality; *ii*) this reduction is due to the interplay between labor and social protection incomes; and *iii*) the labor market by itself is playing against reductions in inequality, which shows the relevance of the (still limited and not very progressive) Brazilian social protection system.

**Keywords:** inequality in Brazil; Gini coefficient; Shorrocks decomposition; concentration coefficient.

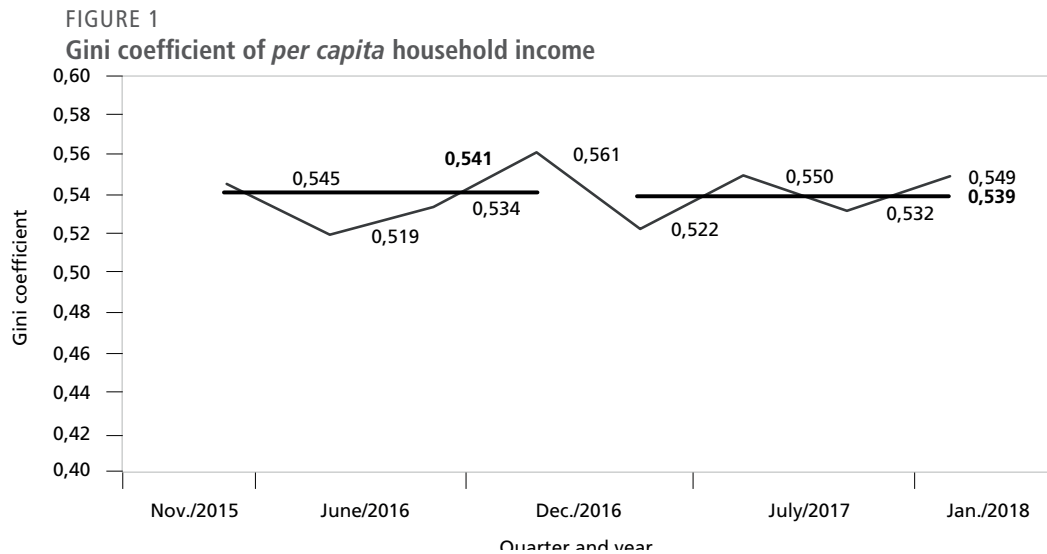




## 1 INTRODUCTION

In April of 2018 the Brazilian Geography and Statistics Institute (*Instituto Brasileiro de Geografia e Estatística* – IBGE) released the complete income microdata for the first interviews of the 2017 Continuous Household Survey (*Pesquisa Nacional por Amostra de Domicílios Contínua* – PNAD *Contínua*).<sup>1</sup> Complete income data are also available for the first interviews of the 2016 survey, and this means that a preliminary dynamic distributive analysis is possible.

Unfortunately, for Brazil as a whole, there appears to be little to analyze, since the Gini coefficient barely changed between 2016 and 2017 and IBGE has not yet released complete income data for 2012 to 2015. From 2016 to 2017, the Gini coefficient fell slightly from 0.541 to 0.539, which is a small change of 0.18 Gini point. Figure 1 shows the evolution of Gini coefficients of *per capita* household income from 2016 to 2017. Quarterly data are in light grey numbers and yearly data in black numbers. The upper and lower limits of the vertical axis of the graph correspond roughly to the highest and lowest Gini coefficients for middle-income countries such as Brazil.<sup>2</sup>



1. The PNAD *Contínua* is a panel survey with five interviews. Questions on labor income are asked in each of the five. Questions about other income sources are asked only in the first and last. In this text, I use only the first interview.

2. Inequality of household per capita income as measured by the Gini coefficient varies from close to 40 for egalitarian middle-income countries such as Uruguay to a little over 60 for the champions of inequality such as South Africa and Namibia.

The quarterly up and downs may be due to sampling noise, seasonality or both. Apparently, inequality is higher in the last quarter of each year, but it is difficult to know with only two comparison points. The stability in yearly inequality is evident from comparison of the two thick black lines, which are even difficult to tell apart.

## 2 SHORROCKS DECOMPOSITION

Sometimes, apparent stability in an income distribution may be masking changes that cancel each other out. In this part of the text, I will calculate a standard Shorrocks decomposition analysis to try to see if any insights are forthcoming. In a Shorrocks decomposition, all changes in the Gini coefficient are due either to changes in concentration coefficients (CCs) of individual factor shares or in changes in their relative weights. Details of this approach can be found in Shorrocks (1982), Lerman and Yitzhaki (1985), Hoffmann (1998) and Soares (2006) and will not be reproduced here.

The division of total income by factor components was taken straight from the PNAD *Contínua* questionnaire. The factor components are: labor income (by far the most important source), income from *Bolsa Família*, income from *Benefício de Prestação Continuada* (BPC), income from other social assistance programs (mostly state and municipal), social security income (retirement and survivor's pensions, including the highly regressive civil servant pensions), private transfers to households, and capital income (rents, dividends, and interest).

Table 1 shows both the CCs and weights for each factor component (income source). Labor income corresponds to approximately three quarters of household income, social security to about one fifth, capital income and private transfers are between 1% and 3% of total income, and the remaining income shares are responsible for less than 1% of household income. These shares evidently do not correspond to shares found on the National Accounts or Income Tax Data due to reasons that range from sampling scheme to the questionnaire. They are, however, highly comparable across time.

Table 1 also shows that CCs vary from -0.624 for the highly distributive *Bolsa Família* to 0.797 for capital income (not exactly a surprise). The CCs for *Bolsa Família*, BPC, other social assistance programs, and private transfers are all inferior to the Gini coefficient. This

means that (marginal) increases in their income shares will lead to reductions in the Gini coefficient.<sup>3</sup> Increases in all other incomes shares will lead to increases in the Gini coefficient.

TABLE 1  
Income weights and CCs (2016-2017)

Source	2017		2016	
	CC	Income share (%)	CC	Income share (%)
BPC	-0.050	0.9	-0.059	0.9
<i>Bolsa Família</i>	-0.624	0.7	-0.608	0.7
Other social assistance	0.027	0.1	0.068	0.1
Social security	0.542	20.2	0.544	19.5
Private transfers	0.348	1.2	0.333	1.1
Capital	0.797	2.5	0.786	2.3
Labor	0.551	74.5	0.554	75.3
Total (Gini coefficient)	0.539	100.0	0.541	100.0

Source: PNAD *Continua*/microdata.  
Elaborated by the author.

Table 2 shows the variation in income shares and CCs for each factor component from 2016 to 2017.

TABLE 2  
Variation ( $\Delta$ ) and averages in income shares and CCs (2016-2017)

Source	$\Delta$ CC	$\Delta$ Income share (%)	Average CC	Average income share (%)	CC effect	Income share effect	Total
BPC	0.009	-0.01	-0.054	0.9	0.000	0.000	<b>0.000</b>
<i>Bolsa Família</i>	-0.016	-0.02	-0.616	0.7	-0.000	0.000	<b>0.000</b>
Other	-0.041	-0.02	0.047	0.1	-0.000	-0.000	<b>-0.000</b>
Social security	-0.002	0.66	0.543	19.8	-0.000	0.004	<b>0.003</b>
Private transfers	0.014	0.06	0.340	1.2	0.000	0.000	<b>0.000</b>
Capital	0.012	0.19	0.791	2.4	0.000	0.001	<b>0.002</b>
Labor	-0.003	-0.86	0.552	74.9	-0.002	-0.005	<b>-0.007</b>
<b>Total</b>					<b>-0.002</b>	<b>0.001</b>	<b>-0.002</b>

Source: PNAD *Continua*/microdata.  
Elaborated by the author.

In spite of the relatively small changes observed in the Gini coefficient, the changes in the distributions of some income components are somewhat more visible.

3. Lambert (1993) shows that non-marginal changes may lead to reordering, which means that non-marginal changes in CCs may lead to paradoxical results.

The most relevant change is that the income share of labor income has become smaller. This, together with a modest reduction in its CC, has led labor income to reduce the Gini coefficient by 0.7 Gini point between 2016 and 2017.<sup>4</sup> On the other hand, an increase in the income shares of capital income and social security income, both of which are regressive (social security slightly so; capital highly so) undid about 0.5 point of the 0.7 point due to labor income. The net result is the small 0.18 point reduction in the Gini coefficient seen in figure 1.

Nothing to write home about, but at least it is not getting worse.

### 3 LABOR INCOME INEQUALITY FROM 2012 TO 2017

Since the IBGE has yet to make public microdata on income sources other than labor income for years previous to 2016 and 2017, it is not possible to analyze how household *per capita* income has changed before 2016 using the PNAD *Contínua*. What can be done is to use information limited to labor income and its distribution and see if it sheds any light on what may have happened with general income distribution.

Figure 2 shows in light blue a quarterly series of a statistic with limited information for the analysis of household income distribution – the Gini coefficient of labor income, distributed among individuals. There are two regimes: inequality first falls and then begins to rise from 2016 onward. The obvious hypothesis is that this is due to the 2015 recession. Since the labor market generally lags the product market in the economic cycle, the effects of the recession would hit the workers with full force only from 2016 onwards. Once the recession hits the labor market, all workers lose, but low wage workers lose more, which means that inequality will rise. This scenario, of course, depends on the hypothesis that firms practice some kind of labor hoarding making it less attractive to fire more qualified workers.

The same figure shows in dark blue the evolution of the labor income CC. This statistic varies much more than the labor income Gini coefficient. Both are calculated

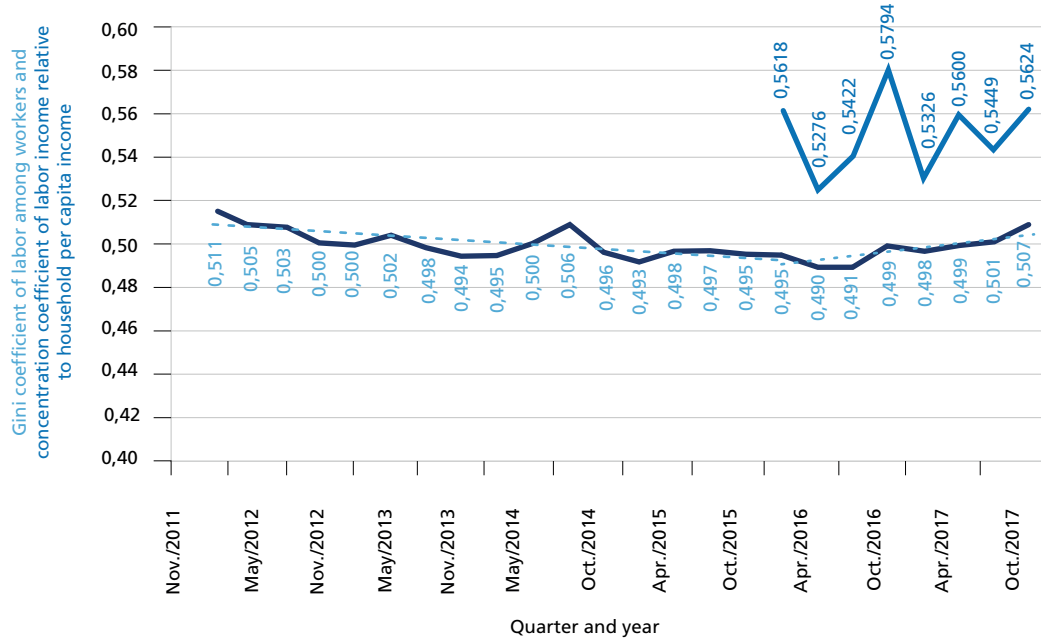
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4. Note that this is the contribution of labor to household *per capita* income inequality, which is different from the inequality of individual labor income. This difference is crucial to understand what is going on in terms of income distribution in Brazil.

from the same microdata, but there are five times more observations in the labor income Gini coefficient as in the labor income CC. This is because only the first interview collects information on income sources other than labor. The result is that the sampling noise should be about 2.2 times greater for the CC, which is clearly the case.

FIGURE 2

Labor income: Gini (individual) and concentration (household) coefficients



Source: PNAD *Continua*/microdata  
Elaborated by the author.

There is no clear trend and the labor income CC for the last quarter of 2017 is almost exactly the same as that for the first quarter of 2016. The labor income Gini coefficient, on the other hand, clearly rises during the same period and is about 1.2 points higher for Q4/2017 than for Q1/2016.

While the two are different statistics and do not refer to the same population, it is curious that one is unchanged while the other clearly increases. The obvious explanation is the relevance of monetary transfers by the government to households. The CC of household labor income relative to total household *per capita* income includes these monetary transfers, but the individual labor income Gini does not. They make a big difference.

One of the differences between the labor income CC and the labor income Gini coefficient is that the former is calculated using the entire population of a given household, while the latter is calculated using only employed individuals. The contribution of a household to the labor income CC is the sum of the labor incomes of all its members divided by the number of members, including those who have no labor income. The contribution of an individual to the labor income Gini coefficient is just that individual's labor income – those who are not in the labor market have no contribution and are ignored in calculating the coefficient.

This means that looking only at the labor income Gini coefficient will ignore the destructive effects of unemployment. These effects can be terrible in a prolonged recession such as the one Brazil began in 2015 and is yet to fully recover from.

Figure 3 attempts to deal with this through a phase diagram in which the labor income Gini coefficient is plotted against the unemployment rate. Only individuals 15 or older are taken into account.

Three periods are visible.

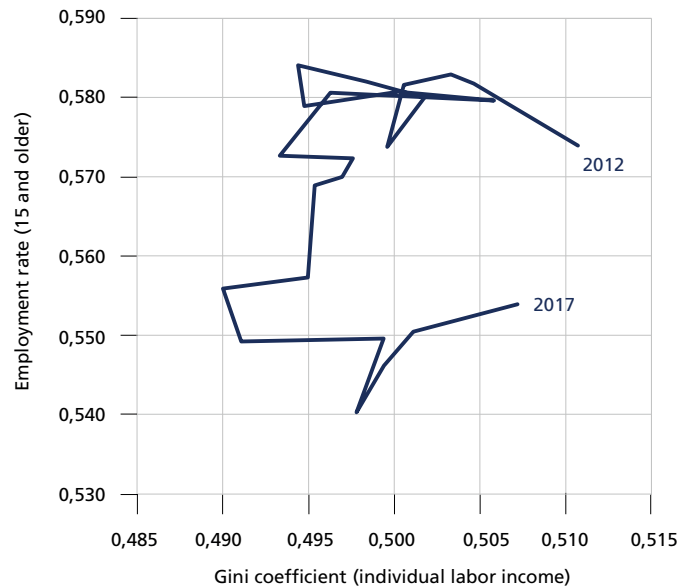
The first are the years between 2012 and 2014, which saw the twilight of the decade-long expansion fueled by high commodity prices. The results are close to ideal: the employment rate remained close to 58% of the population 15 or older and wage inequality fell from close to 51 to close to 49. Alas, it was not to last.

The second period is from 2015 to the beginning of 2016. Inequality remained stable at close to 49, but employment fell from 58% to 55% of the population legally allowed to work. This is when GDP is falling; employers are beginning to let go of their workers and are not hiring any more.

Finally, we have the recession catching up fully to the labor market. From the end of 2016 to the end of 2017, the employment rate remained unchanged at close to 55%, but inequality among those still employed began to rise again. This may be due to labor hoarding on the part of employers who are far more willing to fire workers with low qualification than highly qualified workers that will be more difficult to replace once the economy picks up again.

FIGURE 3

Phase diagram: employment vs labor income Gini



Source: PNAD *Continua*/microdata.  
Elaborated by the author.

So the labor market is getting more unequal and not any more inclusive. Why do we not see an increase in household inequality from 2016 to 2017?

I believe that the labor market, on its own, would lead to an increase in inequality, but since public transfers account for more than 20% of household income, they have had the power to stop the increase in household inequality. The Brazilian social protection system suffers from many problems: it is very expensive, it is barely progressive, it is poorly targeted and it provides very high transfers to wealthy families. Nevertheless, I believe that it has managed to keep inequality stable through a deep and long recession, which is no small achievement.

## 4 DISCUSSION AND CONCLUSION

The income distribution is not something that changes overnight and it is not realistic to expect leaps in a single year. Nevertheless, the fall of 0.18 point in the Gini coefficient



from 2016 to 2017 is well below the 0.7 point, which is the average reduction in inequality from 2001 to 2014. Preliminary tendencies point in two directions.

The first can be discerned from the Shorrocks decomposition of the almost insignificant changes in the Gini coefficient. The main conclusion is that there were two forces acting in opposite directions. Labor income became somewhat less concentrated and less important in total income, which led to less inequality. Alas, this was largely undone by increases in social security and capital income, which are regressive. The net result was close to zero.

The second can be discerned from the divergent paths of the labor income Gini and labor income CC. According to this analysis, the weak labor market was pushing towards higher inequality. Higher household inequality did not result because the social protection system, dominated by social security, was strong enough to keep inequality constant.

So what was it? Did the labor market lead to lower inequality cancelled out because of social security or did the labor market lead to higher inequality cancelled out because of social security?

The answer depends on whether you are looking at workers or households. The labor market is generating higher inequality among individual workers and, if there were no social protection (especially no social security), this would also lead to higher household inequality. Social protection incomes, however, reorder households. This is no small reordering and involves large groups of people (most of all families with retirees) going from the lower to the upper parts of the income distribution. This means that the large increase in individual inequality generated by the labor market is transformed into a small decrease in the contribution of labor income to household inequality because many of the losers, while having low labor incomes, are in higher income families due to social protection incomes.

The main conclusion is clear: the Brazilian social protection system (particularly social security) is working to keep a labor market in crisis from leading to increased household inequality. But a secondary conclusion is also clear: the same social protection

system (particularly social security), however, is also a pillar of high inequality and must be made more egalitarian over time.

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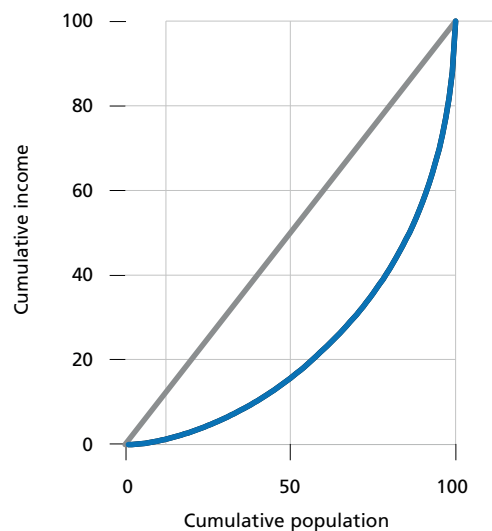
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## APPENDIX

## CONCENTRATION CURVES

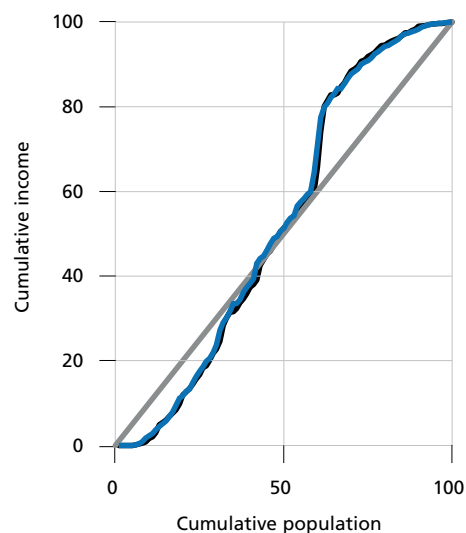
A concentration coefficient (CC) always has a concentration curve associated to it. The following eight figures show that not only has the Gini coefficient remained essentially unchanged, but the concentration curves have also not seen much action.

FIGURE A.1  
Lorenz curve (2016-2017)  
(%)



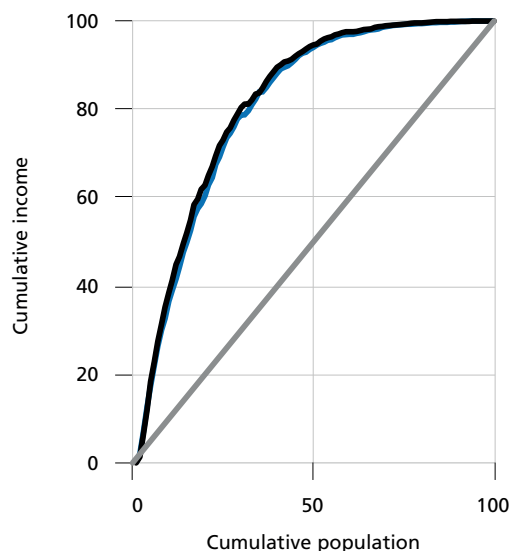
Source: *Pesquisa Nacional por Amostra de Domicílios Contínua* (PNAD Contínua)/microdata.  
Elaborated by the author.

FIGURE A.2  
Concentration curve: *Benefício de  
Prestação Continuada* (BPC) (2016-2017)  
(%)



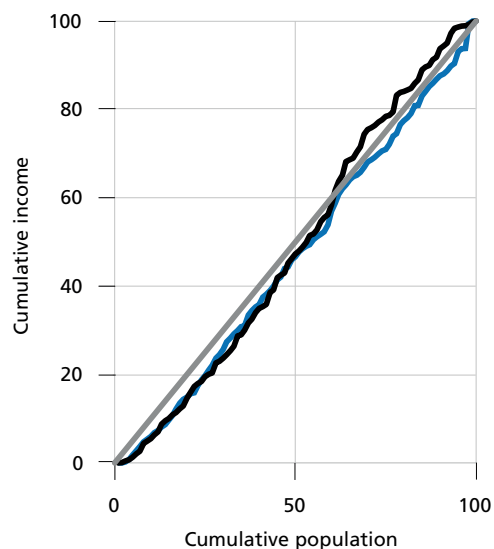
Source: PNAD Contínua/microdata.  
Elaborated by the author.

FIGURE A.3  
Concentration curve: *Bolsa Família* program  
(2016-2017)  
(%)



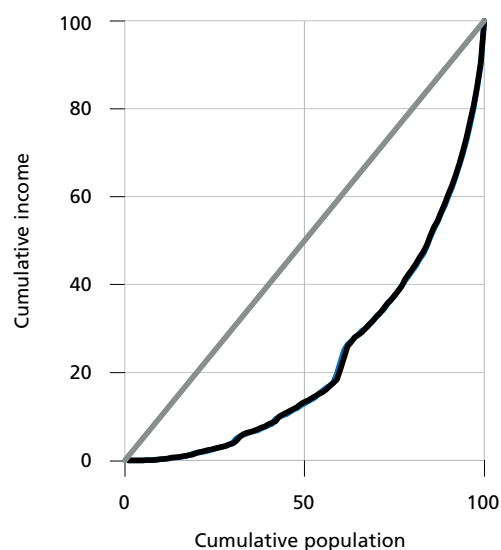
Source: PNAD *Contínua*/microdata.  
Elaborated by the author.

FIGURE A.4  
Concentration curve: other programs  
(2016-2017)  
(%)



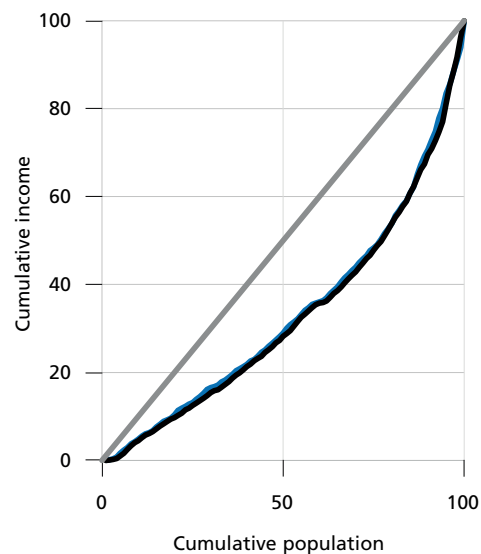
Source: PNAD *Contínua*/microdata.  
Elaborated by the author.

FIGURE A.5  
Concentration curve: *previdência* (2016-2017)  
(%)



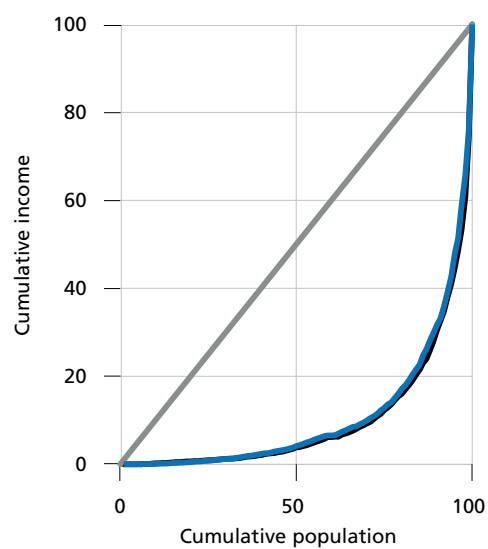
Source: PNAD *Contínua*/microdata.  
Elaborated by the author.

FIGURE A.6  
Concentration curve: private transfer  
(2016-2017)  
(%)



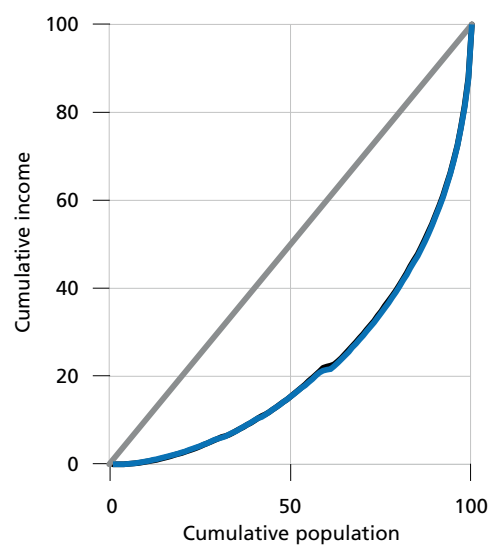
Source: PNAD *Contínua*/microdata.  
Elaborated by the author.

FIGURE A.7  
Concentration curve: *capital* (2016-2017)  
(%)



Source: PNAD *Continua*/microdata.  
Elaborated by the author.

FIGURE A.8  
Concentration curve: *trabalho* (2016-2017)  
(%)



Source: PNAD *Continua*/microdata.  
Elaborated by the author.



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