*7.3 Inequality, Growth and Social Welfare (Gini): Microsimulation of Taxes and Transfers Changes

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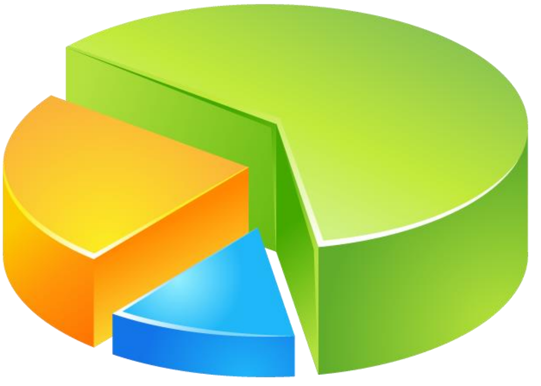


* 7.4 text Drivers of Income Distribution Changes
https://www.cps.fgv.br/cps/bd/curso/Drivers_IncomeDistribution_Neri_Brazill_Updated_GMD.pdf

***text microsimulations https://www.wider.unu.edu/publication/fiscal-redistribution-brazil

***text PNADC https://cps.fgv.br/en/inequality

1

A Social Welfare Function Decomposition (Gini)

Following Atkinson (1970), we can write a general social welfare function denoted as:

$$W = \mu(x*) = \int_0^\infty u(x)w(x)f(x)dx$$

where x is the equally distributed equivalent level of income which, if given to every individual in the society, results in the same social welfare level as the actual distribution of income. This should satisfy:*

$$\int_0^\infty w(x)\,f(x)\,dx = 1$$

A) Sen (1974) developed a social welfare function taking into account the relative deprivation suffered by the poor relative to the non-poor in the society.

If u(x) = x and w(x) = 2 [1 – F(x)] *then applying Atkinson certainty equivalent idea :*

$$W_G = \int_0^\infty u(x)w(x)f(x)dx = 2\int_0^\infty x[1 - F(x)]f(x)dx = \mu(1 - G)$$

where μ is the mean income of the society and G is the Gini Index.

B) Kakwani et al. (2010) Lini Social Welfare Function:

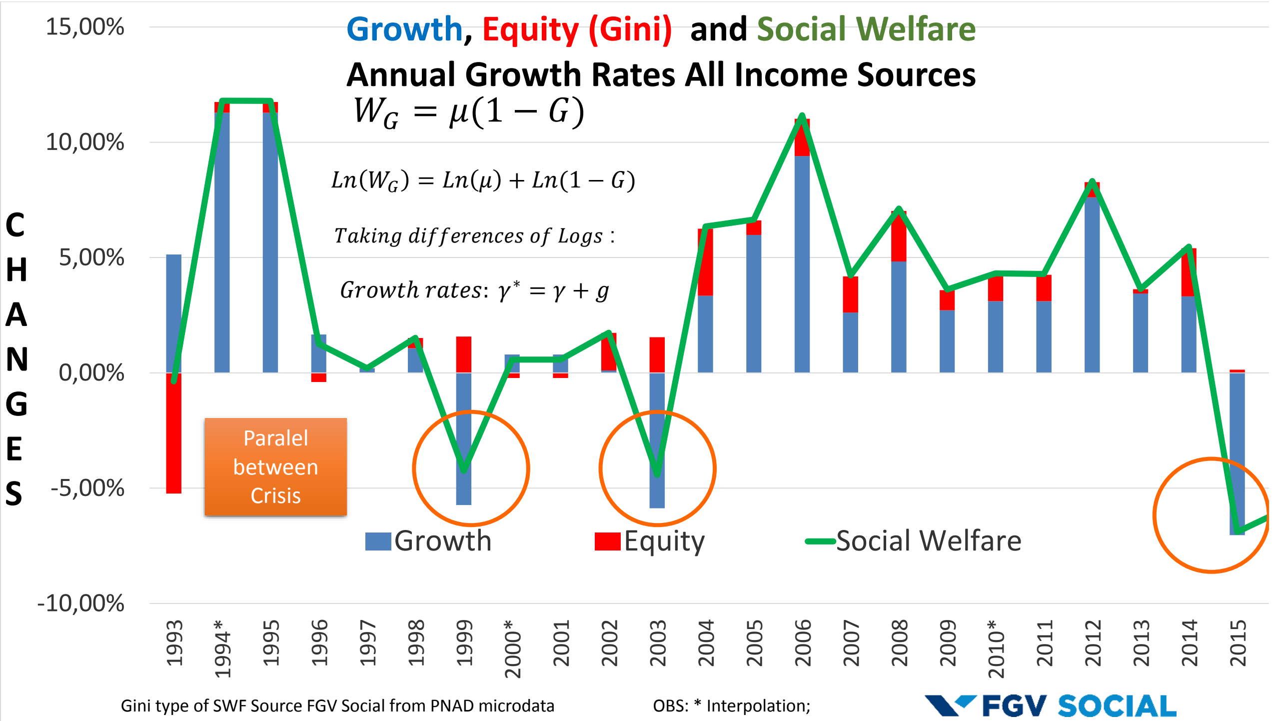
$$log\ (x^*) = 2\int_0^\infty [1 - F(x)]\,log\ (x)\,f(x)dx$$

Derived Inequality Measure from a log utility and Weights a la Gini = Lini:

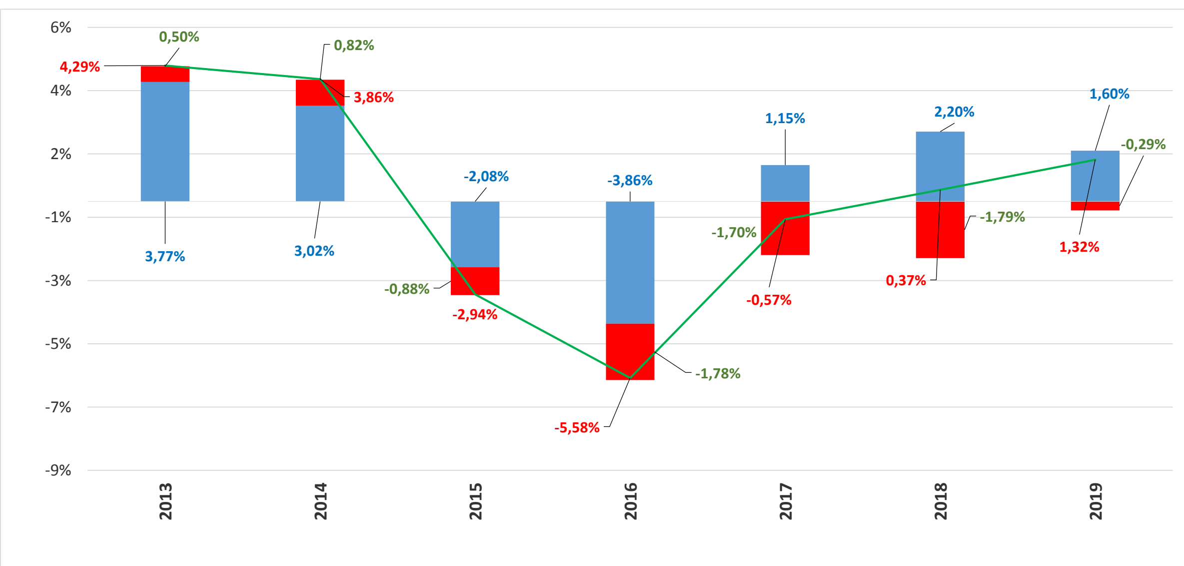
$$\log(I) = 2\int_0^\infty [1 - F(x)][\log(\mu) - \log(x)]\,f(x)\,dx$$

Gini will fall in Brazil with any income increase below the 75th percentile, the Lini is more pro poor.

2



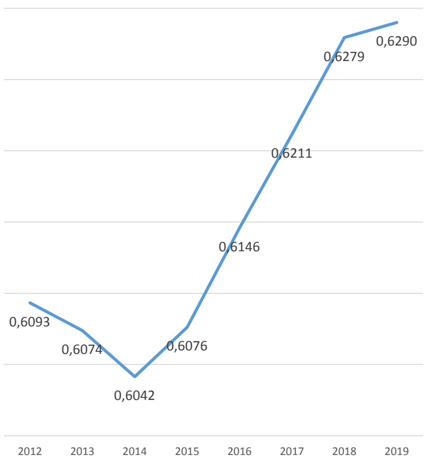
Growth, Equity (Gini) and Social Welfare Annual Growth Rates



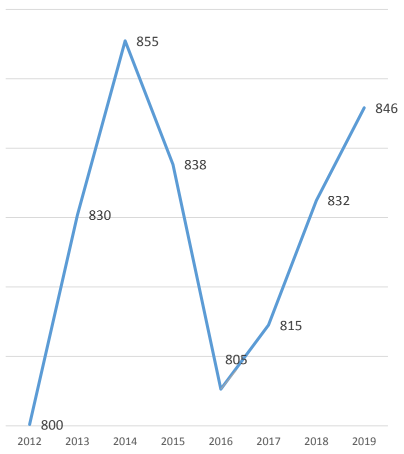
Gini type of SWF Source: FGV Social from PNADC/IBGE microdata per Capita Normal Labor Earnings

Levels Mean, Equity (Gini) and Social Welfare Annual

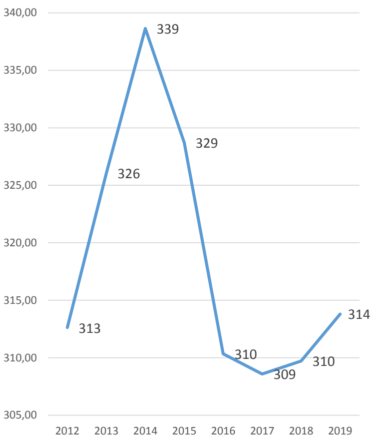
Gini



Mean per Capita

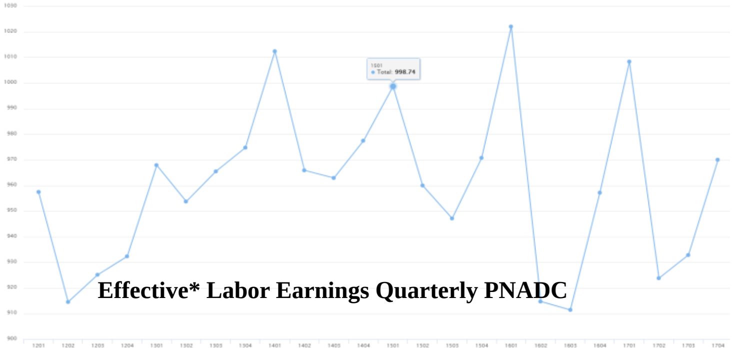


Social Welfare



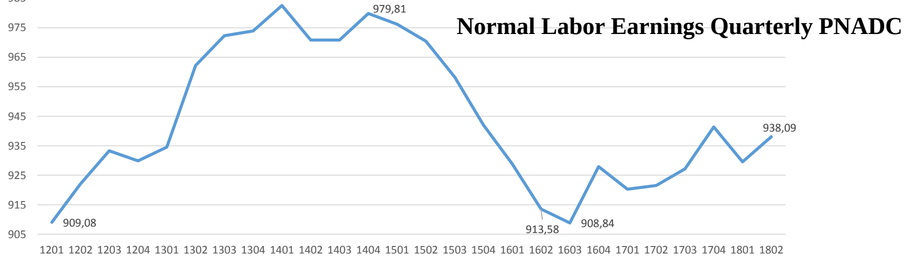
Source: FGV Social from PNADC/IBGE microdata per Capita Normal Labor Earnings

Mean

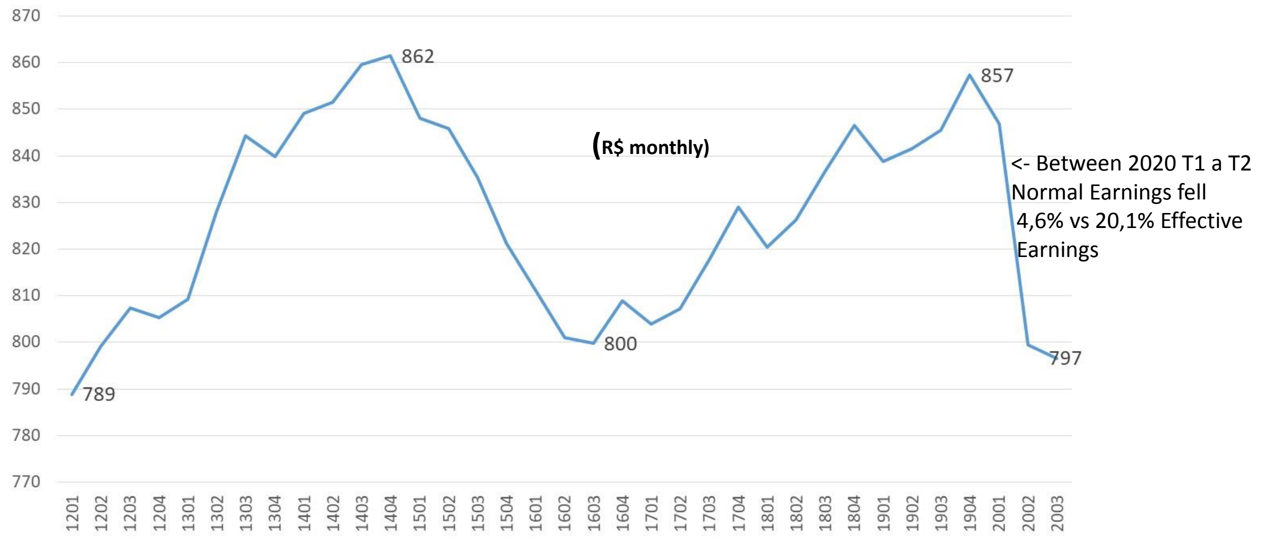


Source: FGV Social from PNADC/IBGE microdata Labour Income

Which Labor Earnings concept to use? Effective (+ Instable) or Normal (+ Traditional)?

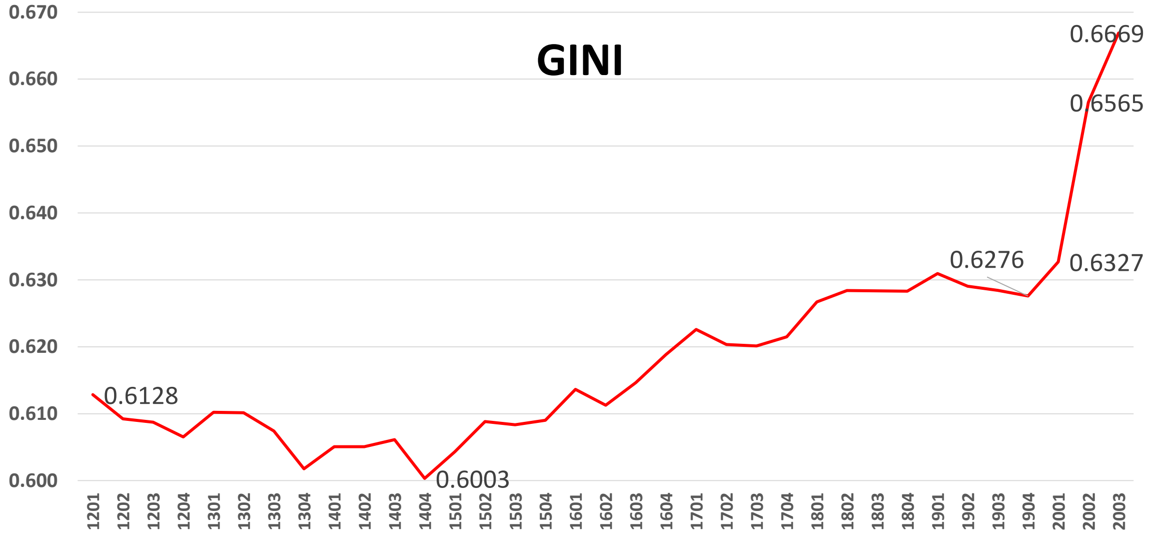


Normal Per capita Labor Earnings Quarterly PNADC

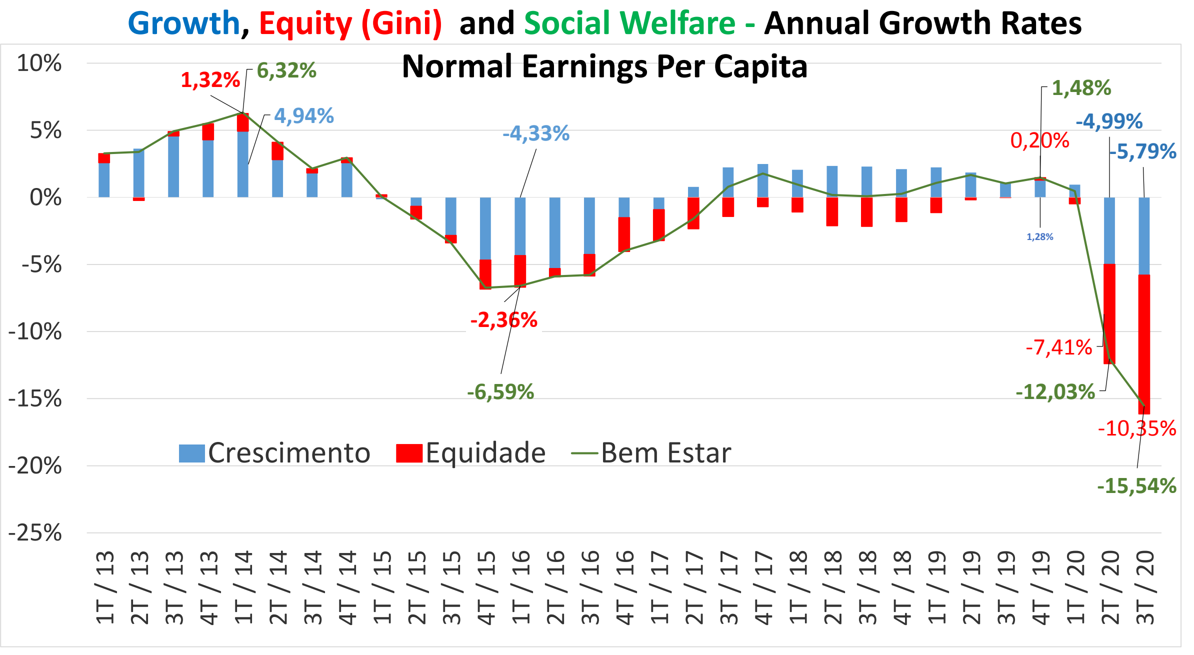


Source: FGV Social from PNADC/IBGE microdata per Capita Normal Labor Earnings

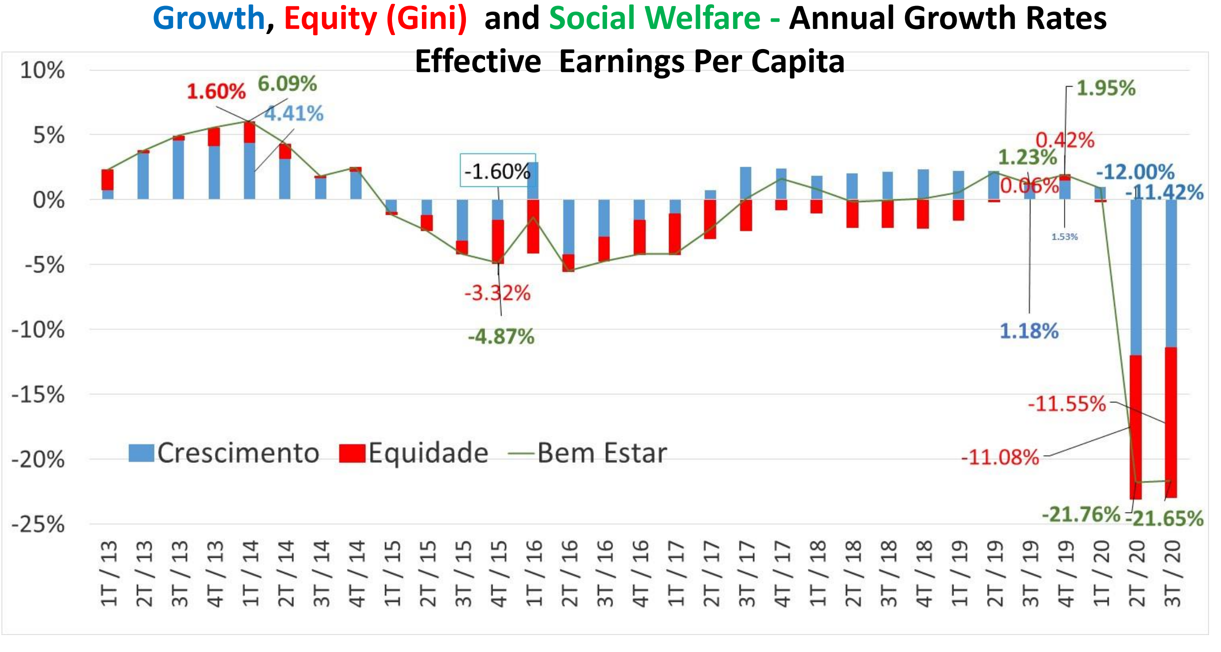
Normal Per capita Labor Earnings Quarterly PNADC



Source: FGV Social from PNADC/IBGE microdata per Capita Normal Labor Earnings



Source: FGV Social from PNADC/IBGE microdata per Capita Normal Labor Earnings



Source: FGV Social from PNADC/IBGE microdata per Capita Normal Labor Earnings

Dynamic Social Welfare Framework

We depart from Atkinson (1970) seminal contribution of decomposing social welfare into mean and inequality components. $W = \mu(1-G) = \mu E$

Where G is the Gini index, which is a relative measure of inequality. *E=(1-G)* is a measure of equity in income. Taking logs:

$$Ln(W) = Ln(\mu) + Ln(E)$$

Which on taking the first difference gives: $\gamma^* = \gamma + g$

Where $\gamma^* = \Delta Ln(W)$ is the growth rate of social welfare W;
$\gamma = \Delta Ln(\mu)$ is the growth rate of average income of the society;
$g = \Delta Ln(E)$ is the equality growth rate, which will be positive (negative) if growth is pro-poor (anti-poor);

Dynamic Social Welfare Decomposition Framework by Income Sources

(same thing but with Gini SWF and Concentration Indexes)

Suppose households draw their income from k sources, then the total mean income would be:

$$\mu = \sum_{i=1}^{k} \mu_i$$

Thus, the mean social welfare of the i^{th} income component would be:

$$W_i = \mu_i(1 - C_i) = \mu_i E_i$$

Which on taking logarithms and the first difference gives the growth rate:

$$\gamma_i^* = \gamma_i + g_i$$

Where $\gamma^* = \Delta Ln(W)$ is the growth rate of social welfare for the i^{th} component;
$\gamma = \Delta Ln(\mu)$ is the growth rate of average income for the i^{th} component;
$g = \Delta Ln(E)$ is the equality growth rate for the i^{th} component;

Income, Equality and Social Welfare:
Annual Contribution by Component – Disposable Income (2003 to 2015)

(Contribution of each Income Concept to Disposable Income Growth)	2003 to 2015 (Annual)		
	Mean Income	**Equality**	**Welfare**
Initial income	0.0276	0.0072	0.0349
Cash Transfers	0.0110	0.0055	0.0165
Public Pensions	0.0083	0.0016	0.0099
Poor Elderly/Disability Benefits - BPC	0.0010	0.0013	0.0023
Wage Bonus + Family Wage	0.0004	0.0003	0.0008
Unemployment Benefit	0.0004	0.0004	0.0008
Family Grant (CCT)	0.0013	0.0022	0.0034
Gross Income	0.0387	0.0127	0.0514
(-) Direct Taxes	0.0038	-0.0010	0.0028
Personal Income Tax	0.0018	-0.0013	0.0005
Social Security Contribution	0.0021	0.0003	0.0023
Disposable Income	0.0348	0.0137	0.0486
(-) Indirect Taxes	0.0080	0.0029	0.0109
Final Income	0.0269	0.0108	0.0377

official cash transfers → accelerated the growth of social welfare (+1.65%)

direct and indirect taxes changes operated in the opposite direction (0.28% and 1.09%,)

more to mean income growth (72%) than inequality reduction (28%).

Source: FGV Social with BRAHMS microsimulations

The Gini index based social welfare grew 4.86% per year. Higher than the respective growth rate associated initial income (4.36%) and final income (4.47%), but not of gross income (4.91%).

BRAZILIAN MAIN INCOME POLICIES (as Cash Tranfers)

INFLUENCED BY THE MINIMUM WAGE

- **WAGE BONUS AND FAMILY WAGE** → SUBSIDIZE LOW-INCOME FORMAL EMPLOYEES
- **UNEMPLOYMENT BENEFIT** → NON-EXPERIENCED RATED INSURANCE FOR FIRED FORMAL EMPLOYEES
- **SOCIAL SECURITY** → PUBLIC SYSTEM THAT INCLUDES A NON-CONTRIBUTORY RURAL RETIREMENT; PUBLIC SERVANTS; BENEFITS ABOVE THE MINIMUM HAVE TO BE ADJUSTED ONLY BY INFLATION

NON-CONTRIBUTORY CASH TRANSFERS*

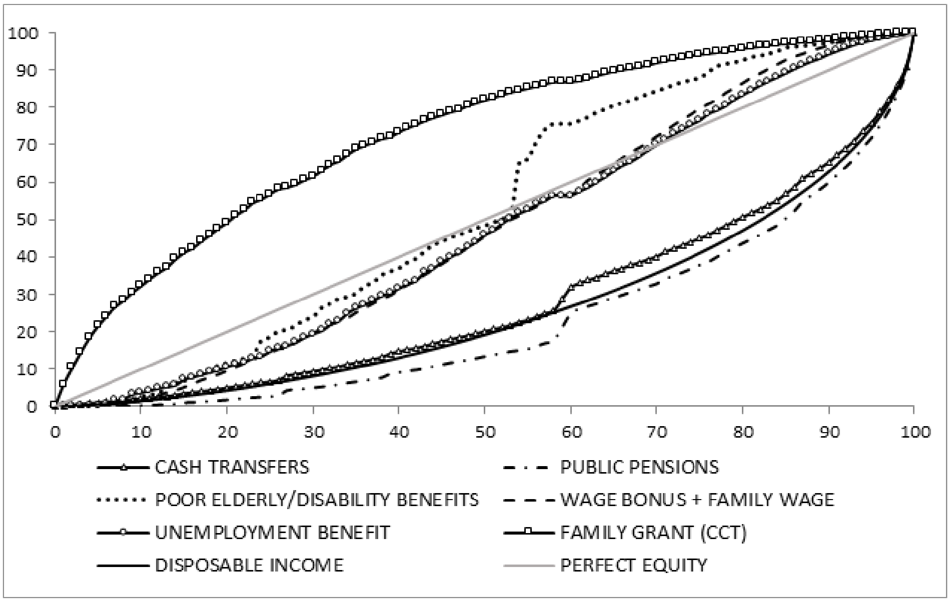
- **BPC / LOAS** → CASH TRANSFER FOR THE ELDERLY AND THE DISABLED POOR
- **BOLSA FAMÍLIA** → CONDITIONAL CASH TRANSFER

**Rural retirement is a non-contributory social security program*

POLICY ORIENTATION:

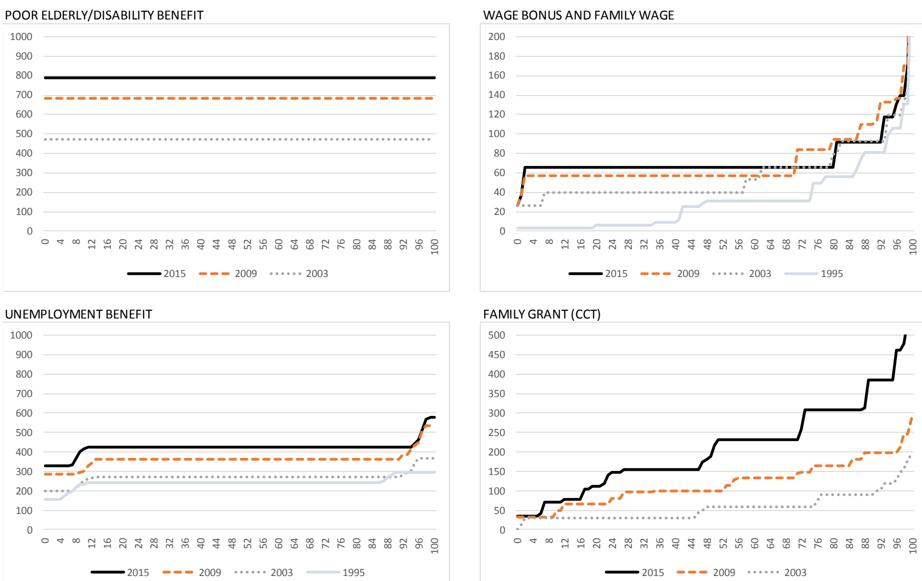
LABOUR | SOCIAL SECURITY | ANTI-POVERTY

Concentration Curves of Cash Transfers ordered by Disposable Income (2015)



Source: FGV Social with BRAHMS microsimulations

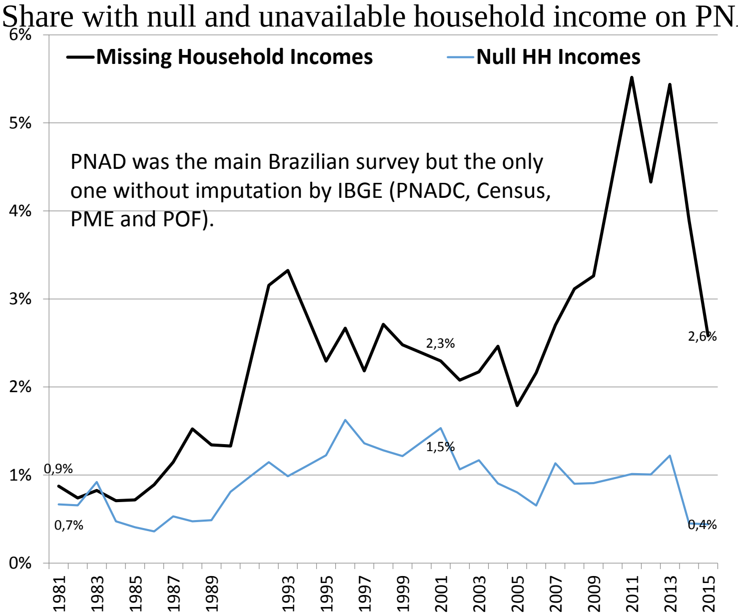
Individual Distributions of Cash Transfers, Taxes and Income Concepts - 2015



Source: FGV Social with BRAHMS microsimulations

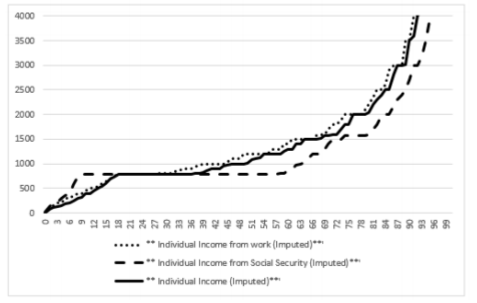
Does missing income on data affect distributive trends? No

Share with null and unavailable household income on PNAD



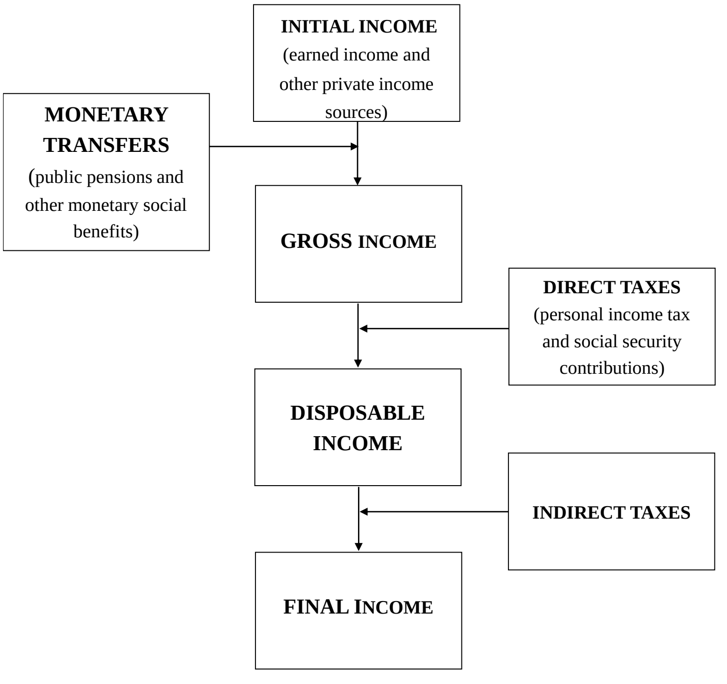
New imputation method, combining regression and stochastic component. Preserves inequality and discontinuities (ex: minimum wage).

Figure 1: Individual income cumulative distributions (2015)

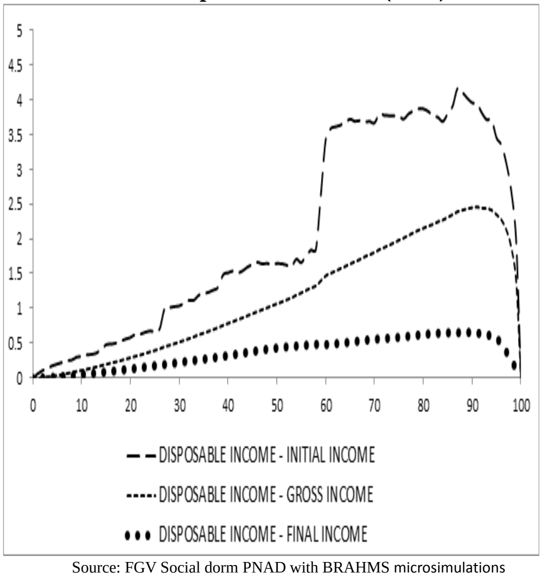


From 2001 to 2015 imputation increases the level of mean income, slightly increases inequality indexes and decreases the main poverty indicators but it **bridges PNAD and PNADC poverty levels . It does not affect inequality trends in the period**

Income Concepts



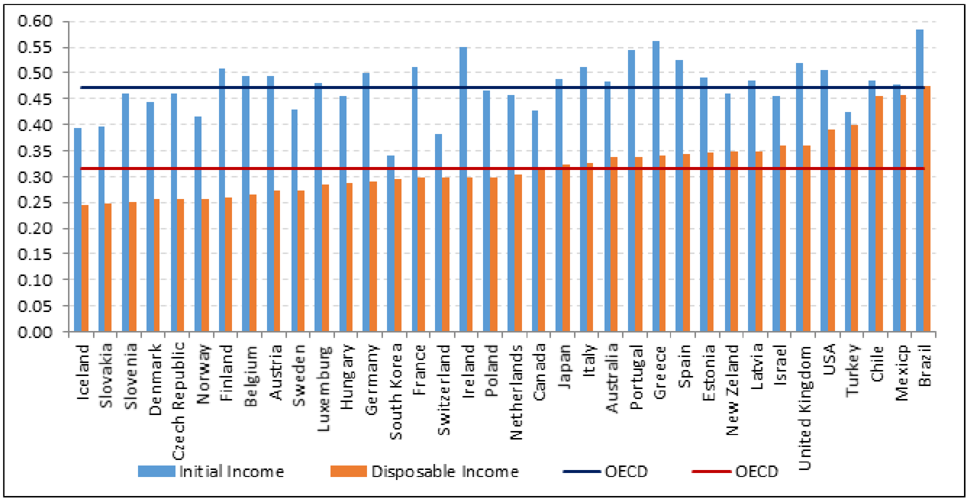
Concentration Curves Differences in relation to Disposable Income – (2015)



Source: FGV Social dorm PNAD with BRAHMS microsimulations

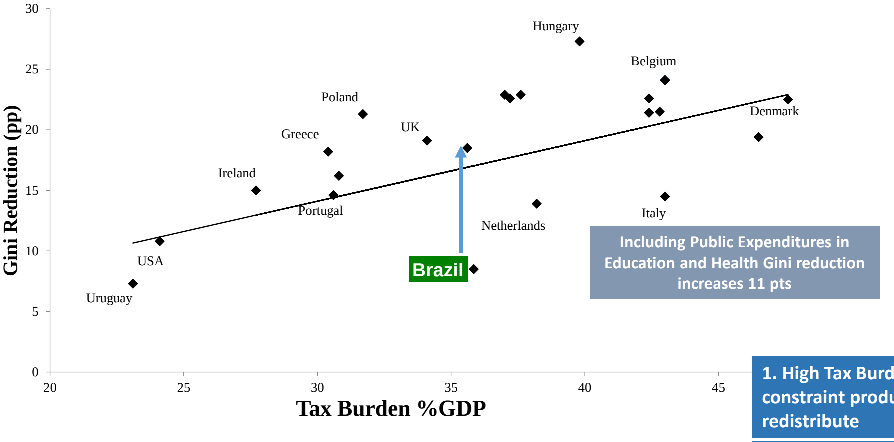
Gini Coefficient of Initial and Disposable Income:

Brazil and Other Countries - 2015



Source: OECD

WHAT IS THE IMPACT OF TAXES AND CASH TRANSFERS (SUBSIDIES) IN INEQUALITY?



Source: Nogueira, Siqueira and Luna (2015) e Lustig (2016)

1. High Tax Burden and transfers constraint production and do not redistribute

2. Public Expenditures in Education and Health redistribute more, but has a low impact at the Brazilian productivity

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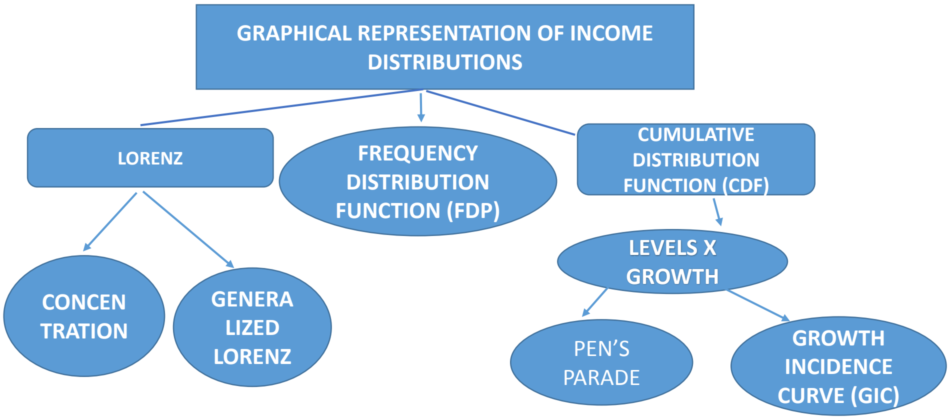
GRAPHICAL REPRESENTATION OF INCOME DISTRIBUTIONS
LORENZ
FREQUENCY DISTRIBUTION FUNCTION (FDP)
CUMULATIVE DISTRIBUTION FUNCTION (CDF)
CONCEN TRATION
GENERA LIZED LORENZ
LEVELS X GROWTH
PEN'S PARADE
GROWTH INCIDENCE CURVE (GIC)