*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

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 , Neri e Son (2010) Lini Social Welfare Function: $$log\left(x^*\right) = 2\int_0^\infty [1-F(x)]log(x)\,f(x)dx$$

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.

Dynamic Social Welfare Framework

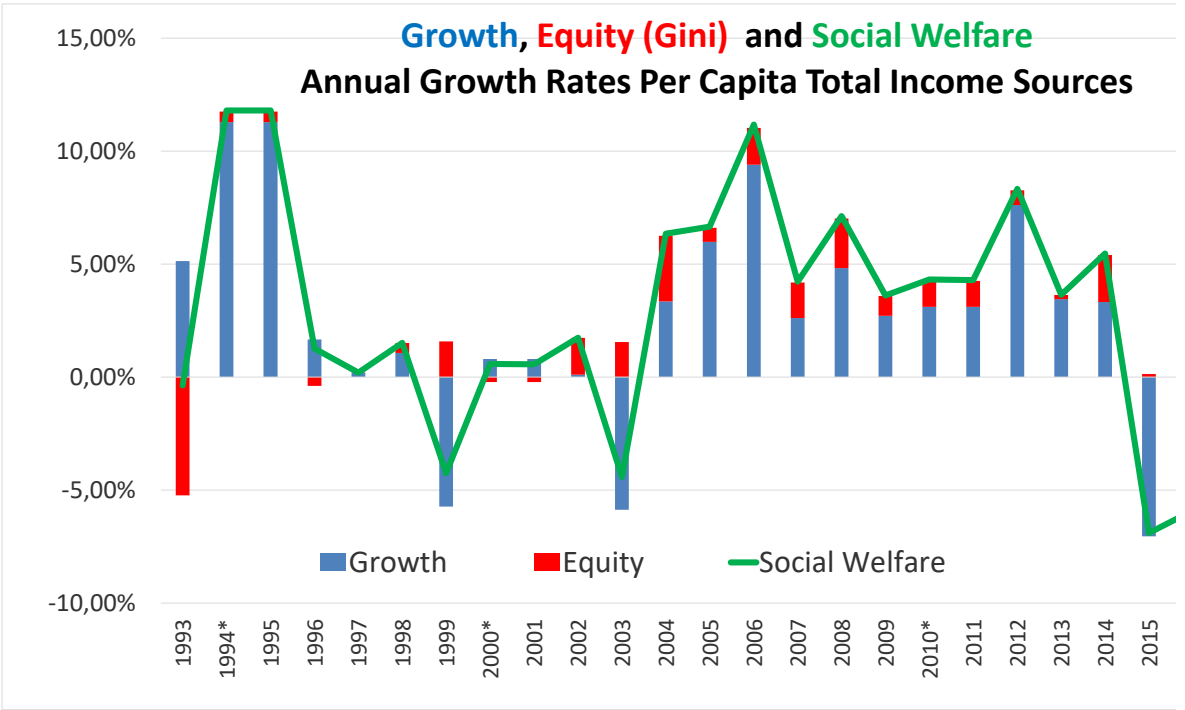
We depart from Atkinson (1970) seminal contribution of decomposing social welfare into mean and inequality components. $W = \mu(1-G) = \mu E$

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:

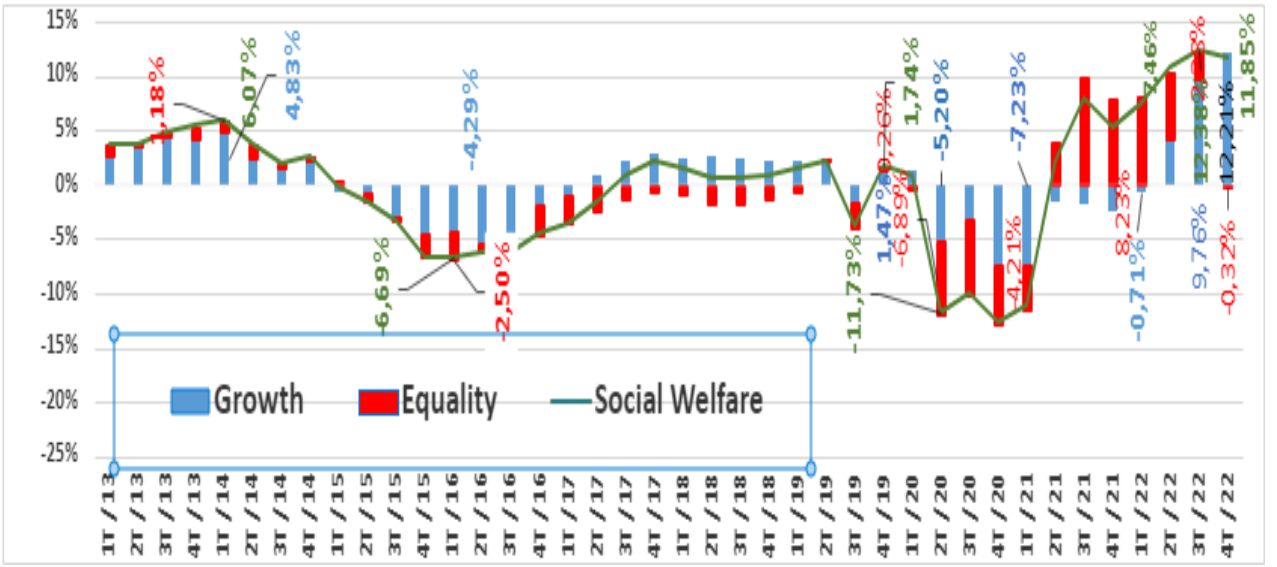
$$Ln(W) = Ln(\mu) + Ln(E)$$

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);



Growth, Equity (Gini) and Social Welfare
Normal Per Capita Labor Earnings Growth Rates - 12-Month change



Fonte: FGV Social a partir dos microdados da PNAD Contínua/IBGE

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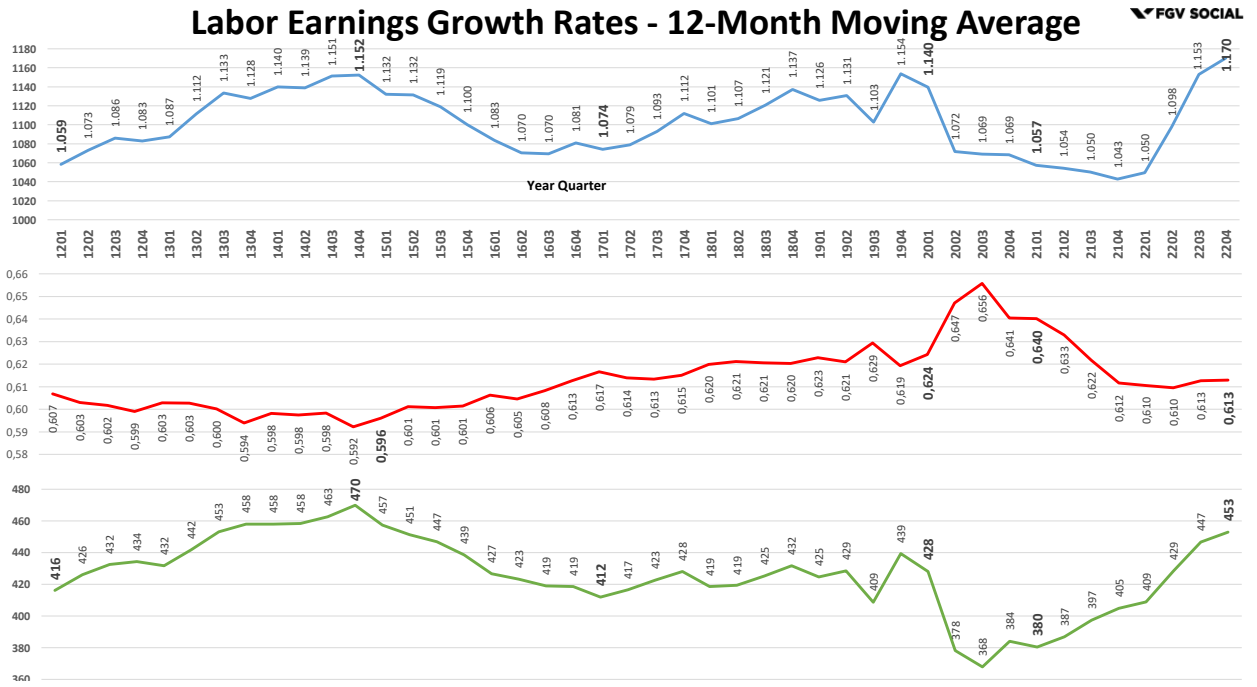
GMean, Equality (Gini) and Social Welfare Levels Normal Per Capita Labor Earnings Growth Rates - 12-Month Moving Average



Dynamic Social Welfare Decomposition Framework by Income Sources
(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;

Concentration Indexes (geometric interpretation – área)

BRAZILIAN MAIN INCOME POLICIES (as Cash Tranfers)

INFLUENCED BY THE MINIMUM WAGE

NON-CONTRIBUTORY CASH TRANSFERS*

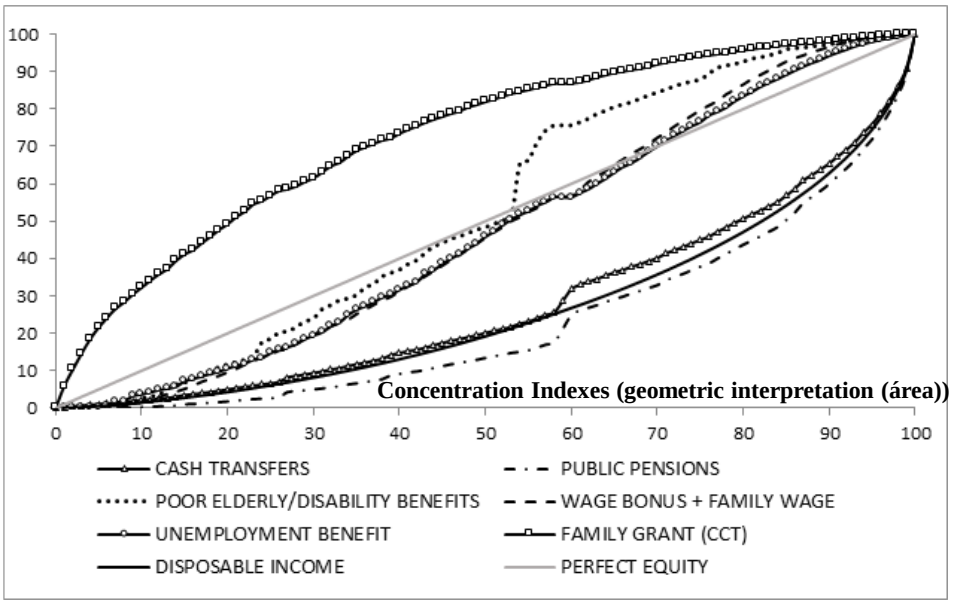
***Rural retirement is a non-contributory social security program*

POLICY ORIENTATION:

- **LABOUR**
- **SOCIAL SECURITY**
- **ANTI-POVERTY**

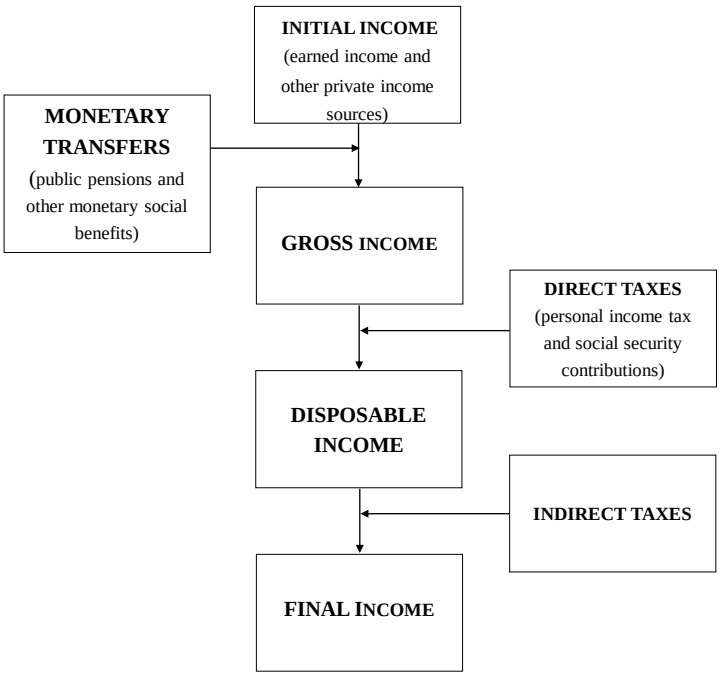
WAGE BONUS AND FAMILY WAGE	**SUBSIDIZE LOW-INCOME FORMAL EMPLOYEES**
UNEMPLOYMENT BENEFIT	**NON-EXPERIENCED RATED INSURANCE FOR FIRED FORMAL EMPLOYEES**
SOCIAL SECURITY	**PUBLIC SYSTEM THAT INCLUDES A NON-CONTRIBUTORY RURAL RETIREMENT; PUBLIC SERVANTS; BENEFITS ABOVE THE MINIMUM HAVE TO BE ADJUSTED ONLY BY INFLATION**
BPC / LOAS	**CASH TRANSFER FOR THE ELDERLY AND THE DISABLED POOR**
BOLSA FAMÍLIA	**CONDITIONAL CASH TRANSFER**

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



Source: FGV Social with BRAHMS microsimulations

Income Concepts



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 on disposable income grew 4.86% per year. Higher than the respective growth rate associated with initial income (4.36%) and final income (4.47%), but not of gross income (4.91%).