*Inequality, Growth and Social Welfare (Gini based):

Marcelo Neri
FGV Social

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 $w(x) = [1 - F(x)]$ 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 $\mu$ 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.
Growth, Equity (Gini) and Social Welfare Annual Growth Rates

\[ W_G = \mu (1 - G) \]

\[ \ln(W_G) = \ln(\mu) + \ln(1 - G) \]

\[ \gamma^* = \gamma + g \]

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

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

Gini type of SWF Source FGV Social from PNAD microdata

Observation: * Interpolation;
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

Effective* Labor Earnings Quarterly PNADC

Source: FGV Social from PNADC/IBGE microdata Labour Income

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

Usual Labor Earnings Quarterly PNADC

17/02/2020
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 ith 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 ith component;
- $\gamma = \Delta \ln(\mu)$ is the growth rate of average income for the ith component;
- $g = \Delta \ln(E)$ is the equality growth rate for the ith component;
Income, Equality and Social Welfare:

Annual Contribution by Component – Disposable Income (2003 to 2015)

(Contribution of each Income Concept to Disposable Income Growth)

<table>
<thead>
<tr>
<th>Component</th>
<th>Mean Income</th>
<th>Equality</th>
<th>Welfare</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial income</td>
<td>0.0276</td>
<td>0.0072</td>
<td>0.0349</td>
</tr>
<tr>
<td>Cash Transfers</td>
<td>0.0110</td>
<td>0.0055</td>
<td>0.0165</td>
</tr>
<tr>
<td>Public Pensions</td>
<td>0.0083</td>
<td>0.0016</td>
<td>0.00999</td>
</tr>
<tr>
<td>Poor Elderly/Disability Benefits - BPC</td>
<td>0.0010</td>
<td>0.0013</td>
<td>0.0023</td>
</tr>
<tr>
<td>Wage Bonus + Family Wage</td>
<td>0.0004</td>
<td>0.0003</td>
<td>0.0008</td>
</tr>
<tr>
<td>Unemployment Benefit</td>
<td>0.0004</td>
<td>0.0004</td>
<td>0.0008</td>
</tr>
<tr>
<td>Family Grant (CCT)</td>
<td>0.0013</td>
<td>0.0022</td>
<td>0.0034</td>
</tr>
<tr>
<td>Gross Income</td>
<td>0.0387</td>
<td>0.0127</td>
<td>0.0514</td>
</tr>
<tr>
<td>(-) Direct Taxes</td>
<td>0.0038</td>
<td>-0.0010</td>
<td>0.0028</td>
</tr>
<tr>
<td>Personal Income Tax</td>
<td>0.0018</td>
<td>-0.0013</td>
<td>0.0005</td>
</tr>
<tr>
<td>Social Security Contribution</td>
<td>0.0021</td>
<td>0.0003</td>
<td>0.0023</td>
</tr>
<tr>
<td>Disposable Income</td>
<td>0.0348</td>
<td>0.0137</td>
<td>0.0486</td>
</tr>
<tr>
<td>(-) Indirect Taxes</td>
<td>0.0080</td>
<td>0.0029</td>
<td>0.0109</td>
</tr>
<tr>
<td>Final Income</td>
<td>0.0269</td>
<td>0.0108</td>
<td>0.0377</td>
</tr>
</tbody>
</table>

Source: FGV Social with BRAHMS microsimulations

The Gini index based social welfare 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%).

BRAZILIAN MAIN INCOME POLICIES

(as Cash Transfers)

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
Income Concepts

INITIAL INCOME
(earned income and other private income sources)

MONETARY TRANSFERS
(public pensions and other monetary social benefits)

GROSS INCOME

DIRECT TAXES
(personal income tax and social security contributions)

DISPOSABLE INCOME

INDIRECT TAXES

FINAL INCOME

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?

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