Inclusive Development:
Defining, Measuring and Analyzing
for BRICS countries

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Objective s and road map

- Tinbergen (the first Nobel Laureate in Economics) in his theory of economic policy made a clear distinction between policy objectives (targets) and policy means. Following this Tinbergen’s basic contribution a framework of inclusive development is proposed.

- Inclusive development is defined in terms of three major social objectives which have sub-objectives. These social objectives lead to ultimate social objective of enhancing people’s well-being.

- Several social welfare functions have been developed to define various social objectives.

- A sample of policies has been proposed which are means to achieve social objectives.

- Some selected empirical results are presented from BRICS countries.
Economic Growth

- Economic growth increases the output in the economy which is either invested or consumed by people.

- The rate of change in output is measured by growth rate in GDP, which is widely used as a yardstick to assess countries economic performance.

- The growth process also produces a pattern of growth that determines how people are contributing to economic growth and how they are using the output so produced in order to live their lives they want to live.

- The government plays a key role in determining the pattern of growth.
What is Inclusive Development?

• UNDP: Development can be inclusive - and reduce poverty - only if all groups of people contribute to creating opportunities, share the benefits of development and participate in decision-making.

• Amartya Sen: Economic growth has to be but a means to development not an end in itself. What is this end?

• Enhancement of people’s well-being is the Ultimate end of inclusive development.

• Sen defined well-being in terms of “functionings and capabilities”. While functioning is an achievement, capability is the ability to achieve. Thus, functionings are directly related to what kind of life people actually lead, whereas capabilities are concerned with freedom people have in the choice of life they wish to lead.
Economists have extensively used the idea of social welfare function. Development economists seem to have forgotten this concept which has played a key role in economic analysis.

A social welfare function is a rule that provides a form to aggregate different utilities enjoyed by individuals in the society. The main purpose of these functions is to evaluate economic allocations and policies, to identify which policies are working and what are not working.

These different policies affect individuals differently, some individuals will lose and others will gain. So for any evaluation, the normative judgment cannot be avoided, as well the identification and development of indicators using the economic theory of social welfare functions.

My proposed framework of inclusive development extensively uses the idea of social welfare functions.
Pareto optimality criterion: A change is a Pareto improvement if it makes no one worse and some one better off. A situation will be Pareto optimal if there exists no change that is a Pareto improvement.

Social welfare function: Suppose there are \( n \) individuals in the society who have income distribution denoted by:

\[
\bar{x} \approx [x_1, x_2, \ldots, x_n]
\]

Then social welfare function is defined as:

\[
W(\bar{x}) = W[u_1(\bar{x}), u_2(\bar{x}), \ldots, u_n(\bar{x})]
\]

where \( u_i(\bar{x}) \) are the individual utilities.

Social welfare takes account of preferences of all individuals in the society so it is an obvious tool to define inclusive development. But it is defined in income or consumption space.
Social opportunity function

Similar to the idea of social welfare function we propose a social opportunity function defined as

$$O(x) = W[O_1(x), O_2(x), \ldots, O_n(x)]$$

where opportunities are defined as access to various basic services that enhance people’s well-being such as:

- Education
- Health
- Nutrition
- Sanitation
- Clean water
- Employment

There can be two way causation between social welfare defined in Income space and social opportunity function defined in non-income space. They in fact reinforce each other.
Social well-being function

Similar to social welfare and opportunity function, we define a social well-being function:

\[ \text{wel}(\bar{x}) = W[\text{wel}_1(\bar{x}), \text{wel}_2(\bar{x}), \ldots, \text{wel}_n(\bar{x})] \]

This function defines the society’s ultimate objective of enhancing social well-being which is defined in terms of Sen’s functioning and capability. It attempts to answer questions such as:

- Are people able to living long and health life?
- Are all people literate so that they can function in the society.
- Are all children born are able to survive?
- Are all children able to get quality education?
- Are all people able to freely express their views?
Average standard of living in India and China

Per capita GDP in $PPP2005 per year

Per capita household consumption in $PPP2005 per year

9/5/2013
India-China comparison

Growth elasticity of per capita household consumption

Disparity between urban and rural standard of living in China and India
When the average standard of living increases smoothly over time, the people feel secure but when there are wide fluctuations, a sense of insecurity develops which should reduce social welfare. A temporal social welfare allows us to calculate the loss of social welfare due to volatility.

The growth in Brazil has been highly volatile in the 1981-1995 period but then volatility has declined in the 1996-2009 period. % welfare loss in the 1981-1995 period is calculated equal to 19% while in the period 1996-2009 equal to 6%. Thus volatility can substantially reduce welfare.
Inequality causes social concern

- Inequality is a social concern which has been a source of much upheaval in the world. If inequality measures have direct policy relevance, they must be based on some normative notion of social welfare. There is always an implicit social welfare function behind every inequality measure.

- Two types of inequality measures  
  Kolm (1976)

  - Relative or rightist measures: The measures remains unchanged when each income is altered my the same proportion.
  - Absolute or leftist measures : The measures remain unchanged when each income is increased or decreased by the same absolute amount.

- Most of the debate on inequality has been focused on relative measures of inequality. The absolute measures reflect the absolute differences in levels of living rather than relative differences.

  Example: Two persons with income 1000 and 10000. If income are doubled to 2000 and 20000, the relative inequality does not change but absolute inequality has increased from 9000 to 18000 so income gap has widened.
Gini social welfare function

Suppose a person with income \( x \) compares with all other individuals in the society and his welfare is given by \( g(x, y) \) when he compares with individual with income \( y \), then his expected welfare is given by:

\[
E(\text{welfare}/x) = \int_0^\infty g(x, y)f(y)dy
\]

\[
g(x, y) = x \text{ if } x \geq y \\
=x - (y - x) \text{ if } x < y
\]

This formulation implies that if the individual finds that the compared incomes are lower than his or her, then his or her welfare is given by his or own income. If on the other hand, the compared incomes selected are higher than his or her, then individual feels envious and loses welfare. The loss of welfare is equal to the difference in incomes. The aggregate social welfare is given by:

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

\( G = \text{Relative loss of social welfare or relative inequality} \)
\( \mu G = \text{Absolute loss of welfare or absolute inequality} \)
Relative inequality in Brazil

Absolute inequality in Brazil
Social tension due to poverty

Like inequality the existence of poverty also is a social tension, which results in loss of social welfare. The loss depends on what poverty measure is chosen. The most popular poverty measures used in the literature are the class of Foster, Greer and Thorbecke (1984) poverty measures:

\[ \theta_\alpha = \int_0^Z \frac{(z-x)^\alpha}{z^\alpha} f(x) dx \]

where \( z \) is the poverty line. When

\[ \begin{align*}
\alpha &= 0 \rightarrow \theta_\alpha = H, \text{the head count} \\
\alpha &= 1 \rightarrow \theta_\alpha = \text{gap, poverty gap ratio} \\
\alpha &= 2 \rightarrow \theta_\alpha = \text{sev, severity of poverty}
\end{align*} \]

A person feels deprivation when she finds that her income is below the poverty line. Suppose her deprivation is given by a function \( d(z,x) \), which measures the gap between the poverty line and her income \( x \), then her welfare is given by

\[ W(x) = \begin{cases} 
  x & \text{if } x < z \\
  x - d(z,x) & \text{if } x < z
\end{cases} \]

Which implies that she suffers a loss of welfare if she finds that her income is less than the poverty line.
Poverty based social welfare function

Poverty based social welfare is defined as:

\[ W = \mu - \int_0^Z d(z,x)f(x)dx \]

\( d(z,x) \) should be a money metric measure of deprivation or in other words it should be invariant to a positive linear transformation. Thus we obtain a poverty based social welfare function for a class of FGT measures as

\[ W = \mu - Hz\left(\frac{\theta_\alpha}{H}\right)\left(\frac{1}{\alpha}\right) \]

Substituting \( a = 1 \) and \( a = 2 \) gives social welfare functions for poverty gap and Severity of poverty. The absolute and relative measures of poverty deprivation are given by:

\[ AD = Hz\left(\frac{\theta_\alpha}{H}\right)\left(\frac{1}{\alpha}\right) \quad \text{and} \quad RD = \frac{Hz}{\mu}\left(\frac{\theta_\alpha}{H}\right)\left(\frac{1}{\alpha}\right) \]

respectively
### Table 1: Absolute and relative deprivation due to existence of poverty in China

<table>
<thead>
<tr>
<th></th>
<th>1994</th>
<th>2005</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Extreme poor ($PPP1.25)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absolute deprivation poverty gap</td>
<td>6.20</td>
<td>1.53</td>
<td>1.08</td>
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<tr>
<td>Relative deprivation poverty gap</td>
<td>12.02</td>
<td>1.42</td>
<td>0.74</td>
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<tr>
<td>Absolute deprivation severity of poverty</td>
<td>7.33</td>
<td>1.84</td>
<td>1.30</td>
</tr>
<tr>
<td>Relative deprivation severity of poverty</td>
<td>14.21</td>
<td>1.71</td>
<td>0.89</td>
</tr>
<tr>
<td><strong>Poor ($PPP2.0)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absolute deprivation poverty gap</td>
<td>19.53</td>
<td>7.27</td>
<td>5.30</td>
</tr>
<tr>
<td>Relative deprivation poverty gap</td>
<td>37.86</td>
<td>6.74</td>
<td>3.62</td>
</tr>
<tr>
<td>Absolute deprivation severity of poverty</td>
<td>21.82</td>
<td>8.45</td>
<td>6.12</td>
</tr>
<tr>
<td>Relative deprivation severity of poverty</td>
<td>42.31</td>
<td>7.83</td>
<td>4.18</td>
</tr>
</tbody>
</table>

### Table 2: Absolute and relative deprivation due to existence of poverty in India

<table>
<thead>
<tr>
<th></th>
<th>1993.5</th>
<th>2005.5</th>
<th>2009.5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Extreme poor ($PPP1.25)</strong></td>
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<td></td>
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</tr>
<tr>
<td>Absolute deprivation poverty gap</td>
<td>5.15</td>
<td>3.99</td>
<td>2.85</td>
</tr>
<tr>
<td>Relative deprivation poverty gap</td>
<td>11.04</td>
<td>7.47</td>
<td>4.72</td>
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<tr>
<td>Absolute deprivation severity of poverty</td>
<td>6.01</td>
<td>4.71</td>
<td>3.43</td>
</tr>
<tr>
<td>Relative deprivation severity of poverty</td>
<td>12.88</td>
<td>8.81</td>
<td>5.69</td>
</tr>
<tr>
<td><strong>Poor ($PPP2.0)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absolute deprivation poverty gap</td>
<td>20.07</td>
<td>17.31</td>
<td>14.32</td>
</tr>
<tr>
<td>Relative deprivation poverty gap</td>
<td>42.99</td>
<td>32.36</td>
<td>23.73</td>
</tr>
<tr>
<td>Absolute deprivation severity of poverty</td>
<td>22.10</td>
<td>19.26</td>
<td>16.17</td>
</tr>
<tr>
<td>Relative deprivation severity of poverty</td>
<td>47.35</td>
<td>36.00</td>
<td>26.80</td>
</tr>
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</table>
A society is said to be polarized if it is divided into groups, with substantial intra-group homogeneity and inter-group homogeneity. Such a society is likely to be linked with tension and existence of social unrest.

The notion of polarization is fundamentally different from inequality. Take an example from Neri, suppose a society consists of six individuals A,B,C,D,E and F with incomes of R$ 6,5, 4,3,2 and 1, respectively. In this distribution persons with incomes 3 and 4 may be classified as middle class. Suppose that R$1 is transferred from D to F and from A to C. we are now left with a distribution 5, 5, 5 and 2,2,2 so society is now polarized into two homogeneous groups. Since income is transferred from rich to poor, the new distribution is more equal but considerably more polarized.

A more bipolarize distribution is one that is more spread from the middle, so there are fewer individuals with middle level income. Thus the size and share of the middle class is closely linked to the degree of polarization. Depending on how we define middle class a general result is that greater the polarization, the smaller the middle class.
Social welfare based on alienation

A person feels alienated if her income spread from the middle. Suppose $m$ is the median income, then her alienation is given by the difference of her income from the median. Her utility may be defined as:

$$u(x) = x - (m - x) \text{ if } x \ll m$$
$$= x - (x - m) \text{ if } x \gg m$$

Then alienation based social welfare is obtained as:

$$W = \mu - \frac{(m_2 - m_1)}{2}$$

where $\mu$ is the mean income of the society and $m_2$ and $m_1$ are the means of populations above and below the median. Absolute and relative alienation indices are:

$$\text{Absolute alienation} = \frac{(m_2 - m_1)}{2}$$
$$\text{Relative alienation} = \frac{m_2 - m_1}{2\mu}$$

The larger these indices, the greater the spread from the middle and smaller the middle class.
Social welfare function based on polarization

Alienation relates to the inter-group heterogeneity while identification relates to intra-group heterogeneity. Polarization includes both alienation and identification. To capture both dimensions, the utility function for alienation needs to be weighed. Thus the social welfare is given by:

$$ W = \int_{0}^{\infty} u(x)w(x)f(x)dx $$

where weight $w(x)$ is the inverted U function that gives maximum weight at median:

$$ w(x)=\begin{cases} 4F(x) & \text{if } x<m \\ 4(1-F(x)) & \text{if } x>m \end{cases} $$

which gives the polarization based social welfare:

$$ W = \mu - [(m_2 - m_1) - 2\mu G] $$

Absolute and relatives measures of polarization are:

$$ \text{Absolute polarization} = (m_2 - m_1) - 2\mu G $$

$$ \text{Relative polarization} = [(m_2 - m_1) - 2\mu G] / \mu $$

9/5/2013
Polarization and size of middle class in BRICS

Population of middle class in BRICS (millions)

9/5/2013
Defining middle class

Middle class can be defined either in income space or people space. We have defined it in income space with median as the reference point.

The achievement of middle class is measured by three factors:

- Size of middle class denoted as size
- Share of middle class denoted as share
- Relative affluence of middle class is the ratio of share to size denoted ratio

\[
m = \text{median of the distribution}
\]

\[
\text{Size} = F(1.25m) - F(0.75m), \quad F(\cdot) \text{ is the distribution function}
\]

\[
\text{Share} = L(1.25) - L(0.75m), \quad L(\cdot) \text{ is the Lorenz function defined over income space.}
\]

\[
\text{Ratio} = \text{relative affluence of middle class} = \frac{\text{Share}}{\text{Size}}
\]

\[
\text{Size}_1 = F(1.50m) - F(0.5m)
\]

\[
\text{Share}_1 = L(1.5m) - L(0.5m)
\]

\[
\text{Ratio}_1 = \text{relative affluence of middle class} = \frac{\text{Share}_1}{\text{Size}_1}
\]

D = Alienation index

D1 = Polarization index
How much does polarization explain middle class?

Following country fixed effect regressions were estimated from the BRICS data with 88 spells.

<table>
<thead>
<tr>
<th>Equation</th>
<th>Coefficients</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \ln(\text{size}) = 7.16 - 0.95 \ln(D) )</td>
<td>R²=0.99</td>
<td></td>
</tr>
<tr>
<td>( \ln(\text{size}) = 6.86 - 1.07 \ln(D1) )</td>
<td>R²=0.97</td>
<td></td>
</tr>
<tr>
<td>( \ln(\text{share}) = 9.99 - 1.93 \ln(D) )</td>
<td>R²=0.99</td>
<td></td>
</tr>
<tr>
<td>( \ln(\text{share}) = 9.01 - 2.06 \ln(D1) )</td>
<td>R²=0.96</td>
<td></td>
</tr>
<tr>
<td>( \ln(\text{ratio}) = 6.86 - 0.83 \ln(D) )</td>
<td>R²=0.98</td>
<td></td>
</tr>
<tr>
<td>( \ln(\text{ratio}) = 6.32 - 0.84 \ln(D1) )</td>
<td>R²=0.95</td>
<td></td>
</tr>
<tr>
<td>( \ln(\text{size1}) = 6.48 - 0.61 \ln(D) )</td>
<td>R²=0.98</td>
<td></td>
</tr>
<tr>
<td>( \ln(\text{size1}) = 6.32 - 0.70 \ln(D1) )</td>
<td>R²=0.98</td>
<td></td>
</tr>
<tr>
<td>( \ln(\text{share1}) = 8.73 - 1.43 \ln(D) )</td>
<td>R²=0.99</td>
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</tr>
<tr>
<td>( \ln(\text{share1}) = 8.03 - 1.54 \ln(D1) )</td>
<td>R²=0.97</td>
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<tr>
<td>( \ln(\text{ratio1}) = 6.85 - 0.83 \ln(D) )</td>
<td>R²=0.98</td>
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</tr>
<tr>
<td>( \ln(\text{ratio1}) = 6.32 - 0.84 \ln(D1) )</td>
<td>R²=0.95</td>
<td></td>
</tr>
</tbody>
</table>
Equity of Opportunities

Economic growth can directly create opportunities through market operations but also generates tax revenue which governments use to create opportunities in education, health, living conditions etc.

A social opportunity index is given by:

\[
\text{Social Opportunity Index} = \text{Average opportunity} \times \text{Equity in opportunity}
\]

\[
\text{Equity in opportunity}=E, \text{ the larger the } E \text{ the more equitable the opportunity}
\]

E is equal to 1 if all individuals enjoy the same opportunities.
If E<1, opportunities are inequitable benefiting the rich more than the poor and if E>1, opportunities are equitable benefiting the poor more than the rich.

The social objective is to increase the social opportunity index, which can be achieved by increasing the average opportunities in the population or by increasing equity or a combination of both.
## Opportunity in employment in municipals in Brazil

<table>
<thead>
<tr>
<th>Category</th>
<th>2000</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment rate 18 years and over</td>
<td>56.51</td>
<td>61.69</td>
</tr>
<tr>
<td>Equity index</td>
<td>0.98</td>
<td>0.96</td>
</tr>
<tr>
<td>Opportunity index</td>
<td>55.33</td>
<td>59.35</td>
</tr>
<tr>
<td>Formal employment rate 18 years and over</td>
<td>26.44</td>
<td>35.18</td>
</tr>
<tr>
<td>Equity index</td>
<td>0.81</td>
<td>0.82</td>
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<tr>
<td>Opportunity index</td>
<td>21.32</td>
<td>28.94</td>
</tr>
<tr>
<td>Employment rate with 0 earning</td>
<td>3.27</td>
<td>3.30</td>
</tr>
<tr>
<td>Equity index</td>
<td>1.51</td>
<td>1.54</td>
</tr>
<tr>
<td>Opportunity index</td>
<td>4.93</td>
<td>5.09</td>
</tr>
<tr>
<td>Employment rate with wage of 1 minimum wage</td>
<td>21.19</td>
<td>11.03</td>
</tr>
<tr>
<td>Equity index</td>
<td>1.23</td>
<td>1.32</td>
</tr>
<tr>
<td>Opportunity index</td>
<td>25.97</td>
<td>14.51</td>
</tr>
<tr>
<td>Employment rate with minimum wage 1 to 2</td>
<td>14.68</td>
<td>28.20</td>
</tr>
<tr>
<td>Equity index</td>
<td>0.84</td>
<td>0.93</td>
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<tr>
<td>Opportunity index</td>
<td>12.40</td>
<td>26.32</td>
</tr>
<tr>
<td>Employment rate with minimum wage 2 to 3</td>
<td>4.20</td>
<td>7.20</td>
</tr>
<tr>
<td>Equity index</td>
<td>0.75</td>
<td>0.80</td>
</tr>
<tr>
<td>Opportunity index</td>
<td>3.16</td>
<td>5.77</td>
</tr>
<tr>
<td>Employment rate with minimum wage 3 to 5</td>
<td>4.93</td>
<td>5.19</td>
</tr>
<tr>
<td>Equity index</td>
<td>0.69</td>
<td>0.74</td>
</tr>
<tr>
<td>Opportunity index</td>
<td>3.39</td>
<td>3.84</td>
</tr>
</tbody>
</table>
Key messages

- Inclusive development is a multidimensional concept encompassing several dimensions of human development. We have to have several social objectives.

- To evaluate alternative economic alternatives and policies, normative judgment cannot be avoided. We have introduced several social welfare functions that incorporate different kinds of social deprivations. These welfare functions will be utilized to calculate social rates of return that would allow us to judge how good different welfare programs are.

- We can measure social deprivation in both absolute and relative terms. In Brazil, the relative deprivation due to inequality has been declining but absolute deprivation has been increasing. Both relative and absolute deprivation due to poverty have been declining rapidly in Brazil. China also shows a sharp decline in poverty deprivation but the decline in India is much slower.
Key messages (continued)

- There is no consensus on how we should define middle class. The literature gives bizarre definitions. We have shown that concept of polarization and size and share of middle class are closely linked. We do not need to specify middle class in order to compare size and share of middle class across countries and over time.

- Among BRICS countries polarization is highest in South Africa followed by Brazil. Polarization in Brazil has been declining and size and share of middle class increasing.

- In analyzing access to opportunities, we should focus on both level and equity in opportunities. The analysis of labor market in Brazil shows that employment has been expanding and also becoming more equitable. The wages are also increasing with benefits shared by both poor and non-poor.
Thank you!