Poverty and Inequality

Sherif Khalifa
**Definition**

Income inequality is the disproportionate distribution of total national income among households.

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>Rich</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income</td>
<td>$1000</td>
<td>$900</td>
<td>$100</td>
</tr>
<tr>
<td>Population</td>
<td>100</td>
<td>10</td>
<td>90</td>
</tr>
<tr>
<td>Income per capita</td>
<td>$10</td>
<td>$90</td>
<td>$1.1</td>
</tr>
</tbody>
</table>

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<td>$1.1</td>
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If income growth is generated by the rich, they would appropriate it, progress against poverty would slow and inequality would worsen.

If income growth is generated by the poor, they would be its principal beneficiaries and the fruits of growth would be shared more evenly.

The elimination of widespread poverty and income inequality are at the core of all development problems.
Personal distribution of income is the share of the total income accruing to the poorest specific percentage or the richest specific percentage of a population without regard to the sources of that income.

- It deals with individuals and their total incomes, regardless of the source.
- Arrange all individuals in the nation by ascending personal incomes.
- Divide the total population into quintiles (20% of the population) or deciles (10% of the population).
- Determine what proportion of the total national income accrue to each income group.
# Income Inequality

## Personal Distribution

| Individuals | Personal Income (money units) | Share of Total Income (%) | Quintiles | Deciles |
|-------------|-------------------------------|---------------------------|-----------|
| 1           | 0.8                           |                           |           |
| 2           | 1.0                           |                           |           |
| 3           | 1.4                           |                           |           |
| 4           | 1.8                           |                           | 5         |
| 5           | 1.9                           |                           |           |
| 6           | 2.0                           |                           |           |
| 7           | 2.4                           |                           |           |
| 8           | 2.7                           |                           | 9         |
| 9           | 2.8                           |                           |           |
| 10          | 3.0                           |                           |           |
| 11          | 3.4                           |                           |           |
| 12          | 3.8                           |                           | 13        |
| 13          | 4.2                           |                           |           |
| 14          | 4.8                           |                           |           |
| 15          | 5.9                           |                           |           |
| 16          | 7.1                           |                           | 22        |
| 17          | 10.5                          |                           |           |
| 18          | 12.0                          |                           |           |
| 19          | 13.5                          |                           |           |
| 20          | 15.0                          |                           | 51        |
| Total (national income) | 100.0                      |                           | 100       |

*Note: Measure of inequality = ratio of top 20% to bottom 40% = 51/14 = 3.64.*
The Kuznets ratio is the ratio of the income share of the richest 20% to the income share of the poorest 40%.

\[
\text{Kuznets ratio} = \frac{\text{income share of top 20\%}}{\text{income share of bottom 40\%}} = \frac{51\%}{14\%} = 3.64
\]
**Definition**

The Palma ratio is the ratio of the income share of the richest 10% to the income share of the poorest 40%.

\[
\text{Palma ratio} = \frac{\text{income share of top 10\%}}{\text{income share of bottom 40\%}} = \frac{28.5\%}{14\%} = 2
\]
Definition

The Quintile ratio is the ratio of the income share of the richest 20% to the income share of the poorest 20%.

\[
\text{Quintile ratio} = \frac{\text{income share of top 20\%}}{\text{income share of bottom 20\%}}
\]

\[
= \frac{51\%}{5\%} = 10
\]
Income Inequality

Lorenz Curve

Definition

The Lorenz curve is a graph depicting the variance of the size distribution of income from perfect equality.

- The horizontal axis shows the number of income recipients in cumulative percentages.
- The vertical axis shows the share of total income received by each percentage of population.
- The curve shows the quantitative relationship between the percentage of income they receive during a year.
- The diagonal line is representative of perfect equality in size distribution of income.
- The more the Lorenz curve is away from the diagonal, the greater the degree of inequality represented.
Income Inequality

Lorenz Curve

- Line of equality
- Lorenz curve

Percentage of income recipients vs. Percentage of income
<table>
<thead>
<tr>
<th>Individuals</th>
<th>A</th>
<th>B</th>
<th>Cumulative</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$1</td>
<td>$0.5</td>
<td>10%</td>
<td>1%</td>
<td>0.5%</td>
</tr>
<tr>
<td>2</td>
<td>$2</td>
<td>$1.5</td>
<td>20%</td>
<td>3%</td>
<td>2%</td>
</tr>
<tr>
<td>3</td>
<td>$4</td>
<td>$2</td>
<td>30%</td>
<td>7%</td>
<td>4%</td>
</tr>
<tr>
<td>4</td>
<td>$5</td>
<td>$3</td>
<td>40%</td>
<td>12%</td>
<td>7%</td>
</tr>
<tr>
<td>5</td>
<td>$7</td>
<td>$5</td>
<td>50%</td>
<td>19%</td>
<td>12%</td>
</tr>
<tr>
<td>6</td>
<td>$10</td>
<td>$7</td>
<td>60%</td>
<td>29%</td>
<td>19%</td>
</tr>
<tr>
<td>7</td>
<td>$11</td>
<td>$8</td>
<td>70%</td>
<td>40%</td>
<td>27%</td>
</tr>
<tr>
<td>8</td>
<td>$15</td>
<td>$10</td>
<td>80%</td>
<td>55%</td>
<td>37%</td>
</tr>
<tr>
<td>9</td>
<td>$20</td>
<td>$15</td>
<td>90%</td>
<td>75%</td>
<td>52%</td>
</tr>
<tr>
<td>10</td>
<td>$25</td>
<td>$48</td>
<td>100%</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>$100</td>
<td>$100</td>
<td></td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>
Income Inequality

Lorenz Curve
Income Inequality
Lorenz Curve

The Lorenz curve is a graphical representation of income distribution. It shows the percentage of income earned by different income recipients. The x-axis represents the cumulative percentage of income recipients, while the y-axis shows the cumulative percentage of income.

A higher Lorenz curve indicates greater income inequality, as it deviates more from the line of perfect equality (the 45-degree line).
Income Inequality

Lorenz Curve

% of income recipients

% of income
Income Inequality

Lorenz Curve

(a) A relatively equal distribution

(b) A relatively unequal distribution
Whenever one Lorenz curve intersects another, it is difficult to determine which economy has an income distribution that is more equal.
The Gini coefficient can be obtained by calculating the ratio of the area between the diagonal line and the Lorenz curve divided by the total area of the half-square in which the curve lies. The higher the value of the coefficient is, the higher the inequality of income distribution; the lower it is, the more equal the distribution of income.
Gini coefficient = \frac{\text{shaded area } A}{\text{total area } BCD}

Line of equality

Lorenz curve
Income Inequality
Functional Distribution

Definition
Functional or factor share distribution of income attempts to explain the share of total national income that each of the factors of production receives.

Definition
The functional distribution of income is the distribution of income to factors of production without regard to the ownership of the factors.

Definition
Factors of production are resources or inputs required to produce a good or a service, such as land, labor and capital.
Income Inequality

Functional Distribution

- Profits
- Wages
- Wage rate
- Employment
- Employment: $L_E$
- Wage: $W_E$
- Demand for Labor: $D_L = MPL$
- Supply of Labor: $S_L$

Graph showing the relationship between wage rate and employment, with profits and wages represented by curves.
Income Inequality

Functional Distribution

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Poverty and Inequality
Income Inequality

Functional Distribution

[Graph showing the relationship between labor and wage with demand and supply curves intersecting.]
Income Inequality

Functional Distribution

Wage
Supply
Demand

Wage

Labor

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Income Inequality

Functional Distribution

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Income Inequality

Functional Distribution

\[
Wages = 4 \times 4 = \$16
\]

\[
Profits = \left( \frac{1}{2} \right) \times 4 \times 8 = \$16
\]

\[
Income = Wages + Profits = 16 + 16 = \$32
\]

\[
Income \ share \ of \ workers = \frac{16}{32} = \frac{1}{2}
\]

\[
Income \ share \ of \ capitalists = \frac{16}{32} = \frac{1}{2}
\]
Income Inequality

- With high inequality, the smaller the fraction of the population that qualifies for credit to educate their children or expand business.
- With high inequality, the saving rate tends to be low because the highest rate of marginal savings is found among the middle class.
- The rich spend their incomes on imported foreign luxury goods, and send their savings abroad.
- High income inequality undermines a nation’s solidarity, social cohesion, and political stability.
- High income inequality strengthens the political power of the rich and hence their economic bargaining power.
- High income inequality may lead the poor to support populist policies which can set back development progress.
- High income inequality has an adverse effect on incentives to exert hard work and to be productive.
- High income inequality has an adverse effect on social upward mobility or intergenerational mobility.
Definition
Social mobility is the movement of individuals, families, households, or other categories of people within or between social strata in a society.

Definition
Social mobility is a change in social status relative to one’s current social location within a given society.

Definition
The Great Gatsby curve is a chart plotting the positive relationship between inequality and intergenerational social immobility in several countries around the world.
"The Great Gatsby Curve"
Definition

The Kuznets curve is a graph reflecting the relationship between a country’s income per capita and its inequality of income distribution.

- With industrialization, migration by farmers to urban centers causes rural-urban inequality gap.
- Rural populations decrease as urban populations increase with the process of industrialization.
- Inequality is expected to decrease when a certain level of average income per capita is reached.
- The process of industrialization allows for a further increase in the level of income per capita.
Income Inequality
Kuznets Curve

Gini coefficient vs. Gross national income per capita
Income Inequality

Kuznets Curve

- Actual data
- Predicted relationship
- Latin American country
Income Inequality

Negative income growth and increasing inequalities: 20 countries (34%)

Positive income growth and decreasing inequalities: 10 countries (17%)

Positive income growth and increasing inequalities: 26 countries (44%)

Negative income growth and decreasing inequalities: 3 countries (5%)

Income Inequality

Absolute Poverty

Definition
Absolute poverty is the situation of being unable or only barely able to meet the subsistence essentials of food, clothing and shelter.

Definition
The extent of absolute poverty is the number of people who are unable to command sufficient resources to satisfy basic needs. They are counted as the total number living below a specified minimum level of real income known as an international poverty line.

Definition
The poverty threshold or poverty line is the minimum level of income deemed adequate in a particular country.
Absolute Poverty

**Definition**
The head count is the number of a country’s population living below the poverty line.

**Head count index**

$$\text{Head count index} = \frac{H}{N}$$

H: head count of those whose incomes fall below the absolute poverty line.
N: total population.
Absolute Poverty

Definition

Total poverty gap measures the total amount of income necessary to raise everyone who is below the poverty line up to that line. Total poverty gap is the sum of the difference between the poverty line and actual income levels of all people living below that line.

(a) A relatively large poverty gap

(b) A relatively small poverty gap
Absolute Poverty

$Y_i$: income of the $i^{th}$ person.

$Y_p$: poverty line.

$N$: population.

Total poverty gap:

\[ TPG = \sum_{i=1}^{H} (Y_p - Y_i) \]
**Absolute Poverty**

**Definition**
Average poverty gap is the total poverty gap divided by the population.

\[ APG = \frac{TPG}{N} \]

**Definition**
Average income shortfall tells us the average amount by which the income of a poor person falls below poverty line:

\[ AIS = \frac{TPG}{H} \]
## Absolute Poverty

<table>
<thead>
<tr>
<th>Individuals</th>
<th>Country A</th>
<th>Country B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>355</td>
<td>366</td>
</tr>
<tr>
<td>2</td>
<td>265</td>
<td>115</td>
</tr>
<tr>
<td>3</td>
<td>400</td>
<td>165</td>
</tr>
<tr>
<td>4</td>
<td>215</td>
<td>65</td>
</tr>
<tr>
<td>H/N</td>
<td>$\frac{3}{4}$</td>
<td>$\frac{3}{4}$</td>
</tr>
<tr>
<td>TPG</td>
<td>260</td>
<td>750</td>
</tr>
<tr>
<td>APG</td>
<td>$\frac{260}{4} = 65$</td>
<td>$\frac{750}{4} = 187.5$</td>
</tr>
<tr>
<td>AIS</td>
<td>$\frac{260}{3} = 86.7$</td>
<td>$\frac{750}{3} = 250$</td>
</tr>
</tbody>
</table>
Absolute Poverty

Map 7c. Population below the poverty line (%): less than US$ 1 day$^{-1}$
Map 7d. Population below the poverty line (%): less than US$ 2 day$^{-1}$
## Absolute Poverty

<table>
<thead>
<tr>
<th>Region</th>
<th>Headcount Ratio</th>
<th>Poverty Gap</th>
<th>Squared Poverty Gap</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Incidence at $1 per Day</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>East Asia and Pacific</td>
<td>9.05</td>
<td>1.93</td>
<td>0.65</td>
</tr>
<tr>
<td>Europe and Central Asia</td>
<td>0.95</td>
<td>0.22</td>
<td>0.10</td>
</tr>
<tr>
<td>Latin America and the Caribbean</td>
<td>8.64</td>
<td>2.99</td>
<td>1.51</td>
</tr>
<tr>
<td>Middle East and North Africa</td>
<td>1.47</td>
<td>0.26</td>
<td>0.09</td>
</tr>
<tr>
<td>South Asia</td>
<td>30.84</td>
<td>6.96</td>
<td>2.25</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>41.09</td>
<td>17.47</td>
<td>9.91</td>
</tr>
<tr>
<td><strong>Incidence at $2 per Day</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>East Asia and Pacific</td>
<td>36.58</td>
<td>12.45</td>
<td>5.64</td>
</tr>
<tr>
<td>Europe and Central Asia</td>
<td>9.83</td>
<td>2.41</td>
<td>0.92</td>
</tr>
<tr>
<td>Latin America and the Caribbean</td>
<td>22.17</td>
<td>8.89</td>
<td>4.81</td>
</tr>
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<td>Middle East and North Africa</td>
<td>19.70</td>
<td>4.85</td>
<td>1.72</td>
</tr>
<tr>
<td>South Asia</td>
<td>77.06</td>
<td>32.60</td>
<td>16.66</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>71.96</td>
<td>38.09</td>
<td>24.61</td>
</tr>
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