Poverty, Inequality, and Development

Chapter 5

Econ 322 – The Global Economy: Trade and Development

University of Tennessee, Knoxville

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Based on Todaro, P. M. and Smith, C. S. (2020), *Economic Development*, 13th ed., Pearson.

Distribution and Development: Eight Critical Questions

- How can we **best measure inequality and poverty**?
- What is the extent of **relative inequality** in developing countries? how is this related to the extent of poverty?
- **Who are the poor**, and what are their economic characteristics?
- What determines the nature of economic growth—that is, **who benefits from economic growth**, and why?

Eight Critical Questions (Continued)

- Are rapid economic growth and more equal income distribution compatible or conflicting objectives?: Is rapid growth achievable only at a cost of greater income inequality or can lessening income disparities contribute to higher growth rates?
- Do the poor benefit from growth, and does this depend on the type of growth a developing country experiences? What might be done to help the poor benefit more?
- What is so bad about extreme inequality?
- What kinds of policies are required to reduce the magnitude and extent of absolute poverty?

5.1 Measuring Relative Inequality

- Size distributions (quintiles, deciles)
- Lorenz curves
- Gini coefficients and other aggregate measures of inequality

Three tools for relative inequality. Size distributions ask "how much income does each fifth or tenth of the population receive?"; the Lorenz curve draws that answer as a picture; the Gini coefficient turns the picture into a single number.

Desirable Properties for Measures of Relative Inequality

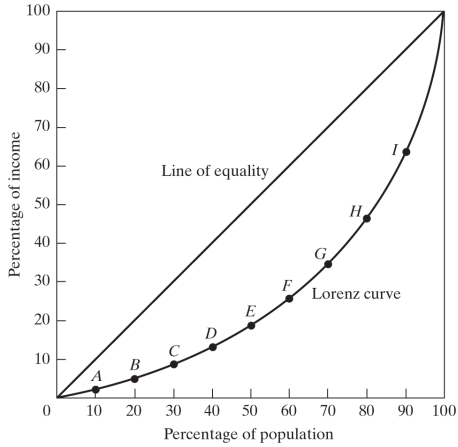
- Anonymity: measure should not depend on who has higher income; e.g. whether we believe the rich or poor to be good or bad people
- Scale independence: inequality measures should not depend on size of the economy – want a measure of income dispersion
- Population independence principle: an inequality measure should not be based on the number of income recipients
- Transfer principle - all other incomes constant, if transfer income from a richer to a poorer person (not so much that the poorer person is now richer than the originally rich person), resulting new income distribution is more equal
- Gini coefficient satisfies all four properties; so does the coefficient of variation (CV), and some others

Table 5.1 Typical Size Distribution of Personal Income

- Arrange all individuals by ascending personal income and then divide the population into quintiles (fifths) or deciles (tenths)
- Income inequality: the disproportionate distribution of total national income among households

	Personal income	Share of total income (%)	
Individuals	(money units)	Quintiles	Deciles
1	0.8		
2	1.0		1.8
3	1.4		
4	1.8	5	3.2
5	1.9		
6	2.0		3.9
7	2.4		
8	2.7	9	5.1
9	2.8		
10	3.0		5.8
11	3.4		
12	3.8	13	7.2
13	4.2		
14	4.8		9.0
15	5.9		
16	7.1	22	13.0
17	10.5		
18	12.0		22.5
19	13.5		
20	15.0	51	28.5
Total (national income)	100.0	100	100.0

Figure 5.1 The Lorenz Curve



Cumulative share of income against cumulative share of population; the diagonal is the line of perfect equality.

Source: Todaro and Smith (2020), Figure 5.1

Drawing a Lorenz Curve Step by Step (1/5)

- Step 1: list everyone, ranked from lowest to highest income

Person	Income
1	10
2	15
3	50

Drawing a Lorenz Curve Step by Step (2/5)

- Step 2: each person's cumulative share of the population

Person	Income	% Pop
1	10	33%
2	15	66%
3	50	100%

Drawing a Lorenz Curve Step by Step (3/5)

- Step 3, an intermediate step: cumulative income!
- Each percentage of the population has a corresponding total income up to that point

Person	**Income**	**% Pop**	**Cumulat**
1	10	33%	10
2	15	66%	25
3	50	100%	75

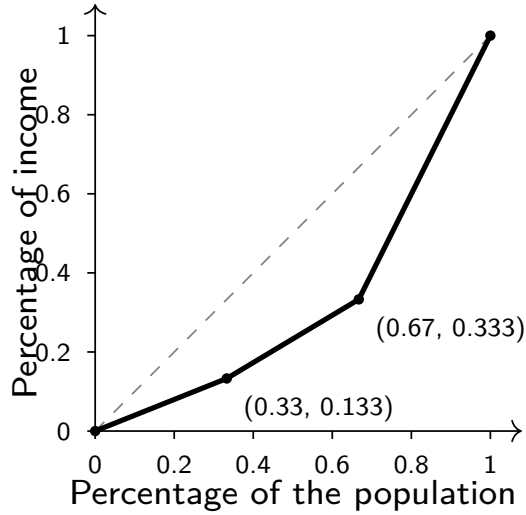
Drawing a Lorenz Curve Step by Step (4/5)

- Step 4: cumulative income as a share of total income (75)

Person	Income	% Pop	Cumulat.	% Income
1	10	33%	10	13.3%
2	15	66%	25	33.3%
3	50	100%	75	100%

Drawing a Lorenz Curve Step by Step (5/5)

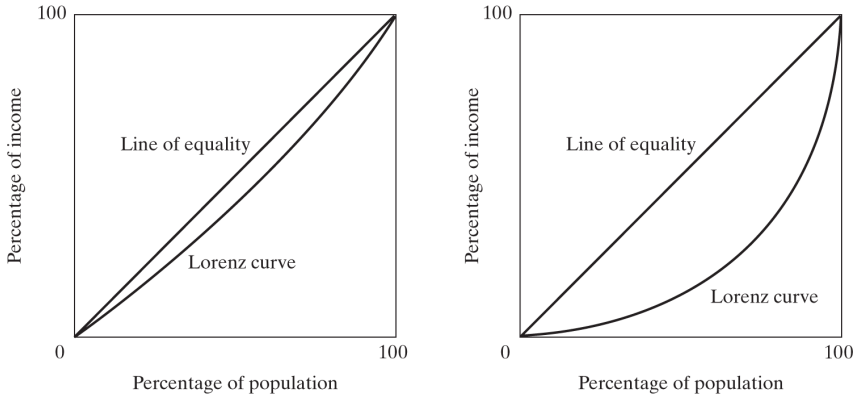
Person	Income	% Pop	Cumulat.	% Income
1	10	33%	10	13.3%
2	15	66%	25	33.3%
3	50	100%	75	100%



Perfect Equality

Person	Income	Cumulative Income	% cumulative income share
1	5	5	10
2	5	10	20
3	5	15	30
4	5	20	40
5	5	25	50
6	5	30	60
7	5	35	70
8	5	40	80
9	5	45	90
10	5	50	100

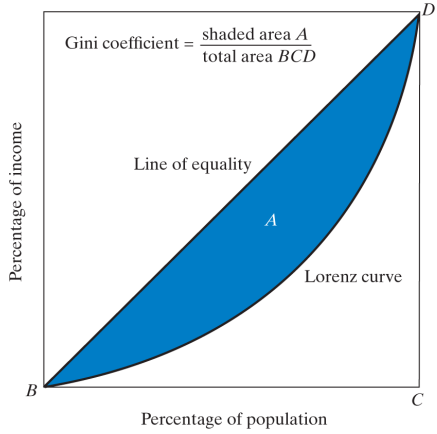
Figure 5.2 More Curvature of the Lorenz Curve, More Inequality



(a) A relatively equal and (b) a relatively unequal distribution: the farther the curve bends from the diagonal, the greater the inequality.

Source: Todaro and Smith (2020), Figure 5.2

Figure 5.3 Estimating the Gini Coefficient



Gini coefficient $= A/(A + B)$: the shaded area between the diagonal and the Lorenz curve, relative to the whole triangle BCD.

Source: Todaro and Smith (2020), Figure 5.3

Calculating the Gini Coefficient

- Expression: $G = \dfrac{A}{A+B}$, where A is the area between the line of equality and the Lorenz curve and B is the area below the Lorenz curve (Figure 5.3)

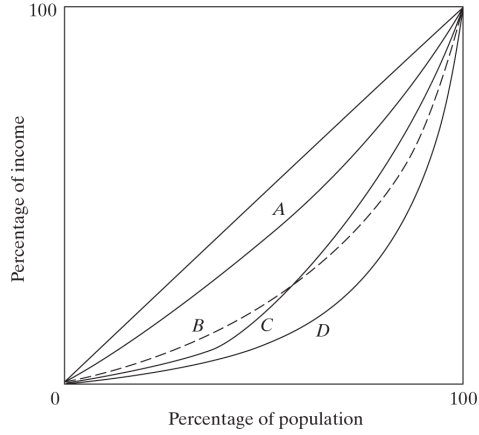
Since $A + B$ is the whole triangle, G is the fraction of the triangle lying above the Lorenz curve: $G = 0$ when the curve sits on the diagonal (perfect equality) and $G \to 1$ as one person receives everything.

Suggested exercise. Half the people have "1" and the other half have "2". What is the Lorenz curve? How can you use it to compute the Gini?

A Brief Review: Desirable Properties for Inequality Measures

- **Anonymity:** Does not depend on who has a higher income
- **Scale independence:** Does not depend on the size of the economy
  - Suggested exercise: What happens if everyone's income goes up by 25%?
- **Population independence:** not based on the number of recipients
- **Transfer principle** - transfer income from a richer to a poorer person, resulting in a more equal distribution
  - What if transfers so much that these people "trade places?"
- Gini coefficient satisfies all four properties, but so does the CV and some others
- This can leave ambiguity in the direction of change in inequality:
  - (As we will see, remains ambiguity when it comes to combining inequality concerns with other concerns)

Figure 5.4 Four Possible Lorenz Curves



When Lorenz curves cross, different inequality measures can rank the distributions differently.

Source: Todaro and Smith (2020), Figure 5.4

Desirable Properties for Poverty Measures

- Desirable properties for poverty measures:
  - Anonymity
  - Population independence
  - Monotonicity
  - Distributional sensitivity
- Plus, the Focus Principle (Amartya Sen):
  - A good poverty measure will be based only on the incomes (wellbeing) of the poor, not the nonpoor
- As we will see, P2 has these properties

Monotonicity and Distributional Sensitivity

- **Monotonicity principle:** If you add income to someone below the poverty line, all other incomes held constant, poverty falls
  - There is a "less decisive" version, called weak monotonicity, which requires that poverty can be "no greater than" it was (the main version of the principle above is sometimes called strong monotonicity for clarity)
- **Distributional sensitivity principle:** if you transfer income from a poor person to a richer person (even if the "richer" person is also below the poverty line), the resulting economy is deemed strictly poorer
- These principles clarify what is lacking in some widely used measures
- Looking ahead, the headcount ratio (fraction below the poverty line) satisfies anonymity and population independence, but not full monotonicity; and it fails on distributional sensitivity
- The simple headcount (number who are poor) fails even to satisfy the population independence principle

5.2 Measuring Absolute Poverty

- Headcount Index: H/N
  - Where H is the number of persons who are poor and N is the total number of people in the economy; H/N is the *fraction who are poor*
- Does not meet desirable properties and accordingly is likely to cause incentive problems (next slide)

Example: if 25 out of 100 people are poor, the headcount index is 0.25. Giving a poor person more income leaves H/N unchanged unless it lifts her across the line—the index ignores the *depth* of poverty.

Unintended Policy Incentives of Using Headcount Measures

- When agencies are told their mission includes poverty reduction...
- Measuring poverty by headcount or fraction poor creates incentive to report improvements in these measures; this plausibly focuses efforts toward those closer to poverty line
- Circumstantial evidence:
  - Incumbent politicians frame poverty progress in terms of headcount or fraction – staff would anticipate and want favorable results - by this measure - to report
  - Government policy exhibits "urban bias," e.g. emphasizing job creation for the poor in cities - who are closer to the poverty line
  - Reports: NGOs work near main roads, or district towns, easier-to-reach; if so, people assisted are less poor on average
  - MFIs have focused commonly on the richest of the poor
  - The MDG of "halving poverty" sent a signal: regions and countries compared in UN reports on this measure, without mention of P2 or usually to any other indicator

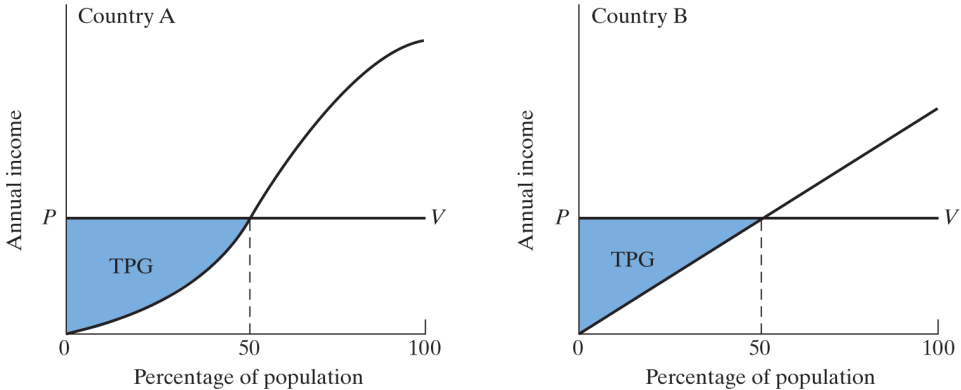
5.2 Measuring Absolute Poverty

- **Total poverty gap (TPG)**:
  - Where Y_p is the absolute **poverty line**; and Y_i the income of the ith poor person

$$\text{TPG} = \sum_{i=1}^{H} (Y_p - Y_i)$$

Economic meaning: the TPG is the total amount of money that would be needed to lift every poor person exactly up to the poverty line.

Figure 5.5 Measuring the Total Poverty Gap



(a) A relatively large poverty gap (b) A relatively small poverty gap

Countries A and B have the same headcount, but the shaded area (TPG) is larger in A: its poor are further below the line.

Source: Todaro and Smith (2020), Figure 5.5

5.2 Measuring Absolute Poverty

- **Average poverty gap (APG)**:

$$\text{APG} = \frac{\text{TPG}}{N}$$

  - Where N is number of persons in the economy (**total population**, not just the poor H)
  - TPG is total poverty gap
  - Note: normalized poverty gap, $\text{NPG} = \text{APG}/Y_p$

If $\text{TPG}_A = \text{TPG}_B$ but $\text{Population}_A > \text{Population}_B$, then $\text{APG}_A < \text{APG}_B$.
If $\text{APG} = \$0.3$ and $Y_p = \$2$, then $\text{NPG} = 0.3/2 = 15\%$: on average, each person is 15% below the poverty line.

5.2 Measuring Absolute Poverty (Continued)

- Measuring Absolute Poverty
  - **Average income shortfall (AIS)**:

$$\text{AIS} = \frac{\text{TPG}}{H}$$

  - Where H is number of **poor** persons
  - TPG is total poverty gap
  - Note: Normalized income shortfall, $\text{NIS} = \text{AIS}/Y_p$

If $\text{AIS} = \$0.3$ and $Y_p = \$2.00$, then $\text{NIS} = 0.3/2 = 15\%$.

5.2 Measuring Absolute Poverty (Continued)

- **The Foster–Greer–Thorbecke (FGT) index**:

$$P_\alpha = \frac{1}{N}\sum_{i=1}^{H}\left(\frac{Y_p - Y_i}{Y_p}\right)^\alpha$$

  - N is the number of persons, H is the number of poor persons, and $\alpha \geq 0$ is a parameter
  - When $\alpha = 0$, we get the headcount index measure: $P_0 = H/N$
  - When $\alpha = 1$: $P_1 = \dfrac{\text{TPG}}{N\,Y_p} = \dfrac{\text{APG}}{Y_p} = \text{NPG} = \dfrac{H}{N}\cdot\text{NIS}$
  - When $\alpha = 2$, we get the "P_2" measure

Incomes $0.6, 0.6, 0.8, 0.8, 2, 2, 6, 6$ and $Y_p = 1$: $P_0 = H/N = 4/8 = 0.5$; $\text{TPG} = (1-0.6)+(1-0.6)+(1-0.8)+(1-0.8) = 1.2$; $P_1 = \frac{1.2}{8\cdot 1} = 0.5\cdot\frac{1.2}{4\cdot 1} = 0.5\cdot 0.3 = 15\%$.

An Alternative Expression for P_1: the Normalized Poverty Gap

- Start with the definition of P_1 from the P_α formula
- With some algebra we find: $P_1 = (H/N) \times \text{NIS}$
  - (Multiply the basic P_1 formula by H/H; take out the constant Y_p; then apply the definition of NIS and collect terms)
- Interpretation: P_1 is the per capita poverty gap = headcount ratio (H/N) times the normalized income shortfall among the poor
- That is, poverty goes up whenever either the fraction of people in poverty goes up, or the fractional income deficits go up

Measuring Poverty: Numerical Example for P_1

- 8-person economy with income distribution $(0.6, 0.6, 0.8, 0.8, 2, 2, 6, 6)$; the poverty line is $Y_p = 1$
- You can always calculate P_1 using the full P_α formula, summing individually
- Or, using the simplified formula $P_1 = (H/N) \times \text{NIS}$:

$$P_1 = \frac{H}{N} \cdot \frac{\text{TPG}}{HY_p} = \frac{1}{2} \cdot \frac{1.2}{4 \cdot 1} = \frac{1}{2} \cdot 0.3 = 0.15$$

Measuring Poverty: Numerical Example using P_2

- Same 8-person economy with $Y_p = 1$: the four poor have incomes $0.6,\ 0.6,\ 0.8,\ 0.8$
- Normalized income shortfalls: $z_i = (Y_p - Y_i)/Y_p = 0.4,\ 0.4,\ 0.2,\ 0.2$

$$P_2 = \frac{1}{N}\sum_{i=1}^{H} z_i^2 = \frac{0.16 + 0.16 + 0.04 + 0.04}{8} = \frac{0.40}{8} = 0.05$$

Compare $P_0 = 0.5$, $P_1 = 0.15$, $P_2 = 0.05$: squaring the shortfalls gives the poorest the largest weight, so P_2 responds most to income given to the very poor.

An Alternative Expression for P_2

- Uses *inequality among the poor*
- $P_2 = \frac{H}{N}\left[\text{NIS}^2 + (1 - \text{NIS})^2 \, (CV_P)^2\right]$
- This form helps us see intuitively how each property is present
- BTW, similar in spirit to the Sen measure "S": $S = \frac{H}{N}\left[\text{NIS} + (1 - \text{NIS}) \, G_P\right]$

Deriving the Alternative Expression for P_2 (1/3)

$$P_2 = \frac{1}{N} \sum_{i=1}^{H} \left(\frac{Y_p - Y_i}{Y_p} \right)^2$$

$$z_i = \frac{Y_p - Y_i}{Y_p} \qquad \text{(normalized income shortfall)}$$

$$P_2 = \frac{H}{N} \cdot \left(\frac{1}{H} \sum_{i=1}^{H} z_i^2 \right) = \frac{H}{N} \cdot E[z_i^2]$$

Deriving the Alternative Expression for P_2 (2/3)

$$\text{NIS} = \bar{z} = \frac{1}{H}\sum_{i=1}^{H} z_i$$

$$\text{Var}(z) = E[z^2] - (\text{NIS})^2 \;\Rightarrow\; E[z^2] = \text{NIS}^2 + \text{Var}(z)$$

$$P_2 = \frac{H}{N}\left[\text{NIS}^2 + \text{Var}(z)\right]$$

Deriving the Alternative Expression for P_2 (3/3)

$$CV_p = \frac{\sigma_z}{\bar{z}} = \frac{\sqrt{\mathrm{Var}(z)}}{\mathrm{NIS}} \;\Rightarrow\; \mathrm{Var}(z) = \mathrm{NIS}^2 \cdot (CV_p)^2$$

$$P_2 = \frac{H}{N}\left[\mathrm{NIS}^2 + \mathrm{NIS}^2 \cdot (CV_p)^2\right] = \frac{H}{N} \cdot \mathrm{NIS}^2\left(1 + (CV_p)^2\right)$$

Measuring Poverty: Using P_2

- Intuitively, the four key properties are present because for P_2:
- Measure is **Anonymous**, by construction
- The **Population Principle** holds because one divides the result by population
- **Monotonicity** holds because adding income to any of the poor will decrease P_2 by lowering one of the squared income shortfalls
- **Distributional sensitivity** holds because squaring poverty gaps ensures that income provided to a poorer person will reduce P_2 more than the same income provided to a less poor person

Preview: Measuring Poverty – Income or Multidimensional Indicators?

- Given that we are measuring poverty with income, we have good measures that, like P_2, satisfy desirable properties
- If must have a single indicator, income has advantages e.g., clarity, flexibility
- But in general, is measuring income sufficient?
- Following Amartya Sen's capability approach, it is apparent that, in general, poverty needs to be conceptualized – and so measured – in a multidimensional way
- The new MPI is the best-known effort to do so – we return to it soon...



Amartya Sen, whose capability approach underlies multidimensional poverty measurement.

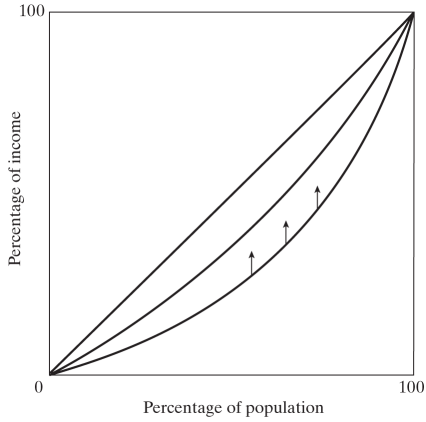
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Poverty, Inequality, and Social Welfare

- What's So Harmful for Economic Development about Extreme Inequality?
- Dualistic Development and Shifting Lorenz Curves: Some Stylized Typologies
  - Traditional-sector enrichment (see Figure 5.6)
  - Modern-sector enrichment (see Figure 5.7)
  - Modern-sector enlargement (see Figure 5.8)

Development moves people from a low-productivity traditional sector to a higher-productivity modern sector. *How* that happens—who gains, and how fast—determines whether the Lorenz curve moves toward or away from the line of equality.

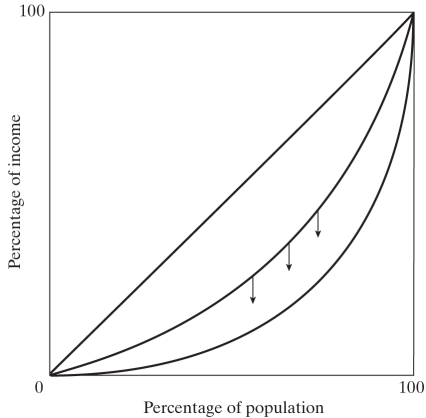
Figure 5.6 Traditional-Sector Enrichment: Improved Distribution



Incomes of the poorest rise: the Lorenz curve shifts toward the line of equality.

Source: Todaro and Smith (2020), Figure 5.6

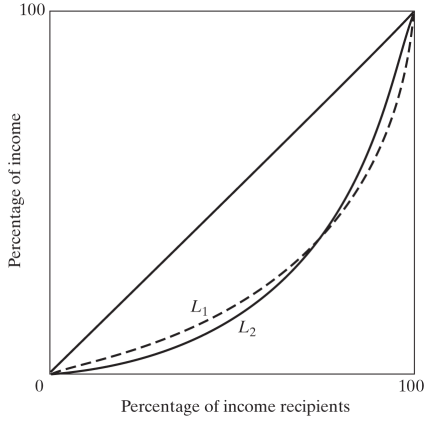
Figure 5.7 Modern-Sector Enrichment: Worsened Distribution



Gains concentrate among the already rich: the Lorenz curve bends away from the diagonal.

Source: Todaro and Smith (2020), Figure 5.7

Figure 5.8 Modern-Sector Enlargement: Crossing Lorenz Curves



As the modern sector absorbs workers the new curve crosses the old one, so the change in inequality is ambiguous.

Source: Todaro and Smith (2020), Figure 5.8

What's So Harmful about Extreme Inequality? 3 Factors

- Extreme income inequality leads to **economic inefficiency**
  - Smaller fraction of population qualifies for credit e.g. for business or school
  - Overall rate of saving in the economy tends to be lower: Highest rate of marginal savings usually found among the middle classes
  - Inequality may lead to an inefficient asset allocation
  - e.g. overemphasis on higher education at the expense of quality universal primary education
  - High inequality of land ownership inefficient because most efficient scales for farming are family and medium-size farms
  - The result can be a lower average income and a lower rate of economic growth when inequality is high
  - Moreover, these factors in turn often beget still more inequality

What's So Harmful about Extreme Inequality? 3 Factors (Continued)

- Extreme disparities undermine **social stability and solidarity**
  - High inequality strengthens political power of the rich, and thus concentrates economic and social bargaining power
  - High inequality facilitates rent seeking
- Finally, extreme inequality is generally viewed as **unfair**
  - John Rawls' thought experiment: uncertainty behind the "veil of ignorance"

Veil of ignorance: not knowing whether you would be born rich or poor, healthy or sick, urban or rural—what kind of society would you design? Rawls argues that under this uncertainty rational people choose the fairer, more equal society.

Table 5.2 Selected Income Distribution Estimates

	Lowest	Quintile					Highest	
Country	**10%**	**1st**	**2nd**	**3rd**	**4th**	**5th**	**10%**	**Year**
Bangladesh	4.3	9.4	12.6	16.1	21.1	40.8	26.6	2005
Brazil	1.1	3.0	6.9	11.8	19.6	58.7	43.0	2007
China	2.4	5.7	9.8	14.7	22.0	47.8	31.4	2005
Colombia	0.8	2.3	6.0	11.0	19.1	61.6	45.9	2006
Costa Rica	1.6	4.4	8.5	12.7	19.7	54.6	38.6	2007
Guatemala	1.3	3.4	7.2	12.0	19.5	57.8	42.4	2006
Honduras	0.7	2.5	6.7	12.1	20.4	58.4	42.2	2006
India	3.6	8.1	11.3	14.9	20.4	45.3	31.1	2005
Jamaica	2.1	5.2	9.0	13.8	20.9	51.2	35.6	2004
Namibia	0.6	1.5	2.8	5.5	12.0	78.3	65.0	1993
Pakistan	3.9	9.1	12.8	16.3	21.3	40.5	26.5	2005
Peru	1.3	3.6	7.8	13.0	20.8	54.8	38.4	2007
Philippines	2.4	5.6	9.1	13.7	21.2	50.4	33.9	2006
South Africa	1.3	3.1	5.6	9.9	18.8	62.7	44.9	2000
Tanzania	3.1	7.3	11.8	16.3	22.3	42.3	27.0	2001
Zambia	1.3	3.6	7.8	12.8	20.6	55.2	38.9	2005
Japan	4.8	10.6	14.2	17.6	22.0	35.7	21.7	1993
United States	1.9	5.4	10.7	15.7	22.4	45.8	29.9	2000

Source: Based on World Bank, World Development Indicators, 2010. (Washington, D.C.: World Bank, 2010), tab. 2.9.

Table 5.3 Income and Inequality in Selected Countries

Country	Income p.c.	Gini (%)	Year
Low Income			
Malawi	320	44.7	2016
Niger	360	34.3	2014
Mozambique	420	54.0	2014
Ethiopia	740	39.1	2015
Lower Middle Income			
Kyrgyz Rep.	1,130	26.8	2016
Honduras	2,250	50.0	2016
Indonesia	3,540	38.6	2016
Tunisia	3,490	32.8	2015
Philippines	3,660	40.1	2015

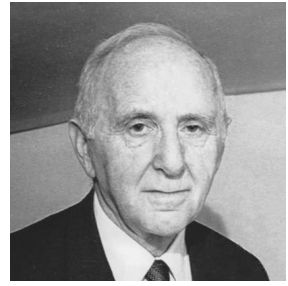
Country	Income p.c.	Gini (%)	Year
Upper Middle Income			
Armenia	3,990	32.5	2016
South Africa	5,430	63.0	2014
Thailand	5,950	36.9	2016
Brazil	8,610	53.7	2016
Mexico	8,610	43.4	2016
High Income			
United Kingdom	40,600	33.2	2015
Netherlands	46,910	28.2	2015
United States	59,160	41.5	2016
Norway	76,160	27.5	2015

Source: Data from World Bank, World Development Indicator Tables, 2018 (Washington, D.C.: World Bank, 2018), tabs. WV.1 and 1.3, accessed 16 June 2019.

5.3 Poverty, Inequality, and Social Welfare

- Kuznets' Inverted-U Hypothesis
- The inverted-U is consistent with modern sector enlargement growth, but not traditional or modern sector enrichment growth

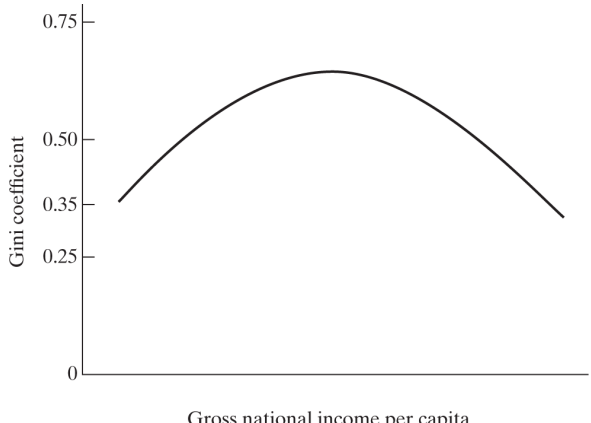
Inverted-U hypothesis (Kuznets, 1950s): as a country develops, inequality first rises, reaches a peak, and then declines.



Simon Kuznets (1901–1985), Nobel laureate in economics, 1971.

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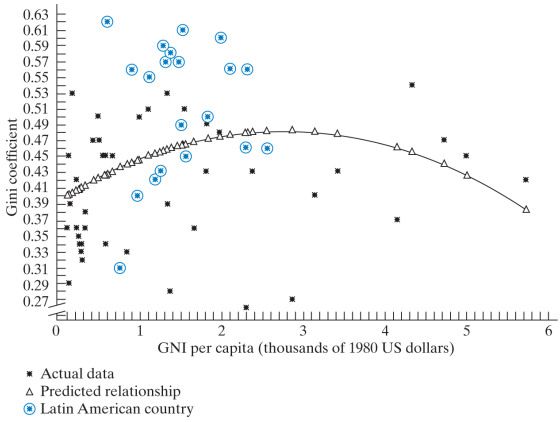
Figure 5.9 The "Inverted-U" Kuznets Curve



Gini coefficient against gross national income per capita: inequality rises in early development, then falls.

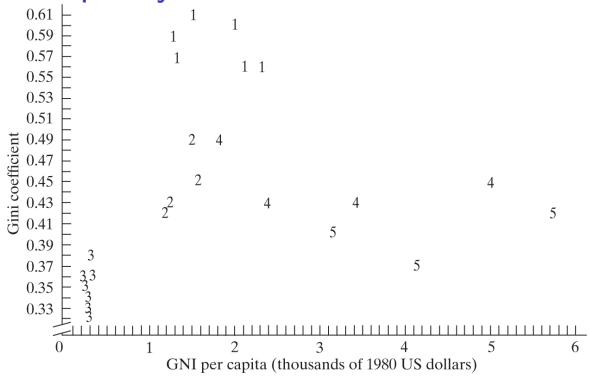
Source: Todaro and Smith (2020), Figure 5.9

Figure 5.10 Kuznets Curve with Latin American Countries Identified



Source: Fields, Gary S. (2001), Distribution and Development: A New Look at the Developing World, Cambridge, M.A.: MIT Press, ch. 3, p. 46. © 2001 Massachusetts Institute of Technology, by permission of The MIT Press.

Figure 5.11 Plot of Inequality Data for Selected Countries



Source: Gary S. Fields, Distribution and Development: A New Look at the Developing World (Cambridge, Mass.: MIT Press, 2001), ch. 3, p. 44. © 2001 Massachusetts Institute of Technology, by permission of The MIT Press.

5.4 Absolute Poverty: Extent and Magnitude

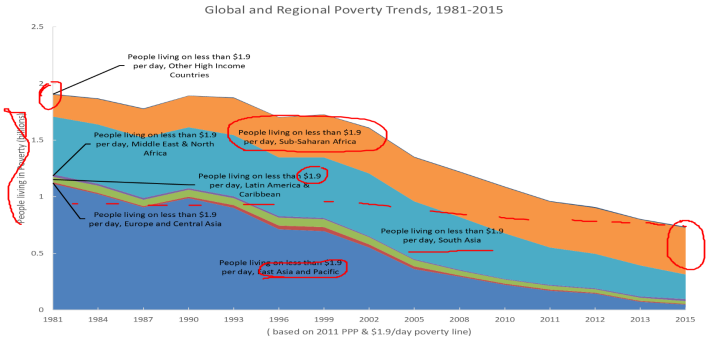
- Progress on Extreme Poverty
  - Clear progress on $1.25-a-day headcount
  - Less clear progress on $2.00-per-day headcount (see Figure 5.14)
  - Incidence of extreme poverty is uneven
- Relationship between Growth and Poverty
  - Association between growth and poverty reduction
  - When it is inclusive, growth reduces poverty
  - Lower extreme poverty may also lead to higher growth

Regional Poverty Incidence, 2013

Region	Headcount ratio	Poverty gap (%)	Squared poverty gap (%)
Regional aggregation at $1.25 per day			
East Asia and the Pacific	0.53	0.17	0.06
Europe and Central Asia	0.67	0.18	0.14
Latin America and the Caribbean	3.16	1.74	1.36
Middle East and North Africa	*survey data coverage too low; result suppressed*		
South Asia	2.0	0.28	0.07
Sub-Saharan Africa	22.59	7.57	3.62
Total	4.63	1.49	0.75
Regional aggregation at $2 per day			
East Asia and the Pacific	4.34	0.82	0.27
Europe and Central Asia	2.46	0.66	0.30
Latin America and the Caribbean	5.83	2.75	1.91
Middle East and North Africa	*survey data coverage too low; result suppressed*		
South Asia	17.98	3.47	1.02
Sub-Saharan Africa	43.59	17.26	9.17
Total	16.11	4.27	2.02

Figure 5.12 Global and Regional Poverty Trends, 1981–2015

Figure 5.12
Global and Regional Poverty Trends, 1981–2015



Number of people living on less than $1.90 a day (2011 PPP), by region: the fall is driven by East Asia; Sub-Saharan Africa is now the largest share.

Source: World Bank data, as reproduced in Todaro and Smith (2020), Figure 5.12; instructor's annotations

Income Poverty at $1.25 per Day and Gini, Selected Countries, 2010–2014 (1/2)

Country	Year	Per capita monthly income (2011 PPP)	Headcount ratio (%)	Poverty gap (%)	Squared poverty gap (%)	Gini index (%)
Bangladesh	2010	109.03	2.17	0.28	0.06	32.13
Benin	2011	82.42	27.64	7.33	2.85	43.44
Brazil	2014	563.57	2.15	1.11	0.84	51.48
Burkina Faso	2014	83.83	12.64	2.14	0.55	35.30
China – Rural	2013	290.41	0.44	0.10	0.05	33.97
China – Urban	2013	373.40	0.15	0.07	0.06	36.69
Cote d'Ivoire	2008	119.31	14.17	4.57	2.10	43.18
Guatemala	2014	257.19	3.17	1.01	0.49	48.66
Honduras	2014	236.33	7.76	3.08	1.85	50.64
India – Rural	2011	95.84	4.23	0.62	0.16	31.13
India – Urban	2011	146.66	2.08	0.28	0.07	39.01
Indonesia – Rural	2014	133.13	0.59	0.05	0.01	31.91

Source: World Development Indicators

Income Poverty at $1.25 per Day and Gini, Selected Countries, 2010–2014 (2/2)

Country	Year	Per capita monthly income (2011 PPP)	Headcount ratio (%)	Poverty gap (%)	Squared poverty gap (%)	Gini index (%)
Indonesia – Urban	2014	191.32	0.79	0.08	0.01	42.77
Madagascar	2012	46.66	58.82	23.34	12.17	42.65
Mexico	2014	341.5	1.02	0.22	0.07	48.21
Mozambique	2008	59.56	46.16	17.28	8.84	45.58
Nicaragua	2014	288.89	1.53	0.49	0.25	47.05
Nigeria	2009	75.86	31.56	10.66	5.00	42.97
Pakistan	2013	134.53	0.45	0.04	0.01	30.69
Peru	2014	424.12	0.87	0.22	0.09	44.14
Philippines	2012	174.01	2.62	0.40	0.10	43.04
Rwanda	2013	82.57	34.84	10.6	4.46	50.44
Senegal	2011	95.98	16.64	4.84	2.16	40.29

Source: World Development Indicators

The Multidimensional Poverty Index (MPI)

- Identification of poverty status through a *dual cutoff*:
- First, cutoff levels within each dimension (analogous to falling below a poverty line for example $1.25 per day for income poverty)
- Second, cutoff in the number of dimensions in which a person must be deprived (below a line) to be deemed *multidimensionally* poor
- MPI focuses on deprivations in health, education, and standard of living; and each receives equal (that is one-third of the overall total) weight

MPI Indicators

- Health - two indicators with equal weight - whether any child has died in the family, and whether any adult or child in the family is malnourished –weighted equally (each counts as one-sixth toward the maximum deprivation in the MPI)
- Education - two indicators with equal weight - whether no household member completed 5 years of schooling, and whether any school-aged child is out of school for grades 1 through 8 (each counts one-sixth toward the MPI)
- Standard of Living, equal weight on 6 deprivations (each counts as 1/18 toward the maximum): lack of electricity; insufficiently safe drinking water; inadequate sanitation; inadequate flooring; unimproved cooking fuel; lack of more than one of 5 assets – telephone, radio, TV, bicycle, and motorbike

Interaction of the deprivations?

- Building the index from household measures up to the aggregate measure (rather than using already-aggregated statistics), MPI approach takes account of multiplied or interactive harm (complementarity) done when multiple deprivations are experienced by the *same individual or family*
- The MPI approach assumes an individual's lack of capability in one area can only to a degree be made up by other capabilities – capabilities are treated as substitutes up to a point but then as complements

A family without electricity is worse off; a family without electricity, clean water *and* schooling is worse off by more than the sum of the parts. Building the MPI up from household data captures this overlap; separate national averages by indicator cannot.

Computing the MPI

- The MPI for the country (or region or group) is then computed
- A convenient way to express the resulting value is H*A, i.e.,
- The product of the headcount ratio H (the percent of people living in multidimensional poverty), and the average intensity of deprivation A (the percent of weighted indicators for which poor households are deprived on average)
- The adjusted headcount ratio HA is readily calculated
- HA satisfies some desirable properties. Important example -
- *Dimensional monotonicity*: If a person already identified as poor becomes deprived in *another* indicator she is measured as even *poorer* - not the case using a simple headcount ratio

MPI vs Income Poverty: A Different Story

- The results showed that knowing income poverty is not enough if our concern is with multidimensional poverty
- Multidimensionally, Bangladesh is substantially less poor - but Pakistan substantially poorer - than would be predicted by income poverty
- Ethiopia is far more multidimensionally poor, and Tanzania much less so, than predicted by income poverty
- Most Latin American countries e.g. Brazil rank worse on multidimensional poverty than on income poverty; but Colombia's income and MPI poverty ranks are about same

Multidimensional Poverty Index, 2008–2015 Data (1/2)

Country	Survey year	MPI	Percent poor	Thousands poor	Poverty intensity
Bangladesh	2014	0.196	41.3	65,648	47.4
Brazil	2014	0.021	5.3	10,908	40.6
Burundi	2010	0.454	80.8	7,642	56.2
Bolivia	2008	0.089	20.5	1,963	43.7
Burkina Faso	2010	0.535	84.0	13,131	63.7
Cambodia	2014	0.146	33.0	5,061	44.3
Colombia	2010	0.022	5.4	2,472	40.9
Congo, Republic of	2011/12	0.181	39.7	1,702	45.7
Cote d'Ivoire	2011/12	0.310	58.7	12,397	52.8
Dominican Republic	2014	0.034	8.8	919	38.5
Egypt	2014	0.014	3.6	3,186	38.1
Ethiopia	2011	0.564	87.3	78,476	64.6
Ghana	2014	0.156	33.7	9,021	46.2
Guinea	2012	0.459	75.1	8,735	61.1
Haiti	2012	0.248	49.4	5,083	50.3
Honduras	2011/12	0.072	15.8	1,225	45.7
India	2005/06	0.283	53.7	624,593	42.9
Indonesia	2012	0.066	15.5	38,362	52.7
Kenya	2014	0.187	39.9	17,904	47.0
Lao PDR	2011/12	0.174	34.1	2,209	50.9

Multidimensional Poverty Index, 2008–2015 Data (2/2)

Country	Survey year	MPI	Percent poor	Thousands poor	Poverty intensity
Liberia	2013	0.374	71.2	3,059	52.5
Mali	2012/13	0.457	77.7	12,885	58.9
Mexico	2012	0.011	2.8	3,418	38.8
Madagascar	2008/09	0.357	66.9	13,707	53.3
Malawi	2013/14	0.265	56.0	9,350	47.4
Mozambique	2011	0.389	69.6	17,412	55.9
Nepal	2014	0.126	28.6	8,054	44.2
Nigeria	2013	0.303	53.2	92,023	56.8
Pakistan	2012/13	0.230	44.2	80,041	52.1
Peru	2012	0.043	10.5	3,167	41.0
Philippines	2013	0.052	11.0	10,745	47.3
Rwanda	2014/15	0.259	53.8	6,101	48.1
Senegal	2014	0.309	56.9	8,348	54.3
Sierra Leone	2013	0.464	81.0	5,005	57.3
South Africa	2012	0.044	11.1	5,865	39.5
Tanzania	2010	0.332	65.6	29,927	50.7
Timor-Leste	2009/10	0.360	68.1	720	52.9
Uganda	2011	0.367	69.9	23,955	52.5
Viet Nam	2013/14	0.029	7.1	6,584	40.7
Yemen	2013	0.236	45.9	11,713	51.4

Poverty Reduction May Cause Growth (1/2)

- Inclusive growth can cause poverty reduction, directly and indirectly
- Less appreciated: *Poverty reduction can cause growth and development*, while failure to address poverty can constrain prospects for development because:
- Although small, poverty income is part of total income
  - Programs that raise productivity of the poor directly, even at small scale, contribute directly to growth; but of course tiny increments because incomes are so low, and of course there are opportunity costs
- Poor health, nutrition, and education lower the economic productivity of people in poverty, leading directly and indirectly to slower growth

Poverty Reduction May Cause Growth (2/2)

- Often, the poor lack access to credit, which constrains growth, e.g.:
  - Lost opportunities for entrepreneurship which may benefit society
  - Leaves them unable to finance their children's education, also limiting the skilled labor force needed for development
  - Incentives for high fertility as a source of old-age financial security
- Higher income for the poor raises demand for locally produced goods
- Social exclusion/injustice, which is associated with poverty, also likely causes economic stagnation (next slide)

Social Exclusion and Economic Stagnation

- Social exclusion/injustice, which is associated with poverty, also likely causes economic stagnation in the long run
  - Political and social reform needed to overcome constraints to access to land, water, basic resource based livelihood opportunities
  - Elite control of natural resources translates to social and political power to protect elite interests that may be inconsistent with modernization
  - Inadequate voice for the poor who know their public goods needs
  - Other features of a broader social justice agenda which as many have pointed out is *also* a foundation of economic efficiency
  - The poor may be susceptible or coercible to participating in civil conflict
  - Among its other benefits improved social justice may positively contribute to growth

5.5 Economic Characteristics of High-Poverty Groups

- Rural poverty
- Women and poverty
- Ethnic minorities, indigenous populations, and poverty
- Disproportionately children



A women's self-help group meets in a village in Tamil Nadu, India; the blackboard records members' savings and loans.

Wikimedia Commons, McKay Savage from London, UK, CC BY 2.0

Poverty: Rural vs Urban

Percentage of the population below the national poverty line

Region and country	Survey year	Rural pop. (%)	Urban pop. (%)	National pop. (%)
Sub-Saharan Africa				
Benin	2011	39.7	31.4	36.2
Burkina Faso	2014	47.5	13.7	40.1
Cameroon	2014	56.8	8.9	37.5
Malawi	2010	56.6	17.3	50.7
Tanzania	2011	33.3	15.5	28.2
Uganda	2012	22.4	9.6	19.5
Zambia	2010	77.9	27.5	60.5
Asia				
Bangladesh	2010	25.2	21.3	31.5
India	2011	25.7	13.7	21.9
Indonesia	2014	14.2	8.3	11.3
Uzbekistan	2013	–	–	14.1
Vietnam	2014	18.6	3.8	13.5
Latin America				
Bolivia	2015	–	–	38.6
Brazil	2014	–	–	7.4
Dominican Republic	2015	–	–	32.4
Guatemala	2014	76.1	42.2	59.3
Honduras	2014	65.0	61.0	62.8
Mexico	2014	62.4	50.5	53.2
Peru	2015	–	–	21.8

Table 5.6 Indigenous Poverty in Latin America

	Below poverty line (%), early 1990s		Change in poverty (%), various periods		
Country	**Indigenous**	**Nonindigenous**	**Period**	**Indigenous**	**Nonindigenous**
Bolivia	64.3	48.1	1997–2002	0	−8
Guatemala	86.6	53.9	1989–2000	−15	−25
Mexico	80.6	17.9	1992–2002	0	−5
Peru	79.0	49.7	1994–2000	0	+3

Sources: Data for the left side of the table from Psacharopoulos, George, and Patrinos, Harry A. (1994), 'Indigenous people and poverty in Latin America,' Finance and Development, 31: 41, used with permission; data for the right side of the table from Gillette Hall and Harry A. Patrinos, eds., Indigenous Peoples, Poverty, and Human Development in Latin America, 1994–2004 (New York: Palgrave Macmillan, 2006).

The Functional Distribution of Income

- "Functional" income distribution is based on shares of national income of each factor of production (labor, capital, and land)
- Focuses on (wage) share of labor as a whole, in contrast to distributions as rent, interest, and profit
- Specific individuals may receive income from all sources, but the functional approach is not based on individuals
- Traditional neoclassical approach: assumes competition; supply and demand curves are assumed to determine the prices of each factor
- Each factor is then paid what it contributes to national output:
- Supply of, and demand for, labor determine market wages
- The (average) wage multiplied by total employment is a measure of total wage payments, also called the total wage bill

The Broad Importance of High-Quality Jobs

- Work is the way most people get most of their income, and where they spend much of their time
- The type of work a person does largely constrains their possibilities of getting *future* higher income
- Broadly, jobs help people gain and maintain capabilities
- Skills and attitudes people develop at jobs affect [how others perceive] their capabilities in other spheres
- People with jobs that develop multiple capabilities are more engaged in civic affairs
- Thus, high inequality in labor markets can serve to magnify other forms of inequalities

Policies and Programs

- Policy can:
- Reduce constraints on job creation, such as building needed infrastructure,
- Ensure incentives do not hinder quality job creation
- But reforming some laws – and even more so norms – is more difficult
- Example: those discouraging women from working
- Programs for employment when jobs are scarce can help, but need careful design and implementation

5.6 Policy Options on Income Inequality and Poverty

Areas of intervention

- Altering the functional distribution
- Mitigating the size distribution
- Moderating (reducing) the size distribution at upper levels
- Moderating (increasing) the size distribution at lower levels

Policy options

- Changing relative factor prices
- Progressive redistribution of asset ownership
- Progressive taxation
- Transfer payments and public provision of goods and services
- A focus on workfare vs welfare programs

Workfare vs Welfare? Basic cost effectiveness considerations

- Workfare, such as a Food for Work Program, are more likely to represent a better policy than welfare on a current program efficiency basis when these criteria are met:
  - It is harder to screen the poor without a workfare requirement
  - Poor workers have lower opportunity cost of time (so the economy loses little output when they work in the program)
  - Non-poor workers have higher opportunity cost of time (so they are unlikely to participate to get the benefits)
  - The fraction of the population living in poverty is smaller (so the extra costs of a universal welfare scheme would be high)
  - Note: Each of the above are factors in the efficiency tradeoff:
  - All these factors *must be accounted for together* to determine whether welfare or workfare is comparatively more efficient

Workfare vs Welfare: Human Capital Factors (1/2)

- Another significant factor in a workfare vs welfare choice is that the program does not reduce incentives for the poor to acquire human capital
  - Note: This factor is largely addressed to incentivize school age children to not see future workfare participation as an alternative to putting high effort into school and continuing their education; a program design response might be very high work hour requirements for participation as a deterrent – but cannot be so high that those who later need the program do not participate
- This is also a social efficiency design consideration, that can save expenditures when viewed across time

Workfare vs Welfare: Human Capital Factors (2/2)

- An additional consideration could be the incentive for *adults* to build skills – this might require a different approach to program design
- A requirement might be participation in work activities that also build relevant skills, or devoting part of work time to training
- *Final note*: Another strategy is to add requirements for school attendance if used over time; if necessary, consider providing schooling on workfare site

Workfare vs Welfare: Other Factors

- Other factors to take into account in a workfare vs welfare choice
  - There are greater net benefits of the program's work output
  - There is less social stigma of visible workfare participation, so the poor are not humiliated or deterred from needed work (otherwise, a discreet welfare transfer may be preferable)
  - Alternatives available for the disabled or others prevented from taking part in the program
  - Which can better encourage farmers and microentrepreneurs to take favorable business bets (a functioning safety net), other factors considered?



Workfare in practice: labourers under India's rural employment guarantee scheme (MGNREGA) desilting a village pond.

Wikimedia Commons, Mulkh Singh, CC BY-SA 4.0

Applying Insights from Behavioral Economics to Address Poverty

- Research findings: "Cognitive Tax of Poverty"
- Impact of poverty on anxiety and mental illness
- Implications for program design



Esther Duflo and Abhijit Banerjee (MIT), 2019 Nobel laureates for their experimental approach to alleviating global poverty.

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A Hidden "Cognitive Tax of Poverty" (1/2)

- Cognitive challenges increase with stress
- For the poor, sources of stress include financial worries, persistent noise, air pollution, disrupted sleep, chronic pain
- Stress and environment-linked deficits in cognitive functions include focused internal and external attention, inhibitory control, cognitive flexibility, planning
- Example: farmers in India perform worse during financial stress before harvest than after harvest – equivalent to about ten IQ points

A Hidden "Cognitive Tax of Poverty" (2/2)

- "Bandwidth" problem: Focus on urgent financial problems leaves less cognitive capability for other activities that would help break out of poverty, such as
  - preventive health care
  - adherence to drug regimens
  - promptness for appointments
  - attentiveness to their children
  - management of family finances
  - general work productivity
- Result: more difficult for poor to take actions to improve their conditions

Implications for poverty program design

- "Choice architecture": Cognitive dimension in programs to help the poor
- Cognitive burden research shows importance of assistance for improving capabilities of people to make good decisions
- Priority of timing programs and activities for when cognitive load on the poor is likely to be lower
- Make interviews required for assistance less threatening and challenging
- Simplifying application forms and helping people fill them out
- Clarifying and improving roles of counselors
- Better nutrition improves cognitive (and physical) functioning
- Importance of addressing high incidence of anxiety, depression, and other mental illness among the poor
- More emphasis on early development, non-cognitive skills
- The importance of being reminded – both explicit (e.g. sending SMS/texts), and implicit (e.g. where assistance is available)

Conclusion: The Need for a Package of Policies

- Policies to correct factor price distortions
- Policies to change the distribution of assets, power, and access to education and associated employment opportunities
- Policies of progressive taxation and directed transfer payments
- Policies to build capabilities and human and social capital of the poor
- Effects of minimum wage laws are more nuanced than once thought
- Policies to address cognitive burden of poverty
- Some of the specific programs examined in later chapters:
- Conditional and unconditional cash transfers (Chapter 8)
- Agricultural extension (Chapter 9)
- Nutrition (Chapters 8, 9, and Chapter 11 case studies)
- Microfinance (Chapter 15, and Chapter 11 case studies)

Chapter Summary

- Relative inequality is measured with size distributions, the Lorenz curve and the Gini coefficient; good measures satisfy anonymity, scale and population independence, and the transfer principle
- Absolute poverty is measured with the headcount index, the poverty gap and the FGT family; P_2 satisfies monotonicity and distributional sensitivity, the headcount does not
- The MPI adds health, education and living-standard deprivations, and tells a different story from income poverty
- How growth happens matters: traditional-sector enrichment, modern-sector enrichment and modern-sector enlargement shift the Lorenz curve differently; the Kuznets inverted-U is not inevitable
- The poor are disproportionately rural, female, minority and young; reducing poverty needs a package of policies, including well-designed workfare and attention to the cognitive burden of poverty

Concepts for Review

- Absolute poverty
- Asset ownership
- Character of economic growth
- Decile
- Disposable income
- Factor share distribution of income
- Factors of production
- Foster-Greer-Thorbecke (FGT) index
- Functional distribution of income
- Gini coefficient
- Headcount index
- Income inequality
- Indirect taxes
- Kuznets curve
- Land reform
- Lorenz curve
- Multidimensional poverty index (MPI)
- Personal distribution of income
- Progressive income tax
- Public consumption
- Quintiles
- Redistribution policies
- Regressive tax
- Size distribution of income
- Subsidy
- Total poverty gap (TPG)
- Workfare programs