Within country inequality and poverty

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Inequality

Inequality

Many dimensions of inequality:

→ Income, Physical assets (such as land), Financial assets, Access to public goods and services (health care, education, …)

→Measuring inequality:

→**Kuznets Ratio**= Top 20% / Bottom 40%

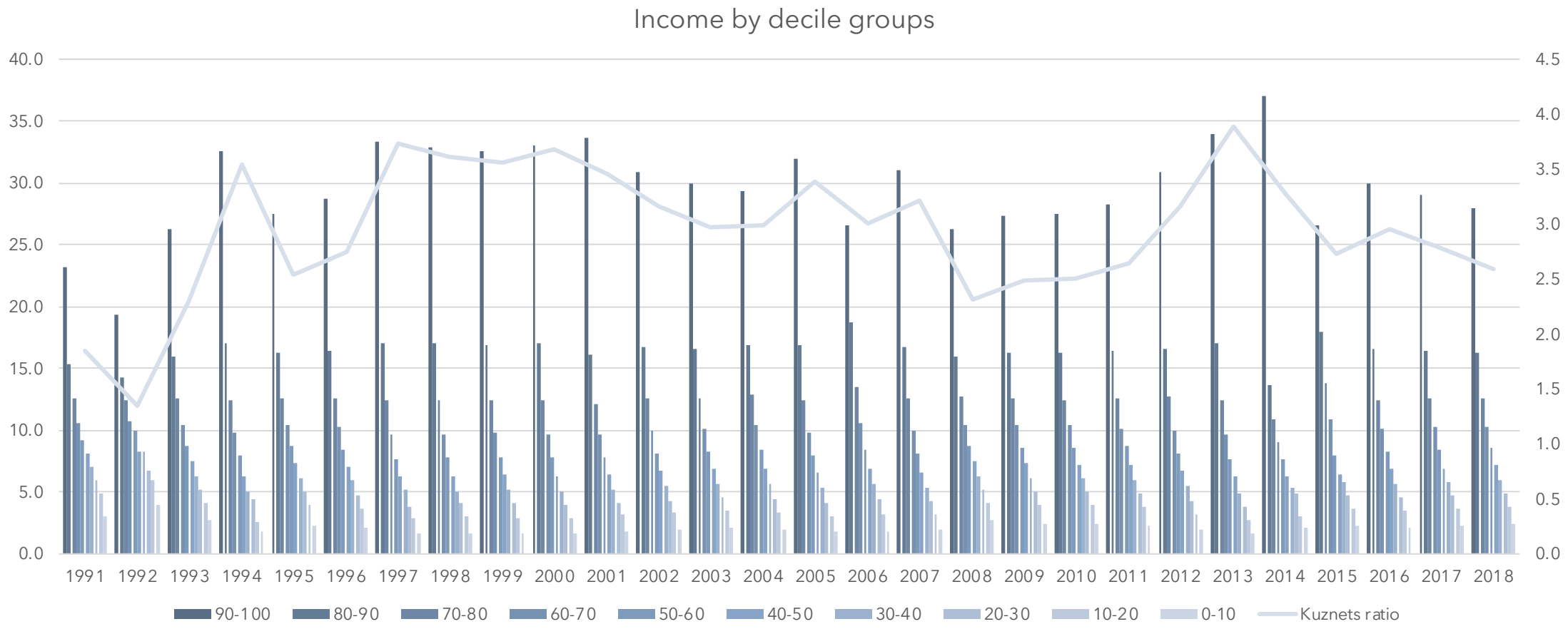
Lorenz curve, Gini coefficient

An example: Income inequality of an economy of 20 individuals

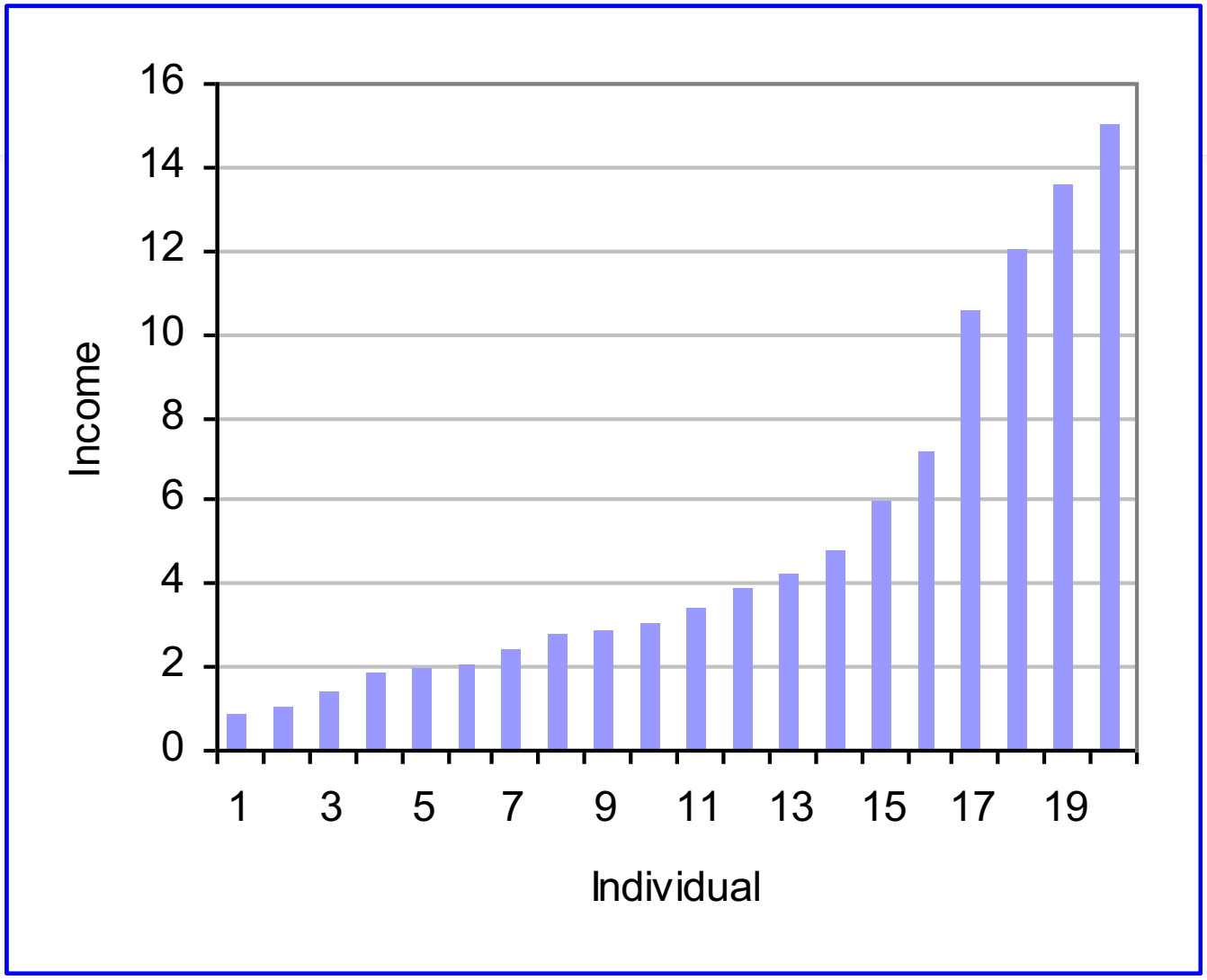
Individuals	Personal Income (money units)	Share of Total Income (%)	
		Quintiles	Deciles
1	0.8		
2	1.0		1.8
3	1.4		
4	1.8	5	3.2
5	1.9		
6	2.0		3.9
7	2.4		
8	2.7	9	5.1
9	2.8		
10	3.0		5.8
11	3.4		
12	3.8	13	7.2
13	4.2		
14	4.8		9.0
15	5.9		
16	7.1	22	13.0
17	10.5		
18	12.0		22.5
19	13.5		
20	15.0	51	28.5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

Note: Measure of inequality = ratio of top 20% to bottom 40% = 51/14 = 3.64.

Income by decile group and Kuznets ratio in the Kyrgyz Repubic, 1991-2018, NSC



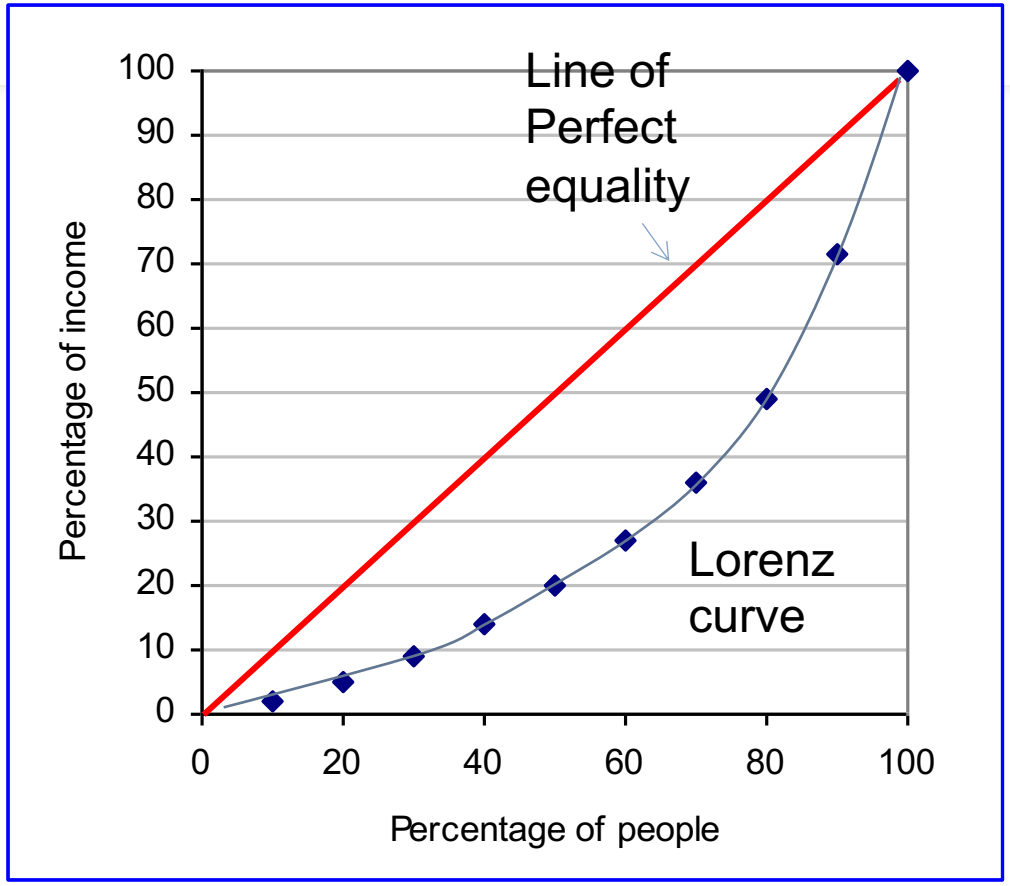
Unequal distribution: How unequal is it?



Inequality measure: Lorenz Curve

3. Lorenz curve

deciles	%	cum %
1	1.8	1.8
2	3.2	5.0
3	3.9	8.9
4	5.1	14.0
5	5.8	19.8
6	7.2	27.0
7	9.0	36.0
8	13.0	49.0
9	22.5	71.5
10	28.5	100.0



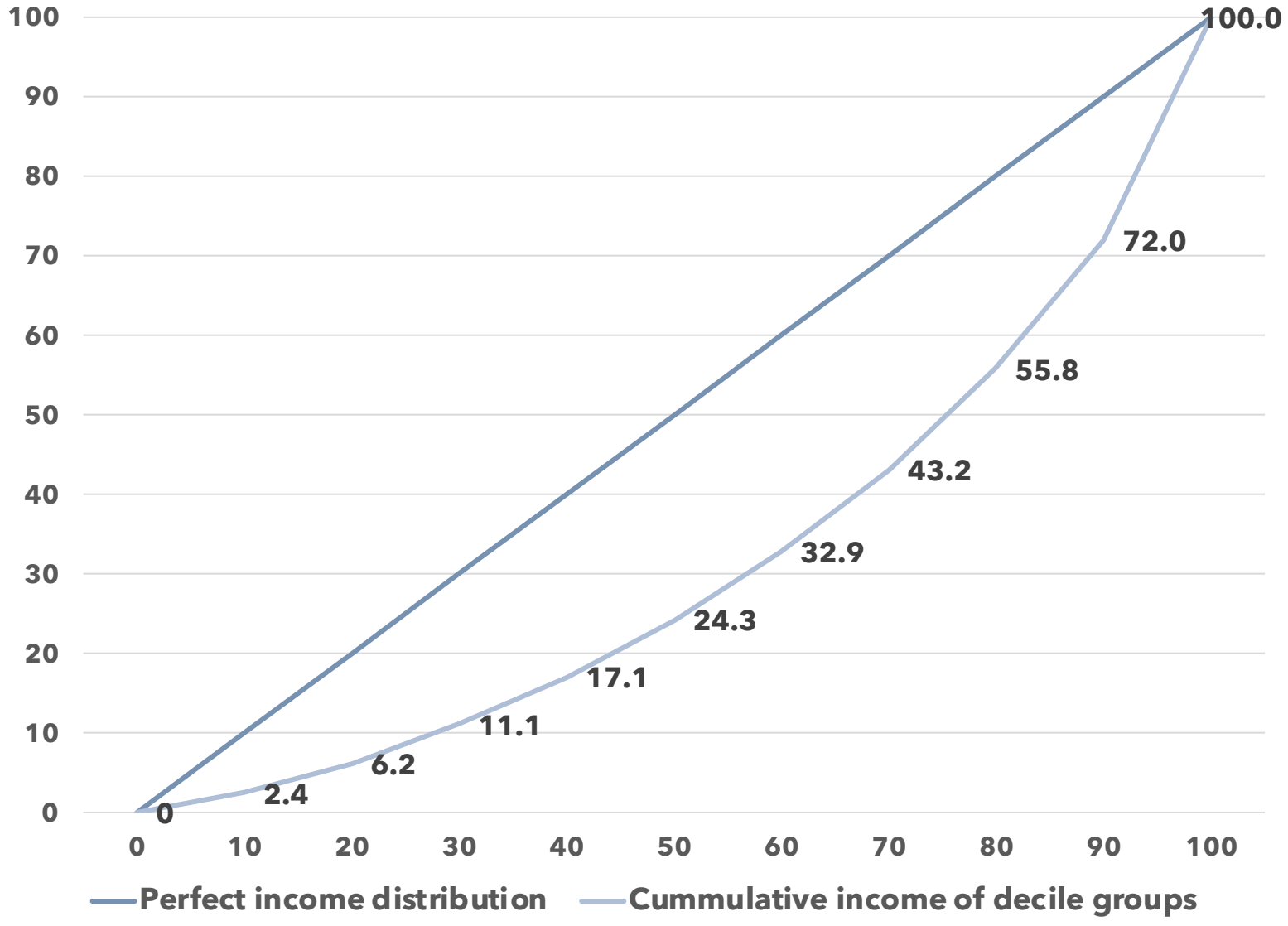
Divide the population in
10 equal groups and
Calculate their income shares –
Group-wise first and cumulative next

Reading inequality from the Lorenz Curve

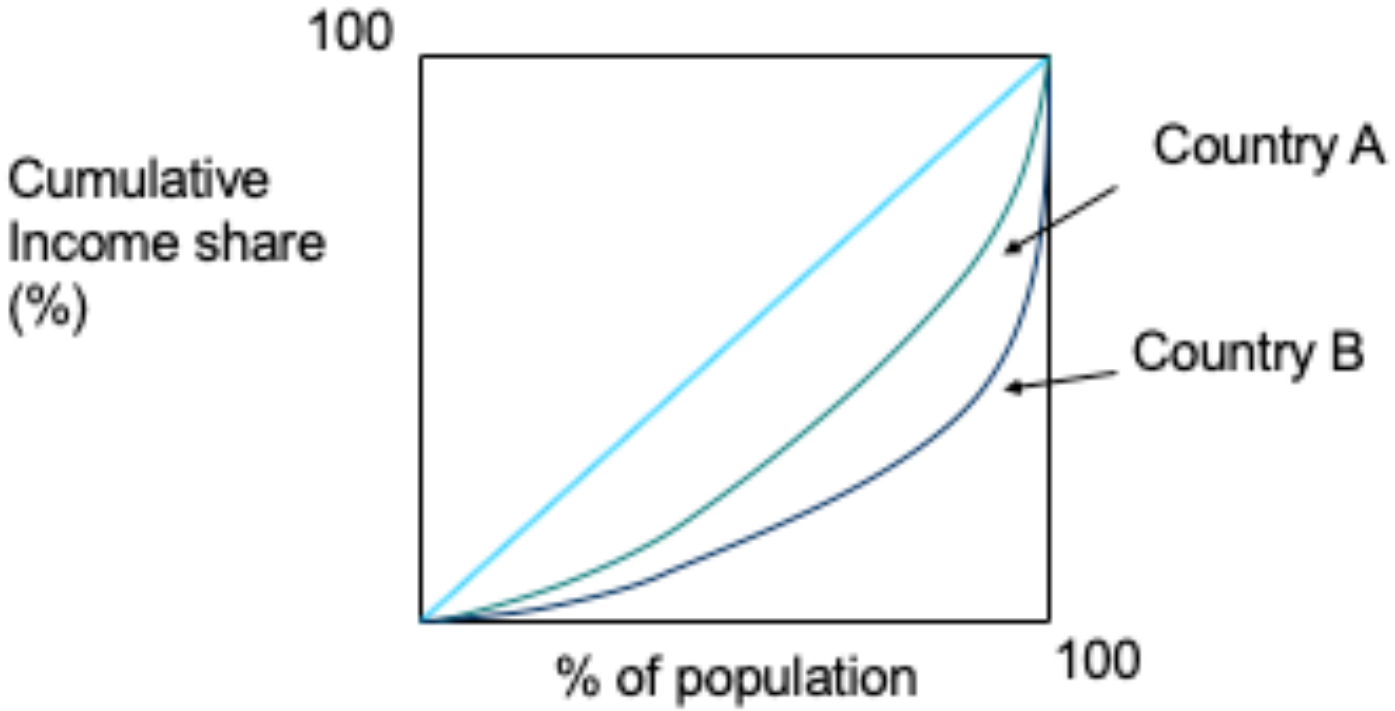
- As can be seen, the more unequal the income distribution is, the bigger the gap between the Lorenz curve and the line of perfect equality.

- In developing countries, this gap on average is bigger than the developed countries.

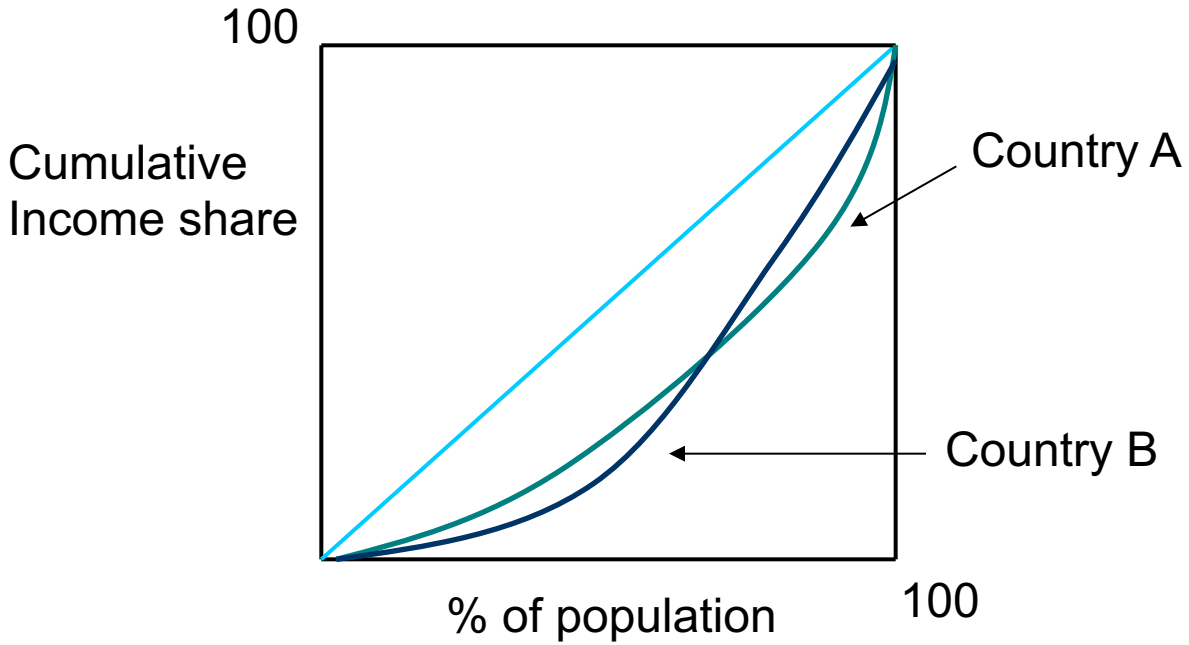
Lorenz curve, Kyrgyz Republic, 2018, NSC



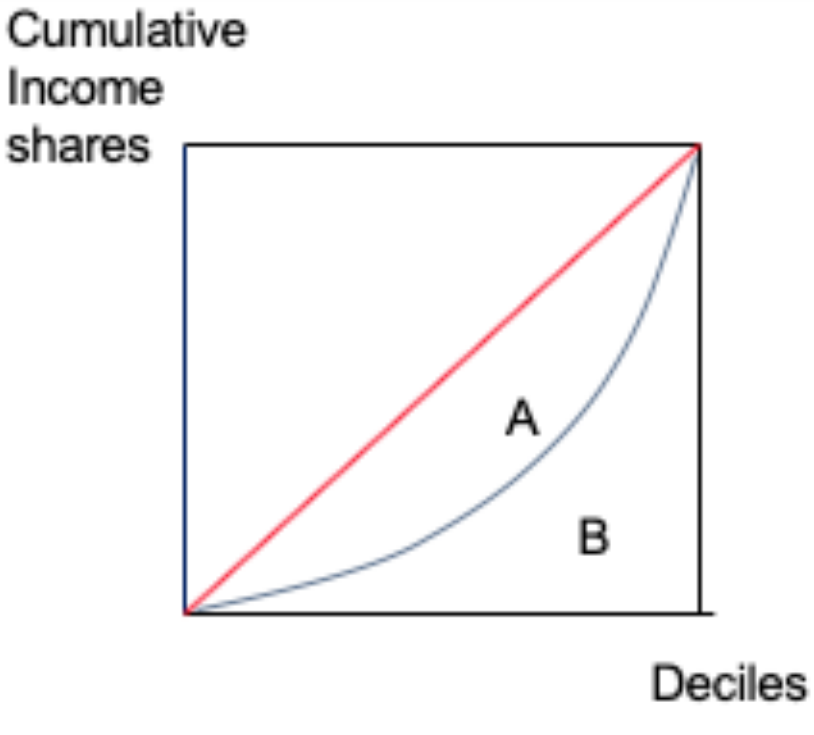
Comparing inequalities: Country B has greater inequality



But we cannot conclude from this graph which country's income distribution is more unequal



2. Inequality measure: Gini Coefficient



0: No inequality
1 (or 100): Maximum possible inequality

Gini Coefficient is a number that summarises inequality permitting easy cross country comparison.

→Calculate the area between the 'line of perfect equality' and the Lorenz curve.

→Divide by the area of the lower triangle (between the line of perfect equality and the horizontal axis)

: Area A/[Area A + Area B]

→ A number between 0 and 1 (Often this is multiplied by 100 to express it on 0 to 100 scale)

Gini formula: Relative mean absolute difference

- Suppose there are 3 people with incomes
- 10, 20, 30
- So in order to compute Gini, we need to take the absolute difference in incomes for each possible pair:
- Holding individual 1 fixed, we get two pairs: (1,2) and (1,3).
  - Take their income differences and ad them up
  - 10+20 = 30

- Now similarly hold individual 2 fixed, get two pairs: (2,1) and (2,3).
  - Take their income differences and ad them up
  - 10+10 = 20

Gini formula

- And for individual 3, the pairs are: (3,1) and (3,2).
  - Take their income differences and ad them up
  - 20+10 = 30

Add them up : 30+20+30 = 80

Now note that each pair has been counted twice, so we need to divide them up by 2: 80/2=40

Also we need to divide this by the number of pairs to get an average difference (i.e., per pair) difference.

There are 3 income levels, which give rise to 6 pairs. So we need to divide it by 6: 40/6

Finally , divide it by the average income: 20

Gini = 40/(6 x20) = 2/6 = .33 (or 33 on a scale of 0 to 100) [moderate income inequality]

Gini: The general formula

- Suppose there are m income groups:
- $(y_1, y_2, \ldots, y_m)$ with population in each group as $(n_1, n_2, \ldots, n_m)$ with the total population as
- $n = \sum_{i=1}^{m} n_i$

- Denote the per capita income as $\mu = \frac{\sum_{i=1}^{m} n_i y_i}{n}$

- Gini coefficient: $G = \frac{1}{2(n^2 - n)\,\mu} \sum_{j=1}^{m} \sum_{i=1}^{m} n_i n_j \left| y_i - y_j \right|$

Why is Gini coefficient accepted as a more desirable measure?

It satisfies four desirable properties:

- **Anonymity** (does not matter WHO has more income)
- **Scale independence** (does not depend on the size of the economy – large or small)
- **Population independence** (does not depend on the size of population)
- **Transfer principle** (If some income is transferred from the rich to the poor, the income distribution becomes less unequal)

Developed country *g* ranges approx. from 20 to 40, Developing country *g* ranges approx. from 35 to 70

Asia: Bangladesh: 32.1 (2010), India: 36.8 (2005), Malaysia: 46.2 (2009), Philippines: 43 (2009), Vietnam 35.6 (2008), China:42.5 (2005)

Africa: Mozambique: 47.1 (2003), Nigeria: 48.8 (2010), South Africa: 63.1 (2009), Uganda: 44.3 (2009), Zambia: 50.7 (2005)

Latin America: Argentina: 44.5 (2010), Brazil: 54.7 (2009), Colombia: 55.9 (2010), Chile: 52.1 (2009), Mexico: 51.6 (2008)

OECD: USA: 46.8 (2009), UK 34.3 (2010), Germany: 27(2006)

Gini coefficients: A global comparison

Why is inequality high in LDCs?

Inequality begets inequality (vicious circle)

- **High income inequality** → education and health inequality (due to unequal access) →Low per capita income (poverty)→ low tax revenues (and corruption and tax evasion)→ less to redistribute → **More inequality at the end**

- **Imperfect credit market:** Only the rich can start new business and accumulates more wealth

Latin America: Highest income inequality because of particular colonial history creating **highly unequal land distribution**, though in general poverty rate is moderate

Measuring poverty

Define a poverty level (usually called *poverty line*) either by income (such as *$1.25 a day, or $2 a day*) or in terms of the cost of some necessary food and non-food items (e.g. *minimum calorie* intake).

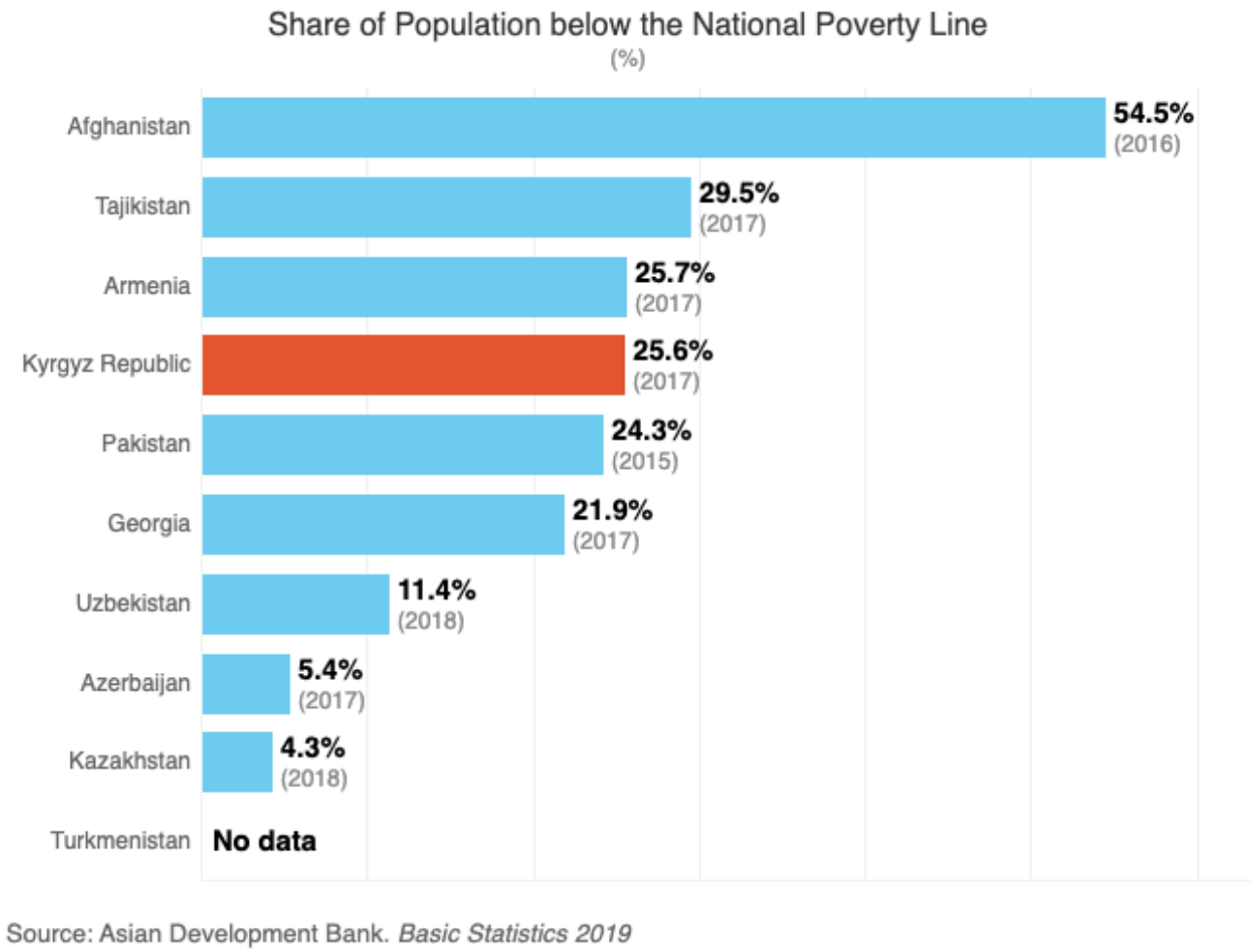
Identify the number of people living below this poverty line.

Simplest poverty measure:

Head count index: → HCI = *H/N*

where *H* is the number of poor and *N* is population.

Some poverty data



Source: Asian Development Bank. *Basic Statistics 2019*

Other poverty measures

Need to understand **how poor a poor** is.

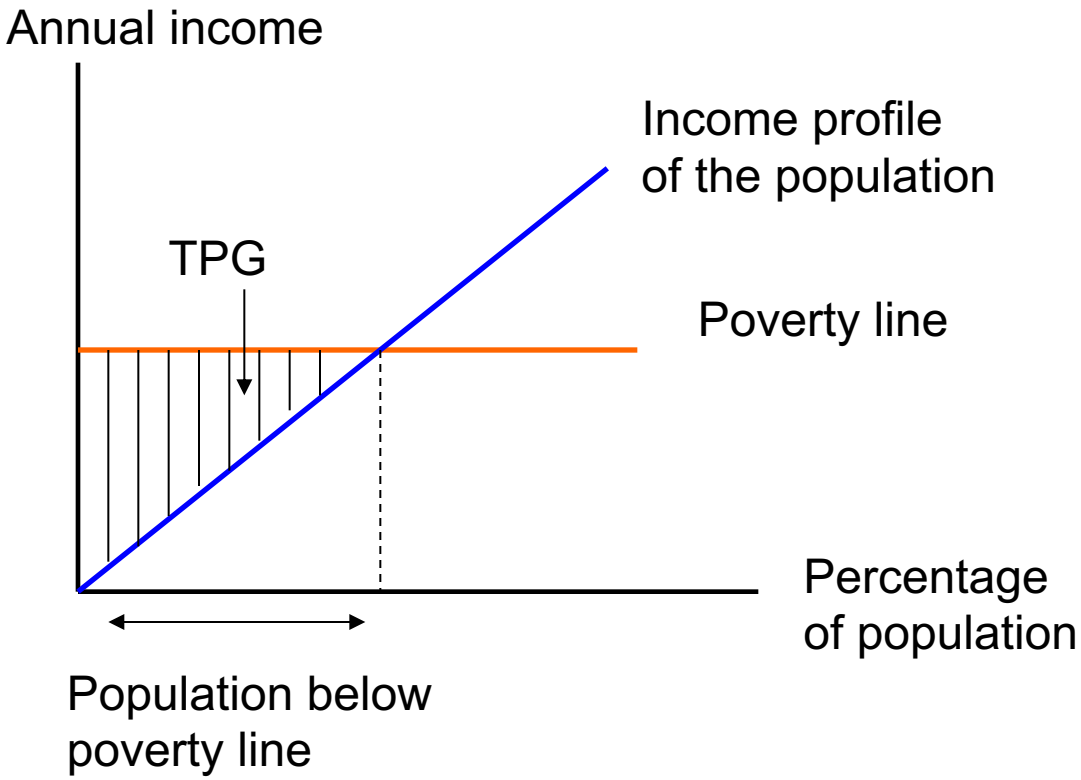
Total poverty gap: Total income needed to bring all the poor people above the poverty line.

$TPG = \sum^{H}_{i=1}(Y_p - Y_i)$ [where Y_p is poverty line] : **Total poverty gap**

$APG = TPG/N$ ***average poverty gap*** (How much money needed per person)

$NPG = APG/Y_p$ ***normalised poverty gap*** (relative to the poverty line)

Graph for Total Poverty Gap



Multi-dimensional poverty Index

- Sen argued that income poverty is not an adequate measure of poverty. Other factors such as education, health, political freedom etc. should also be considered as part of poverty.

- **Multi-dimensional poverty index**: This has been developed by UNDP to estimate the number of people who suffer poverty in all three dimensions, namely **health**, **education** and **standard of living**, simultaneously.

Multi-dimensional poverty Index

- There are 10 indicators of deprivation on three dimensions
- Health: (weight 33.3%)
  - Nutrition, Child mortality
- Education: (weight 33.3%)
  - Years of schooling, Children enrolled
- Standard of Living: (weight 33.3%)
  - Cooking fuel, Toilet, Water, Electricity, Floor quality, Assets

The formula for MPI

- http://hdr.undp.org/sites/default/files/hdr2015_technical_notes.pdf
- For exact formula see the above link
- For each indicator, there is a threshold level to define '**deprivation**'. For example, six years of education is the threshold for education deprivation. For electricity 'no electricity' is the threshold. For assets, not having a radio/TV and not having a bike/animal cart etc. are the thresholds.
- If a family falls below the threshold on any given dimension, then it receives a raw score of 1, otherwise zero.

Indicator	HH 1	HH 2	HH 3	HH 4
Household size	4	7	5	4
Health (33.33%)				
At least one member mal-nourished (16.66%)	0	0	1	0
One child died (16.66%)	1	1	0	1
Education (33.33%)				
Six years of education (16.66%)	0	1	0	1
One child not enrolled (16.66%)	0	1	0	0
Living conditions (33.3%)				
No electricity (5.55%)	0	1	1	1
No access to drinking water (5.55%)	0	0	1	0
No access to toilet/sanitation (5.55%)	0	1	1	0
Dirt floor (5.55%)	0	0	0	0
Dirty cooking fuel (dung or firewood) (5.55%)	1	1	1	1
No access to information or bike etc. (5.55%)	0	1	0	1
Weighted sum (weight x score)	22.2 %	72.2%	38.9%	50.0 %
Multidimensional- poor? (cut-off: 33.3%)	No	Yes	Yes	Yes

MPI for this hypothetical economy

How many people are poor in this economy (in the sense of multi-dimensional poverty) = 7+5+4 = 16

How many people are there = 20

Headcount ratio: H = 16/20 = 80%

Now we need to calculate **intensity of poverty (A)**

$$\frac{(\mathbf{72.2}\times\mathbf{7}) + (\mathbf{38.9}\times\mathbf{5}) + (\mathbf{50}\boldsymbol{x}\mathbf{4})}{(\mathbf{7}+\mathbf{5}+\mathbf{4})} = \mathbf{56.3\%}$$

Multi-dimensional poverty index for the economy**,**
or MPI = H x A = 0.80 x 0.563 = 0.45 or 45%

MPI can give a very different picture of poverty

Country	MPI index	Headcount Multi-dimensional poverty rate	Headcount income poverty rate (PPP $1.25 a day)
Bangladesh	0.237	49.5%	43.3%
India	0.282	55.3%	23.6%
Ghana	0.144	30.5%	28.6%
Sierra Leone	0.40	72.7%	47.4%

Growth effect on poverty

- Growth in China and India helped to bring down the number of absolute poor (earning $1 day) globally and helped achieve the first goal of MDG.
- (Headcount Poverty rate given below is measured by $1.90 a day) → Growth helped

	India	China
Annual GDP growth rate (1990-2000)	5.65%	10.40%
Poverty rate (1993)	45.9%	57%
Poverty rate	38.2% (2004)	40.5% (1999) 21.2% (2005)
Annual GDP growth rate (2015)	7.5%	7%
Poverty rate	21.2% (2011)	1.9% (2013)

But growth is not enough

- India's multi-dimensional poverty index is high (55% population is multi-dimensionally poor)
- Need big push in the form of government interventions

Anti-poverty programmes

- There are many important anti-poverty programmes around the world
- Three programmes are worthy of attention
  - National rural employment guarantee programme (India)
  - The group-lending micro-credit programme of Bangladesh (The *Grameen* model)
  - Conditional cash transfer programme of Mexico (Progresa)

Big Push: India's National Rural Employment Guarantee programme

- in 2006 India launched Mahatma Gandhi National Rural **Employment Guarantee Scheme** (MGNREGS or NREGS), under which
- Anybody in a rural area can get up to 100 days of unskilled work **on demand**.
- In 2013-14 it provided on average 45.94 days of work to 47.48 million households or 225 million poor people.
- The programme is largest in the world and it costs about 1% of India's GDP (more than $7 bn in 2013).
- It is considered to be having a high potential for poverty alleviation and bringing other long run benefits

Employment guarantee programme

- It has created job opportunities during dry seasons
- It also created a lower bound on rural wages
  - (safety against drop in income)
- Women's participation is very high →(empowerment)
- Politicians have incentive to increase the state minimum wages →(political competition)
- People are given a sense of 'right' → (corruption is under control)
- Government is keen to make pay the wages through bank, rather than by cash → people are opening bank accounts → (financial inclusion)
- Poverty alleviation is still a long way. But there is hope

Microfinance: an experiment in poverty alleviation

Harnessing the business capacity and hidden entrepreneurship of the poor.

But who will invest in them? Two big problems: Adverse selection (hidden information) and moral hazard (hidden action)

- Banks are also unlikely to give them loans because hardly any collaterals can be obtained to hedge against the risk of default.

- Private money-lenders will not also give loans (not on easier terms), because they have to wait too long to get their money back

Articles to read

- India's NREGS:

- Ravi, S., Engler, M., (2015) Workfare as an effective way to fight poverty: The case of India's NREGS, World Development, 67: 55-71

- Maiorano, D., (2014) The politics of Mahatma Gandhi National Rural Employment Guarantee Act in Andhra Pradesh, World Development, 58, 95-105.

- Nielhouse, P. and Sukhtankar, S. 2013a, The marginal rate of corruption in public programs: Evidence from India, Journal of Public Economics, 104 -53-63

The Bangladesh experiment: The *Grameen Bank* model of Professor Muhammad Yunus

Started in 1976 with a small bank loan and later in 1983 formally chartered as a financial institution *Grameen Bank* (*Grameen* means rural) applied an innovative model of lending: → Group lending.

The *Grameen Bank* model of Professor Muhammad Yunus

The whole group will lose future loans, if one of their members defaults.

Group lending: Two advantages:

- Self-selection while forming group (screening to avoid adverse selection)
- Peer monitoring (avoidance of moral hazard)

MFI meetings

The *Grameen* Bank model

- Each group contains about 4 to 5 members; they normally self-select.
- Usually, a ‘good’ borrower will find 3 other ‘good’ borrowers from their neighbourhood or network and form a group.
- So individuals use their local information and form a ‘good’ group. The lender may not have that information, but he does not need to.
- It is also possible that some ‘bad’ borrower matches with other ‘bad’ borrowers and form a group.
- The ‘adverse selection’ problem is largely mitigated, but not entirely eliminated.

Grameen bank

- After forming the group, one member at a time gets the loan (subject to approval). But others cannot get loan until the current loan is repaid.

- Thus, group members monitor each other to ensure that the loan is repaid → this helps to avoid the moral hazard problem.

- Very innovative idea

Performance of *Grameen bank (2012)*

Average loan size was $313 of which 40% to 50% went to livestock and poultry farming.

Interest rate: 20%

Repayment term: 1 year

Good effect: Cattle increased by 26% on average, repayment rate high

Most borrowers are women (about 96%)

It had 2000 branches with 76% owned by the borrowers themselves

Grameen bank

- Impact on poverty: Positive, but disagreement on the magnitude
- Evidence suggests that income increased and provided a basic safety, but not enough to pull a large number of people out of poverty.
- More importantly, it created a sense of cooperation and social capital, which is proving to be vital for the provision of health care and education.
- *Bangladesh has only 31% MPI, but 46% as income poor.*

Default risk?

- Microfinance experiment has been replicated all over the world in a variety of formats.

- Generally, default rate on average is about 3 to 4%.

- Compare this with the average failure rate of bank-financed/govt.-aided 'small' scale industries/businesses; it is about 30-40%.

- So as Professor Yunus said, "Poor people are good borrowers." Poor women are even better borrowers.

Microcredit revolution

- Microcredit has been experimented with all over the world in various forms:
  - Individual liability (and direct monitoring) are more common than group lending
  - Women focussed mostly
  - Poor families are targeted
  - Interest rate is higher than the commercial bank rates (20%-30%)

- Studies note a consistent pattern of modestly positive, but not transformative, effects.
- Scepticism over the prospect of lifting billion people out of poverty, but does guarantee some income

- Challenges of micro-credit: Fostering genuine entrepreneurship, and sustainability of microfinance institutions

Articles to read

- On Microcredit:
- Banerjee, A., Karlan, D., Zinman, J. (2015) Six randomized evaluations of microcredit: Introduction and further steps, American Economic Journal, Applied Economics, 17(1): 1-21

- Also six other articles in that issue of the journal are also useful

- Pitt, Mark and Shahidur R. Khandker, 1998, The impact of group-based credit programs on poor households in Bangladesh: Does the gender of participants matter? *Journal of Political Economy*, 106, 958-996

Progresa: The Mexican experiment

- Progresa is an integrated approach to health, education and nutrition.
- Since its inception in 1997, Progresa has covered about 5 million rural and urban households by 2007.
- More than 21 million people are estimated to have benefitted in terms of medical checkups, nutritional supplements and educational scholarships.
- Scholarships and cash subsidies are linked to child continuing her school and routed through mothers.

Key strengths of Progresa

- Policies like cash transfers to **poor** (based on current income) or price support to farmers come with an efficiency loss.
- Some poor may reduce work hours, or the rich farmers also benefit from price subsidy.

- But Prgoresa links welfare payments to school attendance (efficiency/future productivity gains)
- It also increases both the supply and demand for education

Articles to read

- Progresa:

- Schultz, T. (2004) School subsidies for the poor: evaluating the Mexican Progresa poverty program, *Journal of Development Economics* 74: 199-250

- Manuela Angelucci and Orazio Attanasio (2013) The Demand for Food of Poor Urban Mexican Households: Understanding Policy Impacts Using Structural Models, *American Economic Journal: Economic Policy*, 5(1): 146-178