Poverty and Development

COURSE OUTLINE

In this Course we will study

I. **CONCEPTS AND MEASUREMENTS OF POVERTY**

- Definition of poverty

- Various indices(measurement) of unidimensional (monetary) poverty

- Problems in the measurement of monetary poverty

- Introduction to multidimensional poverty measures

II. **CONCEPTS AND MEASUREMENTS OF INCOME INEQUALITY**

- Definition of income inequality

- Measuring income inequality

COURSE OUTLINE….

III. INTRAHOUSEHOLD RESOURCE ALLOCATION

- Gender inequality

- Models of intrahousehold resource allocation

IV. LINK BETWEEN POVERTY, INEQUALITY AND GROWTH

- Is growth good for the poor?

- How does inequality affect poverty?

V. POVERTY-REDUCTION STRATEGIES

PART ONE

CONCEPTS AND
MEASUREMENTS OF POVERTY

CHAPTER OUTLINE

In this chapter we will study

CONCEPTS AND MEASUREMENTS OF POVERTY

1. Motivation to the poverty and inequality study

2. Definition of poverty

3. Various indices(measurement) of unidimensional (monetary) poverty

4. Problems in the measurement of monetary poverty

5. Introduction to multidimensional poverty measures

1. Motivation to the study of poverty and inequality

World population is more than 7 billion

- More than 1.3 billion live in *extreme* poverty (less than $1.25 a day) ➔ they are in absolute poverty
- Nearly half of the world's population — more than 3 billion people — live on less than $2.50 a day
- 1 billion children worldwide are living in poverty. According to UNICEF, 22,000 children die each day due to poverty
- 870 million people worldwide do not have enough food to eat

- The average income in the richest 20 countries is 37 times the average in the poorest 20—a gap that has doubled in the past 40 years
- Richest 20 percent of world population receives 80 percent of world income
- Poorest 20 percent of world population receives 1 percent of global income!!!

1. Motivation to the study of poverty and inequality

- **We are living in unequal world**

1. Motivation to the study of poverty and inequality

- ## We are living in unequal world

2. Definition of poverty

• Many things to discuss: What is poverty? Types of poverty? Causes of Poverty; Effects of poverty; Solutions to poverty…..

What is Poverty?

Let me hear from

you………

2. Definition of poverty

- Poverty is perceived in various ways: In ordinary sense vs Formal definition

- <u>IN ORDINARY SENSE</u> poverty is looked through social indicators like illiteracy level, lack of general resistance due to malnutrition, lack of access to healthcare, lack of job opportunities, lack of access to safe drinking water, sanitation etc…..Analysis of poverty based on social exclusion and vulnerability is now becoming very common…..

- Poverty means

  - Hunger and lack of shelter

  - Lack of clean water and sanitation facilities

  - Poor people are in a situation in which they are ill-treated at almost every place

  - It also means lack of a regular job at a minimum decent level

2. Definition of poverty

- Poverty means .. **Social exclusion..**

  - According to this concept, poverty must be seen in terms of the poor having to live only in a poor surrounding with other poor people, excluded from enjoying social equality of better -off people in better surroundings.

- Poverty means .. **Vulnerability….**

  - Vulnerability to poverty is a measure, which describes the greater probability of certain communities (say, members of a backward caste) or individuals (such as a widow or a physically handicapped person) of becoming, or remaining, poor in the coming years

2. Definition of poverty

In general

1. **Poverty** is the inability of people to meet economic, social and other standards of well-being.

2. **Poverty** is the lack of resources necessary for material well-being: food, water, housing, land, and health care.

3. **Poverty** is unacceptable human deprivation in terms of economic opportunity, education, health and nutrition, as well as lack of empowerment and security

2. Definition of poverty : FORMAL DEFINITION

Definition by United Nations

- Fundamentally, poverty is the inability of getting choices and opportunities, a violation of human dignity

  - It means lack of basic capacity to participate effectively in society.

  - It means not having enough to feed and cloth a family, not having a school or clinic to go to, not having the land on which to grow one's food or a job to earn one's living, not having access to credit.

  - It means insecurity, powerlessness and exclusion of individuals, households and communities.

  - It means susceptibility to violence, and it often implies living in marginal or fragile environments, without access to clean water or sanitation

2. Definition of poverty : FORMAL DEFINITION

Definition by United Nations…..
- The UN definition brings together two important and related themes in contemporary understandings of poverty: the *'capability approach'* of Nobel-prize winning economist Amartya Sen and the *'human rights'* approach
- The 'capability approach' addresses poverty as 'the deprivation of basic capabilities rather than merely as lowness of incomes.' (Sen, 1999)
- In general, capability means lack of ability to function in the society. Poverty a deprivation of these capabilities thus includes situations of low income, undernourishment, illiteracy, premature mortality, and also social stigmatization and low self-esteem.
- The 'human rights approach' sees poverty as a violation of economic, political, social and civil rights. These include the right to health, the right to an adequate standard of living and the right to education and employment opportunities.

2. Definition of poverty : FORMAL DEFINITION

Definition by World Bank

- Poverty is pronounced <u>deprivation in well-being</u>, and comprises many dimensions.

  - It includes low incomes and the inability to acquire the basic goods and services necessary for survival with dignity

  - Poverty also encompasses low levels of health and education, poor access to clean water and sanitation, inadequate physical security, lack of voice, and insufficient capacity and opportunity to better one's life.

Amartya Sen's definition of poverty

- It should be seen as a "deprivation of basic capabilities rather than merely a lowness of incomes"
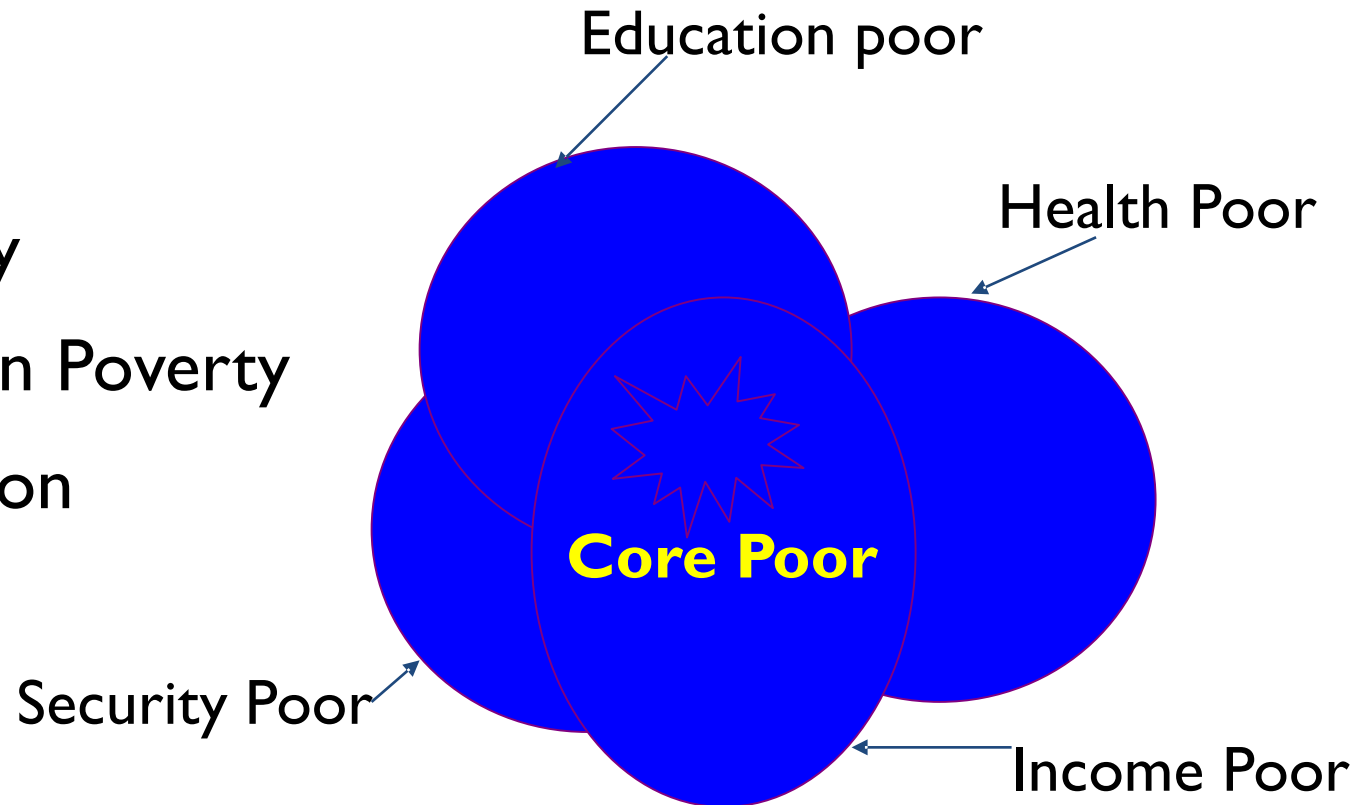
2. Definition of poverty :FORMAL DEFINITION

Overall…

Have a think about that definitions…..

- Q1. Which countries in the world have no poverty whatsoever by this definition?

- Poverty is…….

  - A very complicated phenomenon that is inherently problematic to measure

2. Definition of poverty : TYPES OF POVERTY

- Various understanding of poverty: Poverty has various dimensions

  - Income poverty
  - Security poverty
  - Education poverty
  - Health – Nutrition Poverty
  - Multiple deprivation

Education poor

Health Poor

Core Poor

Security Poor

Income Poor

2. Definition of poverty :<u>TYPES OF POVERTY</u>

Various understanding of poverty

- Relative vs. Absolute
- Objective vs. Subjective
- Human Poverty
- Urban vs. Rural Poverty
- Internal (personal) vs. External (systemic) Causes
- Short-term vs. Long-term
- Clustered (wide-spread) vs. Isolated
- Unidimensional (monetary) vs multidimensional poverty
- Chronic Poverty vs transient – those who never get out of absolute poverty

2. Definition of poverty :<u>TYPES OF POVERTY</u>

Absolute vs. Relative Poverty

<u>Absolute</u>

- Absolute
- Actual deficits
- Primarily physical consequences

<u>Relative</u>

- Comparative
- Perceived deficits
- Primarily emotional consequences

2. Definition of poverty : <u>TYPES OF POVERTY</u>

- **Absolute poverty** is the lack of resources that leads to hunger and physical deprivation

  - **Absolute Poverty**: A situation where individuals do not have access to the basic requirements of life – food, shelter, clothing.

  - **Absolute** Poverty is the lack of basic human needs, such as clean water , nutrition, health care, education, clothing and shelter, because of the inability to afford them

    - *It depends not only on income but also on access to services*

- **Relative poverty** refers to a deficiency in material and economic resources compared with some other population.

- Relative poverty is the condition of having fewer resources or less income than others within a society or country, or compared to worldwide averages

- **Relative Poverty**: A situation where individuals are excluded from being able to take part in what are considered the normal, acceptable standards of living in a society.

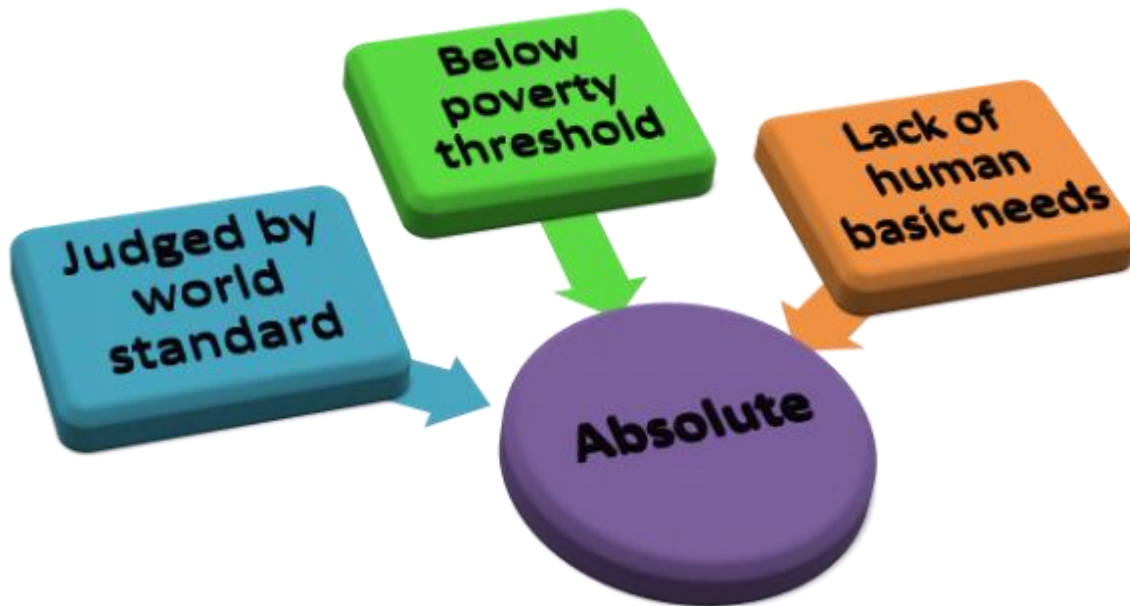## 2. Definition of poverty : <u>TYPES OF POVERTY</u>

Absolute Poverty

- Absolute poverty refers to a set standard which is consistent over time and between countries.

- Absolute poverty or **destitution** refers to the deprivation of basic human needs, which commonly includes food, water, sanitation, clothing, shelter, health care and education.
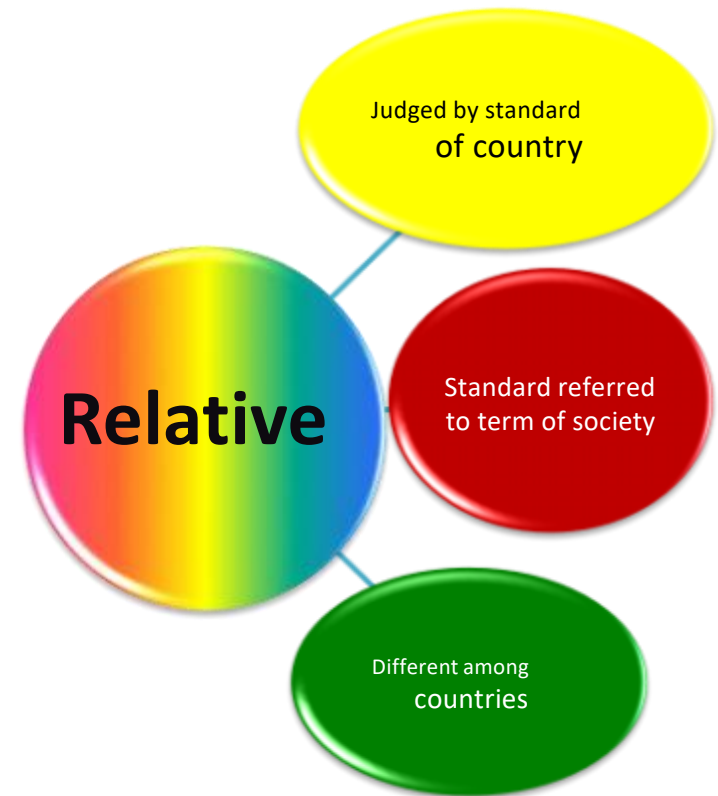
Relative Poverty

- Relative poverty views poverty as <u>socially defined and dependent on social context</u>, hence relative poverty is a measure of income inequality.

- Usually, relative poverty is measured as the percentage of population with income less than some fixed proportion of median income.

2. Definition of poverty :TYPES OF POVERTY

Absolute Poverty

Below poverty threshold

Judged by world standard

Lack of human basic needs

Absolute

Relative Poverty

Judged by standard of country

Relative

Standard referred to term of society

Different among countries

2. Definition of poverty :<u>TYPES OF POVERTY</u>

Objective vs. Subjective Poverty

- The percentage of people whose income is below a poverty line

- The critical threshold of income, consumption or more generally access to goods and services below which individuals can not fulfill basic needs.

- Asking people to report whether their income is sufficient; what level of income would be adequate to make ends meet or to identify themselves as poor

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2. Definition of poverty :TYPES OF POVERTY

Human Poverty

- Deprivation of essential capabilities such as a long and healthy life, knowledge, economic resources and community participation
- Lack of basic human capabilities: Illiteracy, malnutrition, abbreviated life span, poor maternal health, illness from preventable diseases. Indirect measures are lack of access to goods, services and infrastructure - energy, sanitation, education, communication, drinking water - necessary to sustain basic human capabilities

- Human poverty does not focus on what people do or do not have, but on what they can or cannot do. It is deprivation in the most essential capabilities of life, including leading a   long and healthy life, being knowledgeable, having adequate economic provisioning and participating fully in the life of the community (1997, UNDP)

3. Measurement of unidimensional (monetary) poverty

Why measure poverty?

- "The governments are very keen on amassing statistics. They collect them, add them, raise them to the nth power and take the cubed root and prepare wonderful diagrams: But you must never forget that every one of these figures comes in the first instance from the village watchman.

- Poverty reduction a critical goal of almost all modern states, particularly in the developing world…..and, since 2000, an international commitment (MDG 1)
- Reliable, consistent poverty measures support policy effectiveness and accountability by enabling:
    - **Analysis** of the causes of poverty and formulation of appropriate policies to tackle these causes
    - **Targeting** of limited resources to where poverty is highest
    - **Monitoring** poverty trends to assess if policies are working
    - **Evaluating** the impact of policies, programmes or shocks

3. Measurement of unidimensional (monetary) poverty

Why Measure Poverty?

- To be able to identify the poor.

- To be able to target appropriate interventions.

- To be able to monitor and evaluate projects and policies targeted at the poor.

- To be able to evaluate the effectiveness of institutions whose mandate is to help the poor

- "In sum, there is no ideal measure of well-being. The implication is simple: *all measures of poverty are imperfect.* This is not an argument for avoiding poverty measurement, but rather for approaching all measures of poverty with a degree of caution, and for asking in some detail how the measures are constructed."

3. Measurement of unidimensional (monetary) poverty

Measuring poverty: 3 steps

1. Selecting the Indicator of Well-being

2. Defining the Unit of Measurement

3. Identification of Poverty Line

1. Choosing a welfare measure

- Monetary Measure of Welfare

  ➢ Income or consumption

  ➢ Income

  ➢ Expenditure

- Non-Monetary Measures of Welfare

  ➢ Direct Measures

  ➢ Subjective Measures

3. Measurement of unidimensional (monetary) poverty

Measuring poverty: 3 steps…..

2. Defining the Unit of Measurement

   - Household vs. Individual
   - Adjusting for differences among HH
     - Adjusting for the age / gender of HH members
   - Adjusting for HH size

3. Defining a poverty line

   - Setting a minimum level of the chosen welfare measure,   below which an individual is said to be poor

- Collecting welfare data through a survey and comparing it to the poverty line to obtain estimates of:
  - What percentage of the population falls below the poverty line

    (the poverty headcount or poverty incidence)
  - And by how much (the poverty gap and the squared poverty gap)

3. Measurement of unidimensional (monetary) poverty

Defining a poverty line

- **Poverty Lines is the point at which the poor are separated from the non-poor**

- The poverty line defines the level of consumption or income needed for a household to escape poverty.
    - Absolute and relative poverty lines
    - National and international poverty line
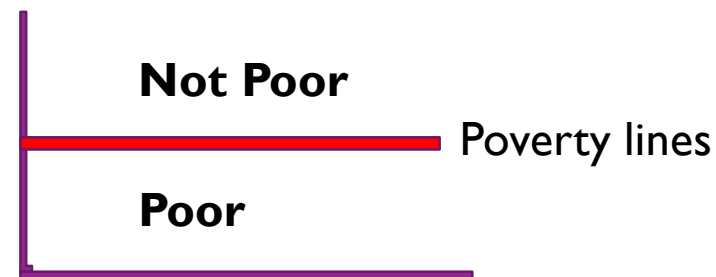
Absolute Poverty Lines (Objective Poverty Lines)

- These lines reflect the value of the resources needed to maintain a minimum level of welfare. The aim is to measure the cost involved in purchasing a basket of essential products (goods and services), which allow a person to reach minimum levels of satisfaction in terms of basic needs

- It is fixed in terms of the standard indicator being used, and fixed over the entire geographical space of the poverty comparison

- The poverty line is set so that it represents the same purchasing power year after year, but this line may differ from region to region or country to country
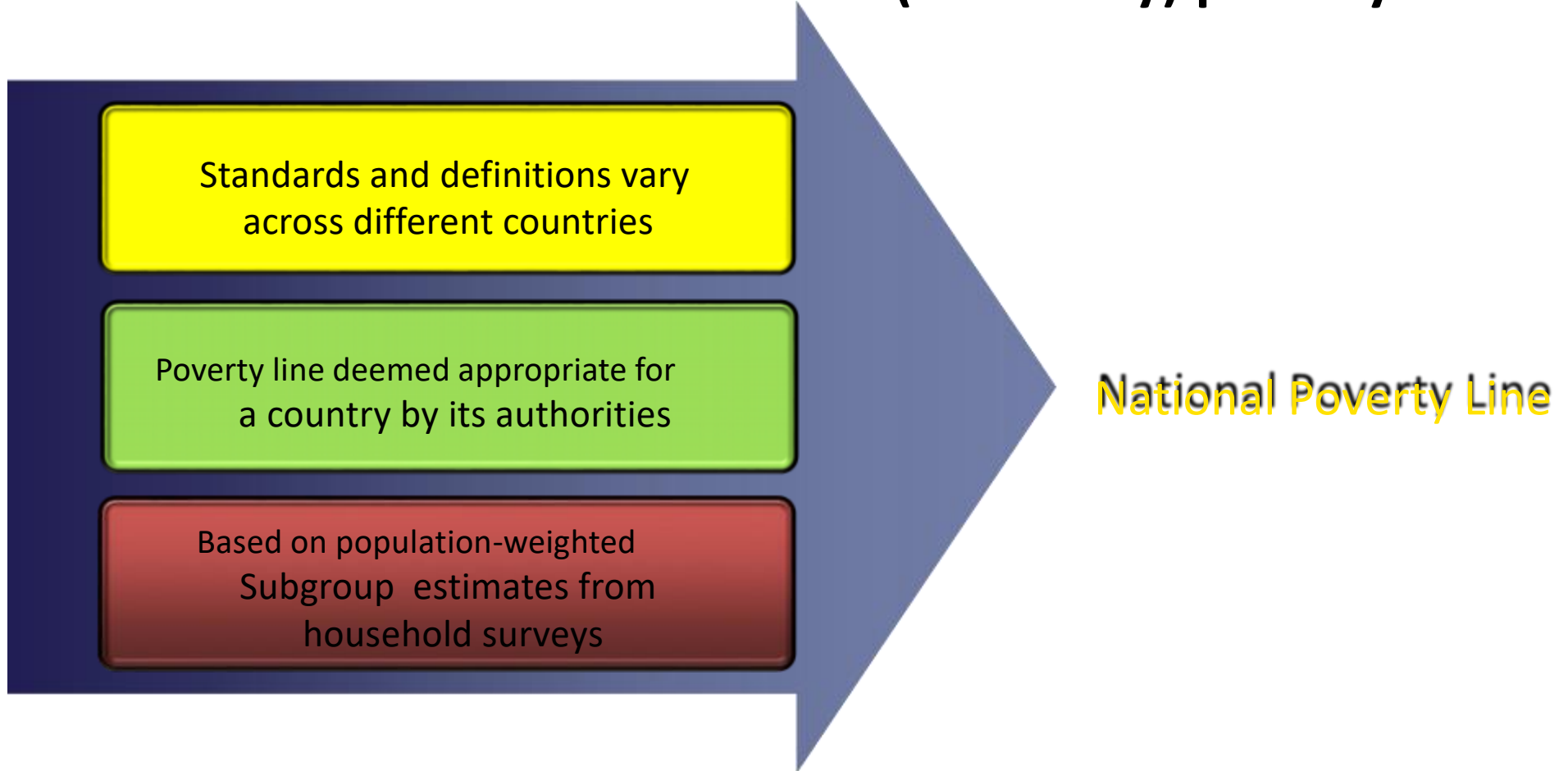
3. Measurement of unidimensional (monetary) poverty

Defining a poverty line……..

Relative poverty Lines

- Views poverty as socially defined and dependent on social context, hence relative poverty is a measure of income inequality.

- Usually, relative poverty is measured as the percentage of population with income less than some fixed proportion of median income

- There are several other different income inequality metrics, for example the Gini coefficient

3. Measurement of unidimensional (monetary) poverty

Standards and definitions vary across different countries

Poverty line deemed appropriate for a country by its authorities

Based on population-weighted Subgroup estimates from household surveys

National Poverty Line

3. Measurement of unidimensional (monetary) poverty

International poverty line (less than $1.25 and $2.50 per day)

- It can use to compare among many countries by some standard. The World Bank uses two lines for what can be called poverty (percentage of household live in $2 per day) and extreme poverty (percentage of household live in $1.25 per day)

- One of these absolute lines that is widely used fixes a dollar per capita a day as the value of minimum resources needed for a person

- Now, the World Bank defines *extreme poverty* as living on less than US$1.25 (PPP) per day, and *moderate poverty* as less than $2 or $5 a day

3. Measurement of unidimensional (monetary) poverty

Defining a poverty line

Origins of the international poverty line, late 1990s
- International community sought to define a list of global development priorities
    - First the OECD-DAC International Development Targets (IDTS)
    - And then, at the millennium general assembly in 2000, the MDGS
- Consolidated from targets agreed at UN conferences during the 1990s, most targets were for human development
- An indicator for absolute poverty was set on the basis of what, in local currency unit equivalents, a dollar could buy in the US in 1990, i.e.

    Us$1 per capita per day, 1990 purchasing power parity (ppp)
    - This had been used in world development report (WDR,1990) on poverty
    - Chosen because among 33 countries for which WDR 1990 had survey data, poverty lines for the poorest ranged from $0.75-$1 pc per day, 1985 PPP
    - This became the international poverty line (IPL)
    - And the basis for MDG 1: "to cut, by 2015, the percentage of the world's population living in absolute poverty to half its 1990 level"

3. Measurement of unidimensional (monetary) poverty

Defining a poverty line

- **Over time, estimates of global poverty have changed**
  This is due to:

  - Changing definition of the IPL (in US$ per capita per day)

    - 1990: $1   1985 PPP

    - 2000: $1.08   1993 PPP

    - 2008: $1.25   2005 PPP

  - Reflecting

    - Updated (and better) data in relative prices

    - New household surveys (which have increased coverage of the population of the developing world)

  - Plus some methodological refinements

  However, the basic principles and steps remain the same

3. Measurement of unidimensional (monetary) poverty

Approaches to Constructing a National Poverty Line

- Cost-of-basic-needs method (Food-share method)

    - Cost of basic food needs

    - Cost of basic non-food needs

- Food-energy method

- Direct Calorie Intake (DCI)

3. Measurement of unidimensional (monetary) poverty

Approaches to Constructing a National Poverty Line

Direct Calorie Intake (DCI)

- Household is poor if its per capita calorie intake is less than the standard per capita nutritional requirement - 2,122 kcal per day.

- Best used to measure under-nourishment as it doesn't include non-food items

- Could result in urban household. However, rural households are mo willing to consume food that is cheaper per calorie. This households appearing to be poorer than rural households even if in fact they are better off.

3. Measurement of unidimensional (monetary) poverty

Approaches to Constructing a National Poverty Line

Food-energy Intake (FEI) method

- Sets PL at the level of expenditure at which FEI is just sufficient to meet basic nutrition requirements
- A monetary expenditure necessary to reach the minimum calorie intake, and it does not include a minimum expenditure of non-food items)
- Expenditure level that meets the food energy requirement
- Based on calorie-income relationships
- Fitting and tracing calorie-expenditure graph
- Food poverty line is the monetary value of the food expenditure that allows households to just meet the stipulated calorie requirement.
- The FEI is normally derived through regression of the relationship between calorie intake and expenditure.

3. Measurement of unidimensional (monetary) poverty

Approaches to Constructing a National Poverty Line

At least <u>three short steps</u> required in adopting the calorie approach:

1. Establish the minimum nutrition requirements

2. Examine the observed spending pattern to see at what average expenditure household just achieve minimum nutrition requirement

- Minimum calorie intake per day (2100 calories per adult per day set by Government of Ethiopia);

3. Transformation of the calorie intake in monetary terms (regression);

- However, rural households are more willing to consume food that is cheaper per calorie. This could result in urban households appearing to be poorer than rural households even if in fact they are better off.

3. Measurement of unidimensional (monetary) poverty
Food Energy Intake Method

The PL determined by the FEI method may vary across regions due to differences in:

> ➢Preferences: if more expensive animal protein and less food grain is eaten.

> ➢Relative Prices: in urban areas it may cost more to obtain basic nutrition because food prices are higher.

> ➢Publicly Provided Goods: in capital city transport to/from work may be cheaper than in provincial cities, allowing for lower expenditure level to meet minimum FEI.
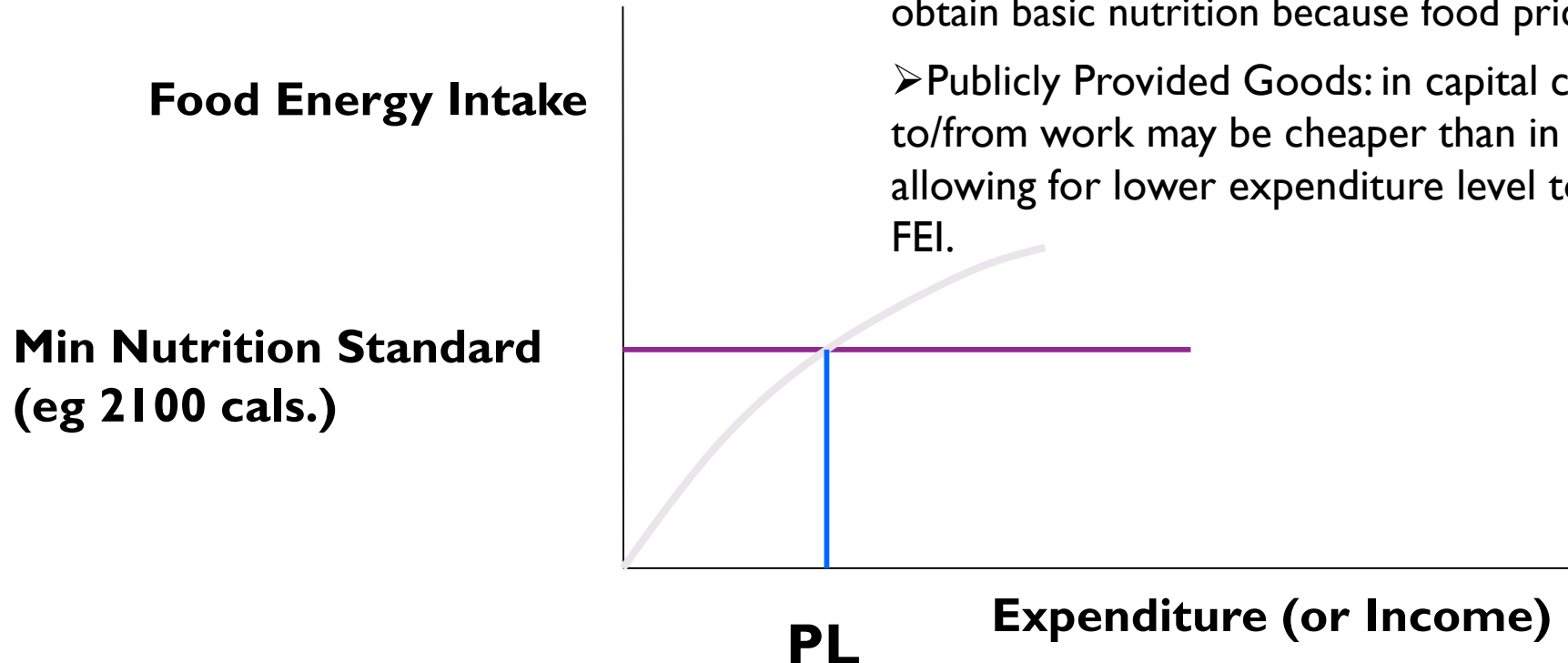
Food Energy Intake

Min Nutrition Standard (eg 2100 cals.)

PL

Expenditure (or Income)

3. Measurement of unidimensional (monetary) poverty

Approaches to Constructing a National Poverty Line

Cost-of-basic-needs method (Food-share method)[CBN]

- A poverty line using a basket of products made up of all those essential goods and services needed to meet the minimum sustenance requirements in households. The poverty threshold is set using the monetary value of this basket plus a fixed amount of money aimed at covering other types of expenditure, such as petrol or rent. Every household whose income is less than this figure will be classified as poor.
- This method requires composing a consumption bundle that is deemed to be adequate, with both food and nonfood components, and then estimate the cost of the bundle for each subgroup.
- **PL is equal to the value of a bundle of consumption goods necessary to meet basic needs**
  - Cost of basic food needs
  - Cost of basic non-food needs

3. Measurement of unidimensional (monetary) poverty

Cost-of-basic-needs method [CBN]

The process is as follows:

1. **Establish the minimum consumption bundle necessary to meet basic needs**

   - A basic food basket is identified from the data, consistent with consumption patterns
   - The quantities in the basket are scaled accordingly to correspond to the nutritional requirement

2. **Establish the cost for the items in the basic consumption bundle** [start by setting the **food poverty line**]

   - Pick a nutritional requirement for good health. The standard value widely used, which has been proposed by the FAO, is 2,100 calories per person per day.
   - Estimate the cost of meeting this food energy requirement, using a diet that reflects the habits of households close to the poverty line. Let this food component be Z^f:
   - The cost of acquiring the basket is calculated = This results in the food poverty line

3. Measurement of unidimensional (monetary) poverty

<u>Cost-of-basic-needs method [CBN]</u>

3. Add a nonfood component, Z_{nf} [Then estimate a minimum consumption level required to meet basic **non-food needs]**

- A non-food poverty line is calculated by estimating the cost of consuming a basic set of non-food goods for such as clothing, housing, health care, education…
- (i) extreme poor households whose total expenditures equals the food pov line (ii) moderate poor hhs whose food expenditure is at food pov line.

4.   Add the food and non-food allowances to obtain a total poverty line: or, simply, the **poverty line**

- Sum up both to derive the basic needs poverty line, $Z^{bn} = Z^f + Z^{nf}$

- NB poverty lines often calculated separately for regions of the country with very different consumption bundles / price levels

3. Measurement of unidimensional (monetary) poverty

How to calculate the Food Poverty Line: Short summary

1. Calculate average household (HH) size
2. Find minimum requirement of daily per-capita calories for WHO
3. Find the typical food bundle of the relative poor HH
4. Calculate the calories of this food bundle
5. Determine the cost of this food bundle

$Z^F=$ [WHO's average minimum calorie requirement calories in average food bundle for relatively poor HH] * [Cost of the average food bundle]

3. Measurement of unidimensional (monetary) poverty

Minimum daily caloric requirements by sector and gender

Age categories	Urban		Rural	
	Male	Female	Male	Female
0 to 1 year	820	820	820	820
>1 to 2 years	1,150	1,150	1,150	1,150
>2 to 3 years	1,350	1,350	1,350	1,350
>3 to 5 years	1,550	1,550	1,550	1,550
>5 to 7 years	1,850	1,750	1,850	1,750
>7 to 10 years	2,100	1,800	2,100	1,800
>10 to 12 years	2,200	1,950	2,200	1,950
>12 to 14 years	2,400	2,100	2,400	2,100
>14 to 16 years	2,600	2,150	2,600	2,150
>16 to 18 years	2,850	2,150	2,850	2,150
>18 to 30 years	3,150	2,500	3,500	2,750
>30 to 60 years	3,050	2,450	3,400	2,750
>60 years	2,600	2,200	2,850	2,450

Source:
Notes: Requirements used are for men weighing 70 kilograms and for women weighing 60 kilograms. Urban individuals are assumed to need 1.8 times the basal metabolic rate (BMR), while rural individuals are assumed to need 2.0 times the average BMR. Children under one year of age are assigned the average caloric need of children either 3–6, 6–9, or 9–12 months old.

Caloric requirements are from WHO (1985, Tables 42 to 49).

3. Measurement of unidimensional (monetary) poverty

How to Calculate the Non-food Poverty Line

1. Find typical Household (HH) on the food poverty line.

2. Calculate the non-food expenditures of the HH.

x^F= per capita expenditures on food

X^N = per capita expenditure on non-food

X = total per capita expenditure

Z^N= E {X^N|x = Z^F}   for the poor

(Non-food poverty line is the per capita non-food expenditure level when the per capita food expenditure level is equal to the food poverty line)

Z^N= E {X^N|x= Z^F}   for the ultra (extreme) poor

(The non-food poverty line is given by the per capita non-food expenditure when the total expenditure is equal to the food poverty line. The food poverty line in essence becomes the total poverty line for the ultra poor)

Z = Z^F + Z^N

3. Measurement of unidimensional (monetary) poverty

How to Calculate the Non-food Poverty Line

- In particular, they start from estimating the food share of total expenditures s as a **linear** function of the logarithm of total spending Y (i.e. food plus non-food) normalised to the cost of the food poverty line z^{FEI} a constant α and an error term u

$$s = \alpha + \beta \ln\left(\frac{y}{z^{FEI}}\right) + u$$

- Individuals with a level of total expenditures y equal to the food poverty line z^{FE}(i.e. $y = z^{FEI}$) will have an average food share equal to $\alpha < 1$. Therefore, their average non-food share of expenditure will be equal to $(1-\alpha)$

- What we are doing exactly is *to look at the average level of non-food expenditures of those individuals with total expenditures equal to the food poverty line.* The cost of basic needs, therefore, will be the cost of the food poverty line scaled up by $(1-\alpha)$

- The cost of basic needs, therefore, will be the cost of the food poverty line scaled up by $(1-\alpha)$, i.e. the average non-food share of expenditure, i.e.

$$z^{CBN} = z^{FEI}\left(1 + (1-\alpha)\right) = z^{FEI}\left(2 - \alpha\right)$$

3. Measurement of unidimensional (monetary) poverty

Food items	Monthly Consumption (kg)	Calories Per kg	Total calories Per month	Unit required	Prices Birr /kg 1996	Food Expenditure Poverty line
Cassava	2.64	3510	9,266.4	2.64	103.30	272.71
Beans	2.46	3,420	8,413.2	2.46	134.77	313.53
Rice	2.20	364.0	8,008.0	2.20	123.06	270.73
Maize	2.28	3.570	8,139.6	2.28	44.95	102.49
Millet	0.38	3,330	1,265.4	0.38	32.00	12.16
Yam	3.29	1,235	4,063.2	3.29	143.72	472.84
Meat	1.63	2,500	4,075.0	1.63	129.87	211.69
Fish(dried)	1.90	2,890	5,491.0	1.90	360.43	684.82
Eggs	0.44	1,400	616.0	0.44	42.111	18.53
Palm oil	0.52	8,750	4,550	0.52	186.15	96.80
Tomatoes	2.58	220	567.6	2.58	131.01	338.01
Pepper	0.87	940	8718	0.87	28.37	24.68
Vegetables	1.28	250	320	1.28	35.58	45.54
Fruits	0.34	430	146.2	0.34	24.8	8.43
Onions	0.57	410	233.7	0.57	47.26	26.94
Sugar	0.22	4,000	880.0	0.22	43.23	9.51
			56,853.1			2,928.93

3. Measurement of unidimensional (monetary) poverty

How to Calculate the food Poverty Line-Example

- Construction of food component(food poverty line)

- To illustrate how this might work, suppose, following common practice, that we use a food energy threshold of 2,100 Calories per day

- Suppose that there are only three foodstuffs: rice, corn and eggs for this hypothetical example,

- imagine that table --- shows the expenditure on each item, and the amount consumed by a household in the second (from bottom) quintile; since such a household consumes, we suppose, just 2,000 KCalories per day, the figures here have to be grossed up to give the cost purchasing 2,100 Calories

3. Measurement of unidimensional (monetary) poverty

How to Calculate the Non-food Poverty Line-Example

Illustration of Construction of Cost of Food Component of Poverty Line				
	Expenditure per day Birr	Calories	Calories, Adjusted to give 2,100 Calories	Expenditure, adjusted to cover 2,100 Calories
Teff	60	1,400	1,470	63
Corn	20	400	420	21
Eggs	20	200	210	21
Total	100	2,000	2,100	105

In this example the cost comes to 105 Birr per day

3. Measurement of unidimensional (monetary) poverty

<u>**Considerations in Setting Poverty Lines**</u>

Data Needs: National level data

- National accounts – GDP, consumption, savings, investment, imports, exports, etc.

- Ministry of Finance, Central Statistical Agency

- Budgets, price surveys, and data collection

- Monthly, quarterly, and yearly

Data Needs: Local level data

- Consumer and producer prices, climatic data, availability and use of markets and services
- CSA, local service providers, regional departments

- Price and market surveys

- Monthly, yearly

3. Measurement of unidimensional (monetary) poverty

Considerations in Setting Poverty Lines

Data Needs: Household – Individual level data

- Household income, consumption, employment, assets, production, demography, etc.
- CSA, sectoral ministries, NGOs, academics
- Household survey, rapid assessments, monitoring and evaluation
- Yearly, 2-3 years, every 5 years

Types of Household Surveys

- Single-topic surveys
- Multi-topic surveys
- Census data
- Poverty monitoring surveys
- Times series data
- Panel data sets

3. Measurement of unidimensional (monetary) poverty

<u>Considerations in Setting Poverty Lines</u>

Indicator of Wellbeing

Monetary indicator; i.e. consumption expenditure of households

<u>5 sub consumption aggregates:</u>

1. Food items

2. Fuel and utilities

3. Housing

4. Frequent non food expenses such as clothing, rent

5. Other non food expenses

3. Measurement of unidimensional (monetary) poverty

<u>Considerations in Setting Poverty Lines</u> Unit of Analysis

- Comparisons across   households at similar consumption level is meaningful when adjustments are made for differences in household size, age composition, the prices they face, the publicly provided goods to which they have access.
- When divided by the number of household members, this gives per capita measure of household consumption expenditure or income.

➤**Household vs. Individual**

- *What is a HH?* UN definition:
  - "Group of people who eat together"
    - But: how long must one be a resident to be counted as part of a HH
      - Students, migrant workers, etc.

3. Measurement of unidimensional (monetary) poverty

Considerations in Setting Poverty Lines :**Unit of Analysis:***Defining the Unit of Measurement*

- Individuals not households i.e consumption per capita

➤**Adjusting for differences among HH**

  ➤Adjusting for the age / gender of HH members

  ➤Adjusting for HH size

- Example:

  ➤2 HH with monthly Y of $150

  ➤HH-1 has 2 members…per capita Y = $75

  ➤HH-2 has 3 members …per capita Y = $50

  ➤BUT:

    - HH-1 has 2 adult men

    - HH-2 has a woman and 2 small children

3. Measurement of unidimensional (monetary) poverty

- HH size is often measured in "adult equivalent" units

- In the simplest case, we can simply use the number of household members to convert household consumption into individual consumption

- Then, total household expenditure per capita is the measure of welfare assigned to each member of the household.

- Although this is by far the most common procedure, it is not very satisfactory for two reasons:

    - while per capita household consumption is a convenient measure of living standards, it ignores household economies of scale which arise because some goods and services that are consumed by the household have public good characteristics—i.e. they generate benefits for other household members beside the primary consumer

- **First,** different individuals have different needs. A young child typically needs less food than an adult, and a manual laborer requires more food than an office worker.

- **Second**, there are economies of scale in consumption, at least for such items as housing. It costs less to house a couple than to house two individuals separately.

3. Measurement of unidimensional (monetary) poverty

<u>Considerations in Setting Poverty Lines :</u> Unit of Analysis:

- Solution of problem of household composition differences is application of a system of weights. For a household of a given size and demographic composition (male adult, female adult, and children) an equivalence scale measures the number of adult males (typically) which the household is deemed to be equivalent to.

- When adjusted for age composition, and therefore household consumption needs, it gives ~~adult~~ <u>equivalence scales</u>

- An adult equivalence scale typically measures the number of adult males to which that household is deemed to be equivalent
  - Each member of the household counts as some fraction of an adult male. Effectively, household size is the sum of these fractions. It is not measured in members but in numbers of adult equivalence.

3. Measurement of unidimensional (monetary) poverty

<u>Considerations in Setting Poverty Lines</u> : **Unit of Analysis:**

Expenditure per capita vs Expenditure per adult equivalent

- Data are collected at the household level so that we have data on total household consumption (E), not individual consumption. It is easy enough to divide E by household size (HHS) to get per capita consumption (e_i) for household i:

$$e_i = \frac{E_i}{HHS_i}$$

which could then be compared with the poverty line

Expenditure per adult equivalent (ea):

$$ea_i = \frac{E_i}{AE_i}$$

where AEi is the total number of adult equivalents for the household, given by:

$$AE_i = \sum_{j=1}^{N} \beta_{j,i}$$

where bj,i is the adult equivalent for individual j in household i.

3. Measurement of unidimensional (monetary) poverty

Considerations in Setting Poverty Lines : Unit of Analysis:

How to adjust?

- We can adjust for household composition by applying "weights" to each category of household member. For example, adjusted household size (N) may be:

$$N_{Equivalent\ Adults} = 1+(N\ Adult\ male \times 1) + (N\ Adult\ Women \times 0.8)+ (N_{Children\ under15} \times 0.5)$$

- There are also scales that take both household size and household composition into account. An example is an OECD scale

$$N_{Equivalent\ Adults} = (N\ Adult\ -1)0.7 + (N_{\ Children\ under15} \times 0.5)$$

- The first adult is given a weight of 1.

- The other adults are given a weight of 0.7, to reflect economies of scale.

- Children are given a weight of 0.5 to reflect their presumably lower needs .

3. Measurement of unidimensional (monetary) poverty

- HH size is often measured in "adult equivalent" units

  ➢each member of the HH counts as some fraction of an adult male

- Many different methodologies are followed within two basic approaches
  ➢Fixed Scales

  ➢Estimated Scales

- *Fixed Scales*

- Ex 1: Adult Equivalent Scale:

  ➢Adult Male = 1

  ➢Adult Female = 0.74

  ➢Child < 5 years = 0.6

Ex 2: OECD Scale: AE=1+0.7*(A-1)+0.5*C
First adult = 1
Additional adults = 0.7
Children < 14 = 0.5

3. Measurement of unidimensional (monetary) poverty

EXPENDITURE PER ADULT EQUIVALENT OF FIVE HOUSEHOLDS ('000 OF PER YEAR)

HOUSEHOLD (1)	TOTAL EXPENDITURE (2)	SIZE (3)	CHILDREN (4)	AE (5) = 0.65X(4)+ (3)-(4)	EXPENDITURE PER ADULT EQUIVALENT = (2)/(5)	EXPENDITURE PER CAPITA = (2)/(3)
1	1,508.6	6	4	4.6	328.0	251.4
2	1,673.2	3	0	3.0	557.7	557.7
3	2,186.6	7	3	6.0	367.5	312.4
4	1,885.6	4	2	3.3	571.4	471.4
5	4,029.2	6	1	5.7	713.1	671.5

3. Measurement of unidimensional (monetary) poverty

- Table above provides an illustration of this calculation

- There are five households of different size and demographic composition

- For simplicity we use a single calorific equivalence scale based on WHO recommendations and consider each child in the age from 0 to 15 as equivalent to 65 per cent of an adult (i.e. b is 0.65 for children and 1 for adults)

- Calculation of expenditure per adult equivalent (ea) would be more precise if we used different values of b for each age and sex category.

- The last column contains per capita expenditure to show the difference with expenditure expressed in adult equivalent units.

- Expenditure per adult equivalent higher than that per capita

3. Measurement of unidimensional (monetary) poverty

Considerations in Setting Poverty Lines: Income or Consumption?

- Consumption data helps in deriving the poverty line than Income
    - Income tends to be understated for the following reasons:
    - Recall problem.
    - Intent to limit tax burden.
    - Reluctance to report income from illegal sources.
    - Some parts of income are difficult to calculate accurately.
    - The understatement of both income and expenditure means that poverty rates are overstated.
    - It also means that the estimates of income and expenditure that are based on sample survey data invariably fall short of the levels observed in national accounts data

3. Measurement of unidimensional poverty: <u>Measures of Poverty</u>

- Income and consumption expenditure level and distribution:

    - Quintiles, deciles, etc

    - Gini coefficient

- Poverty monetary main indicators

    - Incidence of Poverty: Poverty headcount (poverty rate)

        - Percentage of population below food poverty line

        - Percentage of the population below the basic needs poverty line

    - Depth of Poverty – how far a person is below the poverty line

    - Poverty Gap – aggregation of depth of poverty

    - Poverty Severity – aggregation with weights

3. Measurement of unidimensional poverty: <u>Measures of Poverty</u>

<u>Expenditure or Income quintiles / quartiles /deciles</u>

- "<u>Quantiles"</u> <u>are a set of 'cut points'</u> that divide a sample of data into groups containing (as far as possible) equal numbers of observations.

- Main steps
  - Divide population into 'groups' ranked from 'poorest' to 'richest' based on expenditure (or income)
    - Divide into 4 groups (25% of the population each): **quartiles**
    - Divide into 5 groups (20% of the population each): **quintiles**
    - Divide into 10 groups (10% of the population each): **deciles**
  - Sum for each group (equal proportion of the population) the total consumption (or income)
  - Calculate the share of the consumption expenditure for each specific group (quintile, quartile or decile) to the total consumption expenditure or income

- Usual indicators
  - Last quintile/decile - richest fifth/tenth of the population
  - First quintile/decile - poorest fifth/tenth of the population
  - Ratio Q5:Q1 for quintiles or Q4:Q1 for Quartiles

3. Measurement of unidimensional poverty: Measures of Poverty

- **Indicator of distribution. Example of quintiles**

- Income/expenditure distribution: Share of **Poorest** Quintile

- Total consumption/income of the poorest quintile (20%), as a share of total consumption/income of the population

- Income / expenditure distribution: Share of **Richest** Quintile

    - Total consumption/income of the richest quintile, as a share of total consumption/income of the population.

$$C_{(x)} = \frac{\sum_{i=1}^{m} y_i}{N \sum_{i=1}^{} y_i}$$

Where **yi** is per capita consumption/income
- **N** is the total population
- **m** is the number of individuals in the lowest x %.

3. Measurement of unidimensional poverty: Measures of Poverty

• Expenditure per capita by Quintile

Region X and Y: Distribution of consumption expenditure (28 Days) by quintile and areas

Region X 2004/2005	Rural	Urban	Total	Region Y (2007)
Q1 - poorest	9.8	8.9	9.3	7.2
Q2	13.9	12.9	13.3	11.9
Q3	17.3	16.5	16.8	16.3
Q4	22	22	21.9	22.3
Q5 - richest	37	39.6	38.8	42.3
Total	100	100	100	100
Ratio Q5:Q1	3.8	4.4	4.2	5.9
Tshs (millions)	11316	9433	20750	

In **Region X**, the richest 20% spent on average nearly 40% of total consumption expenditure

The 20 percent richest spent 42 percent of total expenditure:This is **6 times more** than the poorest

In **Region Y** the poorest 20 percent spent 7.2 percent of total expenditure

3. Measurement of unidimensional poverty: Measures of Poverty

Measures of Poverty : __General formula:__

$$P(\alpha) = \frac{1}{N} \sum_{i=1}^{k} \left(\frac{z - y_i}{z} \right)^{\alpha}$$

Head-count index (incidence): α = 0:

$$P_0 = \frac{k}{N}$$

Poverty gap (average depth): α = 1:

$$P_1 = \frac{1}{N} \sum_{i=1}^{k} \frac{z - y_i}{z}$$

Squared poverty gap (individual depth): α = 2:

$$P_2 = \frac{1}{N} \sum_{i=1}^{k} \left(\frac{z - y_i}{z} \right)^{2}$$

Where;
- **yi:** *income/expenditure of individual i (adult equivalents) –*
- **z:** *poverty line –*
- **N:** *total population –*
- **k:** *number of poor people –*
- *among the poor.*

α: *parameter showing the degree of aversion to inequality*
The conditional term means that individual i's income must be below the chosen poverty line.

A **poverty measure** is a function of individual incomes **x** = (x , ..., xn) and the poverty line z: P: Rn -> R+

3. Measurement of unidimensional poverty: Measures of Poverty

Incidence of Poverty: **Head Count Index**

HCI = (# poor) / (population)
- Measures the "**incidence**" of poverty
  i.e. it tells us "How many poor"

$$HCR = \frac{q}{n}$$

Where
- q refers to the number of individual below a given poverty line
- n refers to the total number of individuals in country.

$$P_{0i} = p_0(w_i) = \begin{cases} 1 & \text{if} \quad w_i < z \\ 0 & \text{if} \quad w_i \geq z \end{cases}$$

$$HC = \frac{1}{N} \sum_{i=1}^{N} p_0(w_i)$$

Where
- z is the poverty line, w_i is the per adult equivalent consumption expenditure of the individual i, and N is the total population

For example, Amhara's poverty line 2010 is 3840 Birr per year. There are 5.1 million individuals live below the poverty line. And our population is about 22 million people. Amhara's HCR = 23.18%
So, headcount here would show us that 23.18% of total population is in poverty

3. Measurement of unidimensional poverty: Measures of Poverty

- Incidence of Poverty: **Head Count Index**

  Example: Assume a poverty weekly line of Birr 150

Expenditure for each individual in country				Headcount Poverty Rate (P_0)
Expenditure in Country A	100	100	150	150	50%
Expenditure in Country B	124	124	150	150	50%

- There is greater poverty in country A but the headcount index does not capture this.

3. Measurement of unidimensional poverty: Measures of Poverty

Incidence of Poverty: **Head Count Index**

- The headcount index does not capture the intensity of poverty, for example, if a poor household were to give to a very poor household, headcount index would remain unchanged even though overall poverty would have lessened

- The index does not indicate how poor the poor really are, and hence does not change if people below the poverty line become poorer.
- H will not change when a poor persons welfare changes if he/she remains below the poverty line

- Daily Income of 4 individuals in a sample: 1,2,3,4
- Daily Poverty Line Z = 3.0
- H = q/n =3/4 = 0.75 or 75%
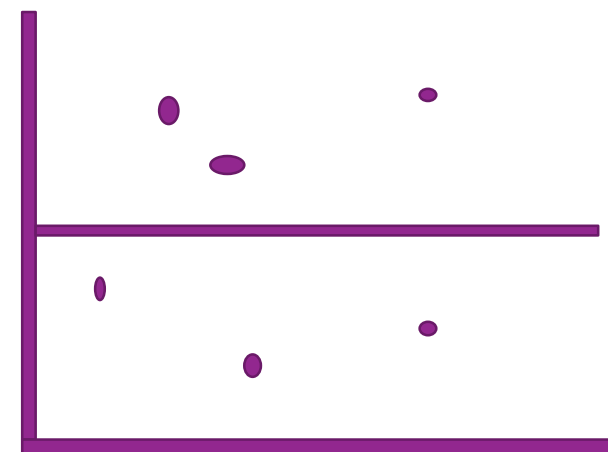
3. Measurement of unidimensional poverty: Measures of Poverty

Incidence of Poverty: **Head Count Index**

- As a welfare function, the headcount index violates the transfer principle – an idea first formulated by Dalton (1920) that states that transfers from a richer to a poorer person should improve the measure of welfare. Here, if a somewhat poor household were to give to a very poor household, the headcount index would be unchanged, even though it is reasonable to suppose that poverty overall has lessened.

- The headcount index implies that there is a 'jump' in welfare, at about the poverty line, In practice, such a jump is not found.

- The headcount index is very simple to construct and easy to understand.

- However, it does not indicate how poor the poor are, and hence does not change if people below the poverty line become poorer.
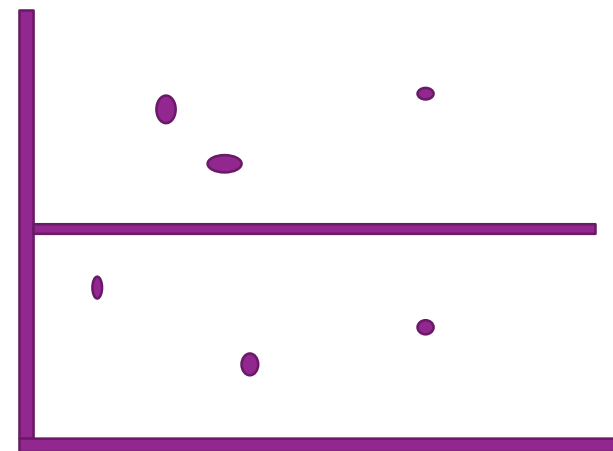
3. Measurement of unidimensional poverty: Measures of Poverty

Poverty Gap Index

- This index measures the extent to which households fall below the poverty line (the poverty gaps) as a proportion of the poverty line.

- **This measure reflects the average distances of the poor below the poverty line so it gives a better idea of the depth of poverty.**

- The sum of these poverty gaps gives the minimum cost of eliminating poverty, if transfers were perfectly targeted

- Is the mean shortfall of the total population from the poverty line expressed as a percentage of the poverty line. This measure reflects the depth of poverty as well as its incidence.

- The indicator is often described as measuring the per capita amount of resources needed to eliminate poverty, or reduce the poor's shortfall from the poverty line to zero, through perfectly targeted cash transfers.

- This measure is also thought of as the cost of eliminating poverty (relative to the poverty line), since it shows how much would have to be transferred to the poor to bring their incomes (or expenditure) up to the poverty line).

- The minimum cost of eliminating poverty using targeted transfers is simply the sum of all the poverty gaps in a population: every gap is filled up to the poverty line. Measures the **depth of poverty**

PG = (# Poor) * (Y shortfall)

PG = $\square$(Z-Y$_i$) /N

$$P_1 = \frac{1}{N} \sum_{i=1}^{k} \frac{z - y_i}{z}$$

Where:
- The poverty gap (z - yi) is the difference between the poverty line (z) and income or consumption for those who are poor

- **It tells us the total Y shortfall of the poor; i.e. the absolute amount that would be needed to raise all the poor up to the poverty line.**

3. Measurement of unidimensional poverty: Measures of Poverty

Poverty Gap Index

Example of Poverty Gap Calculation

- Daily Income of 4 individuals in a sample: 1,2,3,4

- Daily Poverty line = Z = 3; n=4

$$PG = [(3-1)/3 + (3-2)/3]/4$$

$$= [(2/3) + (1/3)]/4$$

$$= [(3/3)/4]$$

$$= \frac{1}{4} \text{ or } 0.25$$

Interpretation 1:
"On average, the poor have an expenditure shortfall of 25 percent of the poverty line"

Example: Calculating the Poverty Gap Index
Assume Z = $125

Expenditure in country	100	110	150	160	
Poverty Gap	25	15	0	0	
G_i /Z	0.20	0.12	0	0	0.08(=0.32/4)

Interpretation 2:
The **per capita cost of eliminating daily poverty** is equal to PG $_x$ z. In our example: 0.75 Birr(= 0.25 $_x$ 3).

- The index does not reflect changes in inequality among the poor.

3. Measurement of unidimensional poverty: Measures of Poverty

Poverty Gap Index (PG)

- The Poverty Gap Index expresses the total amount of money which would be needed to raise the poor from their present incomes (c) to the poverty line (z), as a proportion of the poverty line, and averaged over the total population, which measures the **depth of poverty**

- The **aggregate poverty gap** shows the cost of eliminating poverty by making perfectly targeted transfers to the poor. This total cost can be related to GDP

- The measure is the mean proportionate poverty gap index in the population, where nonpoor have zero poverty gap

- **Drawbacks**

- 1)difficult to interpret

3. Measurement of unidimensional poverty: Measures of Poverty

Poverty Gap Index

- **Drawbacks**: Poverty gap index does not capture differences in severity of poverty. Why?

Region A = (1,2,2,4)

Region B = (2,2,2,4)

Poverty line = Z = 3

$H_A = 0.75$ $H_B = 0.75$

$PG_A = 0.25$ $PG_B = 0.25$

Poverty gap will be unaffected by an income transfer from a poor person to another poor person who remains below the poverty line

Poverty Gap Index (PG)

So if the majority of 'n' poor individuals are along way short of the poverty line (z) then   would be large and the number of people with a large depth of poverty is high.

Example 1

i=90,25,30,5,45,70,20,20,15,15,10,10

Let z=100

=1/12(0.1+0.75+0.7+0.95+0.55+0.3+0.8+0.8+0.85+0.85+0.9+0.9),

So:Poverty Gap Index = 8.45/12=0.704

Example 2

When
i=90,90,95,90,90,96,85,70,50,60,90,30

Let z=100

=1/12(0.1+0.1+0.05+0.1+0.1+0.04+0.15+0.3+0.5+0.4+0.1+0.3),

So, Poverty Gap Index = 2.24/12=0.187

- So the PG index does not merely count how may people are poor (since in both examples 12 people are below the ad hoc poverty line) but reveals the depth of poverty……those in example 1 suffer greater poverty depth than those in example 2.

3. Measurement of unidimensional poverty: Measures of Poverty
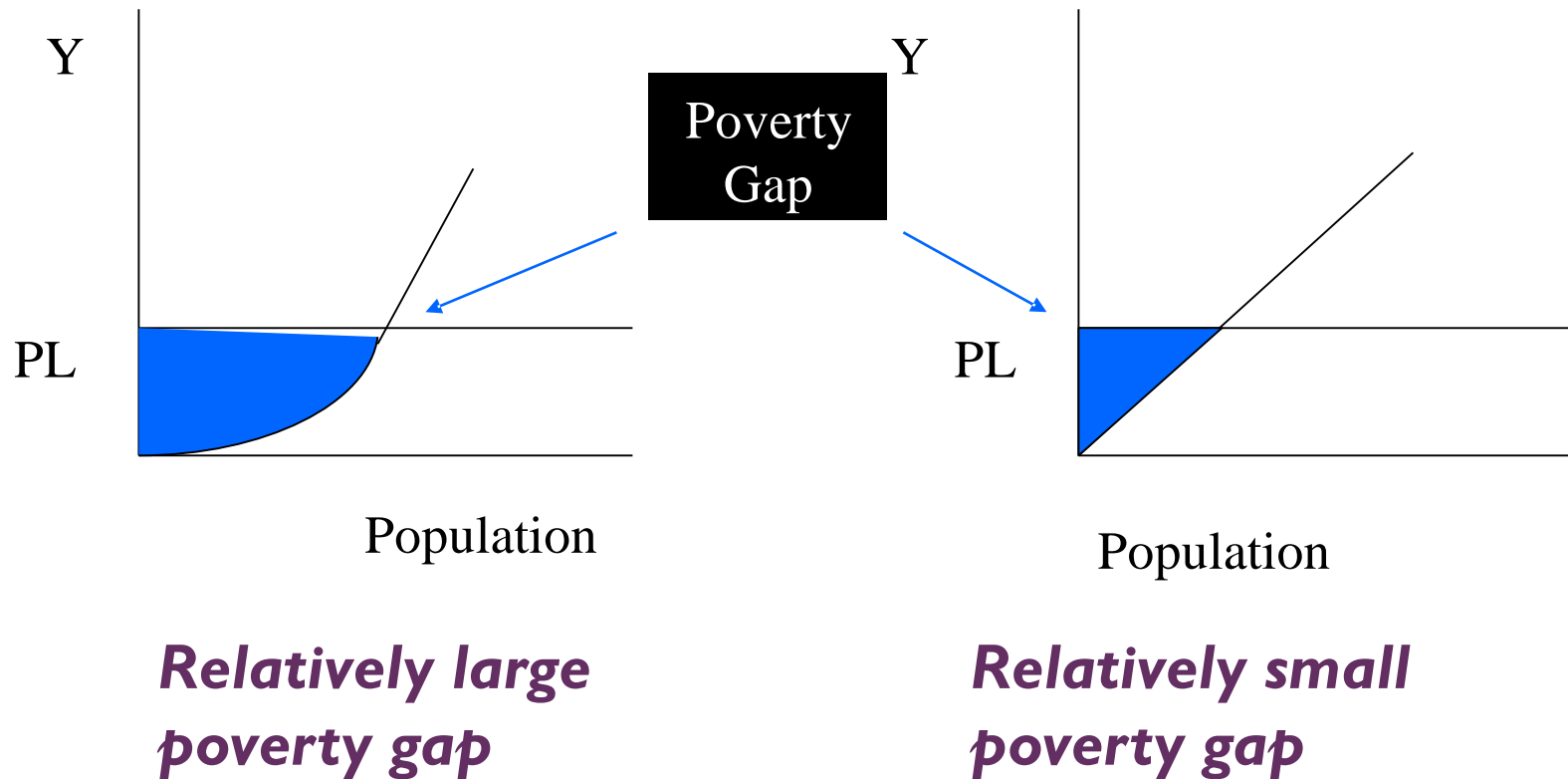
Poverty Gap Index (PG)

Relatively large poverty gap

Relatively small poverty gap

3. Measurement of unidimensional poverty: Measures of Poverty

Squared Poverty Gap Index (SPG): *(Foster-Greere Thorbecke)*

- The **squared poverty gap** measures the severity of poverty as the poorest households are given a greater weight in the equation
- Measures the "**severity**" of poverty
- Squares the difference between the poverty line and each household's income
  - Provides much greater weight to the poorest of the poor because the farther the HH from the poverty line, the greater the weight it is given
- Poverty severity: measure of <u>both</u> the size of the poverty gap and income disparity among the poor

$$P_2 = \frac{1}{N} \sum_{i=1}^{k} \left(\frac{z - y_i}{z} \right)^2$$

3. Measurement of unidimensional poverty: Measures of Poverty

Squared Poverty Gap Index (SPG)

Region A = (1,2,2,4) Region B = (2,2,2,4)

Poverty line = Z = 3

H_A = 0.75 H_B = 0.75

PG_A = 0.25 PG_B = 0.25

Eg: Region A = (1,2,2,4) SPG_A = 0.14

Region B = (2,2,2,4) with Z=3

SPG_B = 0.08

Poverty in region A (sever)> Poverty in region B

Example: Calculating Squared Poverty Gap Index

Assume Z = $125

Expenditure in the country	100	110	150	160	
Poverty Gap	25	15	0	0	
G/Z	0.20	0.12	0	0	
$(G/Z)^2$	0.04	0.0144	0	0	0.0136(= 0.0544/4)

3. Measurement of unidimensional poverty: Measures of Poverty

The Sen's Poverty Index

- Sen (1976) proposed an index that sought to combine the effects of the number of poor, the depth of their poverty, and the distribution of poverty within the group.

- The index is given by: $P_s = P_0(1-(1-G^P)\dfrac{\mu^P}{z})$,

- The Sen Index can also be written as the average of the headcount and poverty gap measures weighted by the Gini coefficient of the poor, giving:

$$P_s = P_0 G^P + P_1(1-G^P)$$

$$P_{SEN} = H \times G_z + PG \times (1-G_z)$$

P_{SEN} is a weighted average of H and PG

Where: P_0 = headcount index

μ^P = mean income (or exp) of the poor

G^P = Gini coefficient of inequality among the poor.

- The Gini coefficient ranges from 0 (perfect equality) to 1 (perfect inequality), and is discussed further below in the context of measuring inequality

- G is Gini coefficient; H is head count, and PG is poverty Gap

3. Measurement of unidimensional poverty: Measures of Poverty

The Sen's Poverty Index

Advantages

- Derived from a set of **axioms**

- **sensitive** to distribution among the poor (as PG2)

Drawbacks

- Because Sen's measure depends on the Gini coefficient, it shares its main **inconvenience**:

- The Gini-and thus the Sen index **cannot be used to decompose poverty** into contributions from different subgroups

- The Sen index has the virtue of taking the income distribution among the poor into account. However the index is almost never used outside of the academic literature, perhaps because it lacks the intuitive appeal of some of the simpler measures of poverty, but also because it "cannot be used to decompose poverty into contributions from different subgroups".

3. Measurement of unidimensional poverty: Measures of Poverty

The Watts Index

- An Increasingly Popular Poverty Measure

- The only poverty measure that satisfies all four axioms described above is the **Watts index:**

$$W = \frac{1}{N} \sum_{i=1}^{q} [\ln(z) - \ln(y_i)]$$

- Where the N individuals in the population are indexed in ascending order of income (or expenditure), and the sum is taken over the q individuals whose income (or expenditure) yi falls below the poverty line z.

The Watts index is **distributionally-sensitive**, by virtue of its use of logarithms (transferring 1Birr to a poor person counts as a larger contribution than transferring to a richer person).

3. Measurement of unidimensional poverty: Measures of Poverty

The Watts Index

- *Example:* How is the Watts index calculated? Consider the four-person income vector x = ($800, $1,000, $50,000, $70,000), with the poverty line set at z =$1,100

- The censored vector is x^* =($800, $1,000, $1,100, $1,100). The logarithm of the poverty line is lnz =ln1,100 =7

- Use the method in equation (above) to calculate the Watts index. The logarithmic differences between the poverty line and the censored incomes are (7 - ln800, 7-ln1,000,0,0) = 1/4(0.3, 0.1, 0, 0), the mean of which is 0.103. Thus, $P_W^{(x;z)}$ = 0.1

3. Measurement of unidimensional poverty: Measures of Poverty

Time taken to exit

- It may be useful to show how long it would take for the average poor person to exit poverty at different potential economic growth rates when thinking about poverty reduction strategies

- For the j th person below the poverty line, the expected time to exit poverty, i.e. to reach the poverty line, if consumption grows at a positive rate **g** per year is:

  z = poverty line

  x_j = consumption of the poor

  g=consumption growth rate

$$t_g^j \approx \frac{\ln(z) - \ln(x_j)}{g}.$$

3. Measurement of unidimensional poverty: Measures of Poverty

Poverty profile

- A poverty profile sets out the major dimensions of poverty

- Used to expose participants to what a poverty profile is and why it is useful, particularly in mapping the various dimensions of poverty

- It shows how the pattern of poverty varies by demographic characteristics and geographical location of individuals or households

- Thus, a poverty profile is useful for comprehensive poverty comparison across sub- groups of a country

3. Measurement of unidimensional poverty: Measures of Poverty

Poverty profile: Objectives

- Analysing the relationship between poverty rates and household's or individual's characteristics
  - Demographic and composition of the household
  - Situation in the labour market
  - Housing conditions and access to basic services
  - Developing a picture of who are the most exposed to poverty
    - Comparison of poverty rates and poverty gaps between different groups of the population

Key Questions to Guide in Preparing a Poverty Profile.

1. Does poverty vary widely between different areas in the country?
2. Are the most populated area also the areas where most of the poor live?
3. How is income poverty correlated with gender, age, urban and rural, racial or ethnic characteristics?
4. What are the main sources of income for the poor?
5. On what sectors do the poor depend for their livelihoods?

3. Measurement of unidimensional poverty: Measures of Poverty

Poverty profile: Key Questions to Guide in Preparing a Poverty Profile

6. -What products or services-tradables and nontradables-do the poor sell? A tradable good is one that is, or easily might be, imported or exported. The prices of such goods are influenced by changes in the world price and the exchange rate.
7. -To what extent are the rural poor engaged in agriculture? In off-farm employment?
8. -How large a factor is unemployment? Underemployment?
9. -What are the important goods in the consumption basket of the poor? How large are the shares of tradables and nontradable?
10. -How is income poverty linked to malnutrition or educational outcomes?
11. -What are the fertility characteristics of the poor?
12. -To what public services do the poor have access? What is the quality of these services?

How important are private costs of education and health for the poor?

1. -Can the poor access formal or informal credit market?
2. -What assets-land, housing, and financial-do the poor own? Do properly rights over such assets exist?
3. -How secure is their access to, and tenure over, natural resources?

3. Measurement of unidimensional poverty: Measures of Poverty

Identifying the determinants of poverty

Objective: To enable identify main causes of poverty and understand how regression technique could be used to identify the immediate main causes of poverty, for purposes of identifying necessary policy interventions

Causes of Poverty

- The main causes of poverty may be classified by certain characteristics;

- Household and individual characteristics, the most important of these are;

- Demographic characteristics, such as household size, age structure, gender of head, dependency ratio

- Economic, such as employment status, occupation, hours worked, property owned

- Social, such as health and nutritional status, shelter, education of head

- Regional level characteristics, which include availability of infrastructure, proximity to markets, quality of governance, property rights and their enforcement, and vulnerability to weather conditions

3. Measurement of unidimensional poverty: Measures of Poverty

Analyzing the Determinants of Poverty

- The most widely used technique to identify the contribution of different variables or indicators to poverty is regression analysis

- There are two main types of analysis;

- (i) Attempts to explain the level of expenditure per capita (an indicator for living standard or welfare) as a function of a variety of variables or indicators, typically those discussed above.

- (ii) Attempts to explain whether the household is poor, using a probit or logit regression. In this case, the independent variables are any type, but the dependent variable is binary, taking the value of 1 if the household or individual is poor and zero otherwise.

- A regression estimate shows how closely each independent variable is related to the dependent variable, holding all other influences constant.

- A typical multiple regression equation as applied in poverty analysis is

$$\text{Log}(\underline{Y}_i) = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \beta_3 X_{i3} + \dots + \beta_n X_{in}$$

- Where y_i is per capita expenditure or income, X_i are respective explanatory variables, and β_j are the coefficients to be estimated.

- Level of significance: As a rule of thumb, t-statistic of less than 2, p-value of 0.05 and above, suggests that estimated coefficient is not statistically significant from zero.

3. Measurement of unidimensional poverty: Measures of Poverty

Poverty Mapping

- Governments are often interested in more detailed poverty rates for relatively small geographical units.

- Often in a given region there are typically wide divergence in standards of living

- Detailed poverty maps cannot be generated from household survey data alone.

- If one tries to use survey data to measure poverty in each district or region, such estimates would be based on just a few observations, and would as such be imprecise.

- One solution is to use population census data.

- Census data are more available for all households and can provide reliable estimates at highly disaggregated levels, such as small municipalities, towns and villages.

- Census do not contain the income or consumption information necessary to yield reliable indicators of welfare or standard of living, such as poverty and inequality measures.

4. Problems in the measurement of monetary poverty

The money-metric approach to poverty measurement has several drawbacks....

- The main drawback is that, this approach presupposes that a market exists for all attributes and that prices reflect the utility weights all households within a specific setting assign to these attributes. However, some attributes (public goods) cannot be purchased because markets donot exist and even where markets exist, they are imperfect.

- However, some attributes (public goods) cannot be purchased because markets do not exist and even where markets exist, they are imperfect.

- As Ravallion admits, consumption theory is not the only framework for the measurement of poverty.

- Likewise there is no reason why prices are the best (or only) weights conceivable.

- Income as the sole indicator of wellbeing is therefore limited as it typically does not incorporate and reflect key dimensions of poverty related to quality of life

- Another drawback is that there is no guarantee that households with incomes at or even above the poverty line would actually allocate their incomes so as to purchase the minimum basic needs bundle and therefore households may be non-poor with respect to income but with some members deprived of some basic needs

4. Problems in the measurement of monetary poverty

The money-metric approach to poverty measurement has several drawbacks….

- Another problem (may be the most important one) is that monetary poverty does not understand poverty as *capability deprivation*

  - According to Sen (1985), poverty should be seen in relation to lack of basic needs or basic capabilities.

    - This means that poverty is a multidimensional phenomenon and should therefore be measured by considering multiple indicators of wellbeing

    - If we understand poverty as capability deprivation we may want MD poverty measures that identify people's deprivations in specific dimensions of wellbeing

4. Problems in the measurement of monetary poverty

The money-metric approach to poverty measurement has several drawbacks….

- Poverty lines are static, capturing a position of poverty at a certain point in time. However, it is highly likely that poverty is dynamic in nature with people moving in and out of poverty

- Poverty lines may differ if different calories are used by different studies: so far most 'lines' used 2122. Recently 2400 or above are also being suggested

- There are current problems with the way it is measured today for global comparisons (e.g. comparability of consumption baskets, determination of "dollar a day" lines)- not really possible

  WE THEN REQUIRE A MULTIDIMENSIONAL POVERTY MEASURES

Why multidimensional poverty measures?

- Because poverty is a multidimensional phenomenon!

4. Problems in the measurement of monetary poverty

Why the new emphasis on measurement or on MD?

1) More and better data becoming available

2) More Measures being developed

3) 2010 HDR measures sparked interest and debate

4) Technical resources do not reflect Human Development measures

5) Political space is opening; demand increasing

6) Income poverty: important but incomplete

- Income poverty certainly provides very useful information. Yet poor people themselves define their poverty much more broadly to include lack of education, health, housing, empowerment, employment, personal security and more.

- No one indicator, such as income, is uniquely able to capture the multiple aspects that contribute to poverty –

- For this reason, since 1997, *Human Development Reports* (*HDRs*) have measured poverty in ways different than traditional income-based measures. The Human Poverty Index (HPI) was the first such measure, which was replaced by the Multidimensional Poverty Index (MPI) in 2010

5. Introduction to multidimensional poverty measures

Multi-Dimensional Nature of Poverty…….

- Poverty is multi-dimensional, irreducible to any one particular dimension- for eg. Income, education, health or social exclusion

- Thus it should be measured multi-dimensionally, involving both income and non-income dimensions of well-being

- Based on Amartya Sen's capabilities approach to human development, multidimensional poverty analysis attempts to extend the measurement of poverty to the functioning and capabilities space from the income and expenditure space.

- Multidimensional poverty measures are needed, not necessarily to replace but to amend traditional income poverty measures (e.g. Rawls 1971, Sen 1985 & 1992, Drèze and Sen 1989, UNDP 1997)

- There is government awareness that focus should be on poverty's many aspects not just *income poverty*

- The most ambitious effort to implement a multidimensional measure of poverty has been the Multidimensional Poverty Index (MPI) introduced in the 2010 Human Development Report (Alkire and Santos, 2010).

5. Introduction to multidimensional poverty measures

- Poverty is about more than income and many different dimensions contribute to the lived experience of poverty, including poor health, a lack of education and low living standards

- Based upon this understanding, Alkire and Foster developed a methodology that can incorporate several different dimensions of poverty or wellbeing

- In 2010 the Oxford Poverty and Human Development Initiative (OPHI) and UNDP collaborated to develop a multi-dimensional poverty index (MPI) along the lines of the Alkire Foster method

- This index is used in UNDP's annual Human Development Reports. The MPI is made up of three dimensions and ten indicators.

- The MPI evaluates poverty based on a household's deprivation in three basic dimensions – education, health and living standards

- Various indicators are used to measure each of the dimensions and they represent a mix of commodities and actual functionings.

5. Introduction to multidimensional poverty measures: Methodology

- Recently, UNDP and other various organizations are using the Multidimensional Poverty Index(MPI) Methodology originated from Professors, Sabina *Alkire* and James *Foster* (AF)
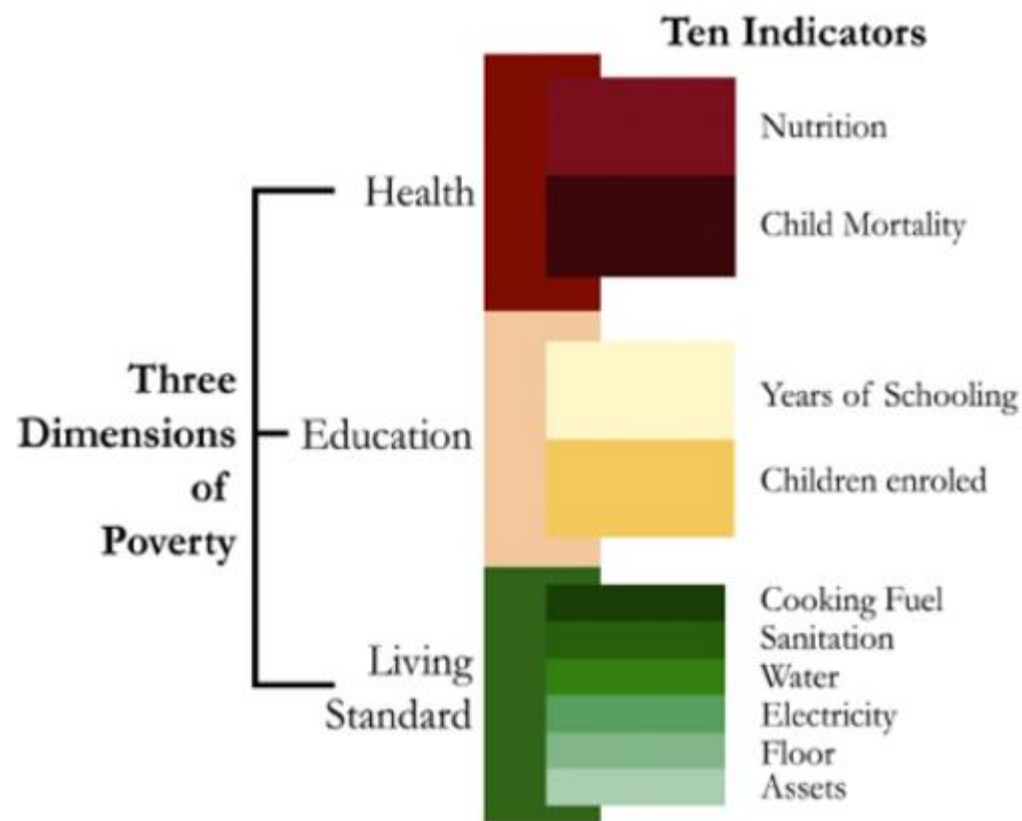

Sabina Alkire   *James Foster*

5. Introduction to multidimensional poverty measures: Methodology Components and computing the global MPI

- The MPI is composed of **three dimensions** made up of **ten indicators** (figure..).

- Associated with each indicator is **a minimum level of satisfaction**, which is based on international consensus (such as the Millennium Development Goals or MDGs)

Ten Indicators

Health
- Nutrition
- Child Mortality

Three Dimensions of Poverty

Education
- Years of Schooling
- Children enroled

Living Standard
- Cooking Fuel
- Sanitation
- Water
- Electricity
- Floor
- Assets

5. Introduction to multidimensional poverty measures: Methodology

Computing the global MPI

6 key steps followed

Step 1: Defining the data source

Step 2: Choosing the unit of analysis

Step 3: Choosing the dimensions and indicators

Step 4: Choosing the indicators' deprivation cut-offs with indicators' weights

Step 5: Choosing the poverty cut-off (to identify the poor)

Step 6: Computing the MPI (aggregation)

- The multidimensional headcount (H)
- Intensity (or breadth) of poverty (A)

5. Introduction to multidimensional poverty measures: Methodology

Computing the global MPI

Step 1: Defining the data source

- Information came from the household survey mostly

Step 2: Choosing the unit of analysis

- The global MPI identifies an individual as deprived based on household achievements so that the unit of analysis is the household
  - Thus we consider households as a unit of analysis

Step 3: Choosing the dimensions and indicators

The dimensions

- **Education** (2 indicators)
- **Health** (2 indicators)
- **Standard of Living** (6 indicators)

5. Introduction to multidimensional poverty measures: Methodology

Computing the global MPI

Step 4: Choosing the indicators' deprivation cut-offs with indicators' weights

- **Education** (two- each weighted equally at 1/6)

  - **Years of Schooling:** deprived if no household member has completed five years of schooling

  - **Child Enrolment:** deprived if any school-aged child is not attending school in years 1 to 8

- **Health** (Two-each weighted equally at 1/6)

  - **Child Mortality**: deprived if any child has died in the family

  - **Nutrition:** deprived if any adult or child for whom there is nutritional information about the HH is malnourished

5. Introduction to multidimensional poverty measures: Methodology

Computing the global MPI

Standard of Living: (Each weighted equally at 1/18)

- **Electricity**: deprived if the household has no electricity

- **Drinking water**: deprived if the household does not have access to clean drinking water or clean water is more than 30 minutes walk from home (MDG Definition)

- **Sanitation**: deprived if they do not have an improved toilet or if their toilet is shared (MDG Definition)

- **Flooring**: deprived if the household has dirt, sand or dung floor

- **Cooking Fuel**: deprived if they cook with wood, charcoal or dung

- **Assets**: deprived if the household does not own more than one of: radio, TV, telephone, bike, or motorbike

5. Introduction to multidimensional poverty measures: Methodology

Computing the global MPI

Indicators, deprivation cut-offs with indicators' weights summary

1	2	3	4	5	6	7	8	9	10
Years of schooling	School attendance	Nutrition	Child mortality	Cooking fuel	Sanitation	Water	Electricity	Floor	Asset ownership
1/6	1/6	1/6	1/6	1/18	1/18	1/18	1/18	1/18	1/18
EDUCATION		HEALTH		STANDARD OF LIVING					
1/3		1/3		1/3					

5. Introduction to multidimensional poverty measures: Methodology

Computing the global MPI

Indicators of the MPI by Dimensions and their Respective Weights

DIMENSION	INDICATORS	HOUSEHOLD IS DEPRIVED IF -	WEIGHTS
Education[1/3]	Years of Schooling	No one has completed five years of education	16.7%
	Child School Attendance	At least one school-age child not enrolled in school in years 1 – 8	16.7%
Health[1/3]	Nutrition	At least one member is malnourished	16.7%
	Mortality	One or more children of age under 5 have died in the last 5 years10	16.7%
Standard of Living[1/3]	Electricity	No electricity	5.6%
	Water	No access to clean drinking water	5.6%
	Sanitation	No access to adequate sanitation	5.6%
	Floor	House has dirt, sand or dung floor	5.6%
	Cooking Fuel	Household uses 'dirty' cooking fuel (dung, firewood or charcoal)	5.6%
	Assets	Household had no car and owns at most one of: bicycle, Motorcycle, radio, refrigerator, telephone or television	5.6%

5. Introduction to multidimensional poverty measures: Methodology

Computing the global MPI

Step 5: Choosing the poverty cut-off (to identify the poor)

- Next, each person is assigned a deprivation score according to his or her deprivations in the component indicators (the deprivation score for each person lies between 0 and 1)
- The score increases as the number of deprivations of the person increases and reaches its maximum of 1 when the person is deprived in all component indicators. A person, who is not deprived in any indicator, receives a score equal to 0
- Formally:

$$C_i = w_1 I_1 + w_2 I_2 + \ldots\ldots + w_d I_d$$

- Where $I=1$ if the person is deprived in indicator i and $I=0$ otherwise, and w_i is the weight attached to indicator i with sum of the weights equivalent to one

Indicators	Weight	Sample			
		1	2	3	4
Household size		4	7	5	4
HEALTH					
At least one member malnourished	1.67	0	0	1	0
One or more children have died	1.67	1	1	0	1
EDUCATION					
No one has completed five years of schooling	1.67	0	1	0	1
At least one school-age child not enrolled	1.67	0	1	0	0
LIVING CONDITIONS					
No electricity	0.56	0	1	1	1
No access to clean drinking water	0.56	0	0	1	0
No access to adequate sanitation	0.56	0	1	1	0
House has dirt floor	0.56	0	0	0	0
Household uses "dirty" cooking fuel	0.56	1	1	1	1
Household has no car and owns at most one of: bicycle, motorcycle, radio, refrigerator, telephone or television	0.56	0	1	0	1
RESULTS					
Weighted count of deprivation, c		2.22	7.22	3.89	5.00
Is the household poor? c>3		NO	YES	YES	YES

5. Introduction to multidimensional poverty measures: Methodology

Computing the global MPI

Identify the poor: Which Household is poor ??

- With any combination of the indicators any one will be multi-dimensionally poor if, and only if

WEIGHTED SCORE	DECISION
>.50	**Severely poor**
0.33 - 0.50	Moderately poor
>= 0.33	**MP POOR**
0.2 - 0.33	Vulnerable to or at risk of becoming multidimensionaly poor
< 0.2	None-vulnerable to poverty

5. Introduction to multidimensional poverty measures: Methodology

Computing the global MPI

MP Poverty lines used

- A household is then considered MP-poor if its deprivation score is greater than a critical threshold (0.33)

- The MPI statistics reported in the annual HDR are based on a threshold of one third (0.33)
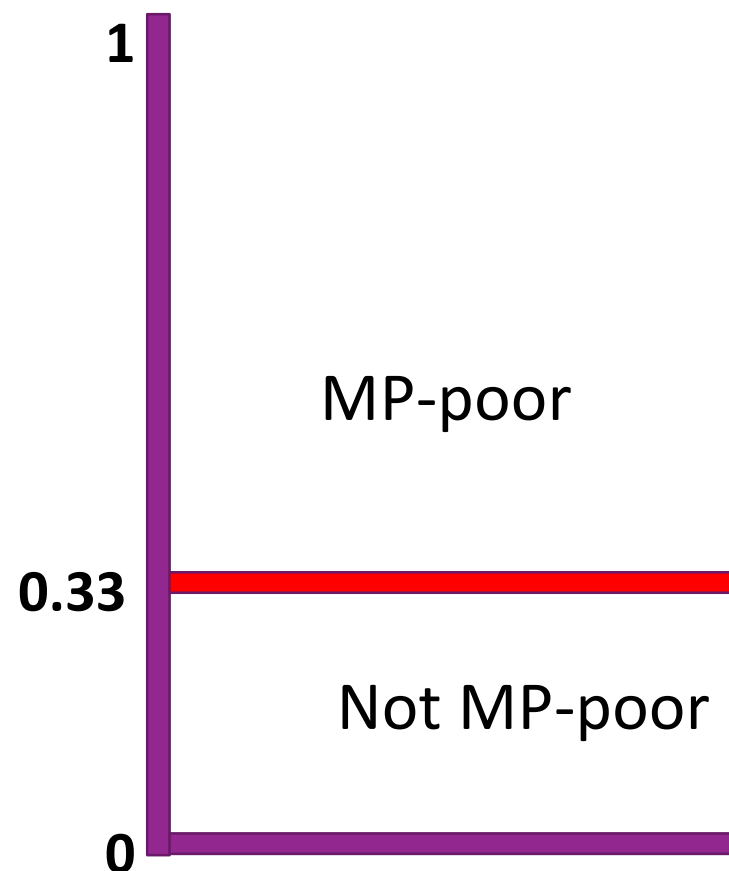
1

MP-poor

0.33

Not MP-poor

0

5. Introduction to multidimensional poverty measures: Methodology

Computing the global MPI

Step 6: Computing the MPI (aggregation)

- *Incidence* ~ the percentage of people who are poor, or the headcount ratio *H*.

- *The multidimensional headcount (H):* Formally, the first component is called the multidimensional headcount ratio:

$$H = \frac{q}{n}$$

q is the number of people who are multidimensionally poor and *n* is total population

5. Introduction to multidimensional poverty measures: Methodology

Components global MPI

Intensity (or breadth) of poverty (A): It is the average deprivation score of the multidimensionally poor people [the average percentage of dimensions in which poor people are deprived] and can be expressed as

$$A = \frac{\sum_{i=1}^{q} c_i(k)}{q}$$

Where $c_i(k)$ is the censored deprivation score of individual i and q is the number of people who are multidimensionally poor

Where, deprivation scores are added only for the one who are poor and the score derived in the numerator is divided by the total number of household poor

Censored : *For those whose deprivation score is below the poverty cut-off, even if it is non-zero, this is replaced by a0, what we call censoring in poverty measurement. To differentiate between the original deprivation score from the censored one, we use the censored deprivation score notation $c_i(k)$*

The MPI is the product of multidimensional headcount (H) and intensity (A):

MPI = *H* × *A*

Example using hypothetical data

Indicators	Weight	Sample			
		1	2	3	4
Household size		4	7	5	4
HEALTH					
At least one member malnourished(1/6)	0.167	0	0	1	0
One or more children have died(1/6)	0.167	1	1	0	1
	0.167				
EDUCATION					
No one has completed five years of schooling(1/6)	0.167	0	1	0	1
At least one school-age child not enrolled(1/6)	0.167	0	1	0	0
LIVING CONDITIONS					
No electricity(1/18)	0.056	0	1	1	1
No access to clean drinking water(1/18)	0.056	0	0	1	0
No access to adequate sanitation(1/18)	0.056	0	1	1	0
House has dirt floor(1/18)	0.056	0	0	0	0
Household uses "dirty" cooking fuel (1/18)	0.056	1	1	1	1
Household has no car and owns at most one of: bicycle, motorcycle, radio, refrigerator, telephone or television (1/18)	0.056	0	1	0	1
RESULTS					
Weighted count of deprivation, c		0.222	0.722	0.389	0.500
Is the household poor? c>3		NO	YES	YES	YES

5. Introduction to multidimensional poverty measures: Methodology

Computing the global MPI: Example

- Weighted count of deprivation in household 1: [(1*1/6)+(1*1/18)=2.22

- Weighted count of deprivation in household 2: (1.67+1.67+1.67+0.56+0.56+0.56+0.56)=7.22

Headcount ratio= $H = \dfrac{7+5+4}{4+7+5+4} = 0.80$

$$H = \frac{q}{n}$$

- 80 percent of people live in poor households

Intensity of poverty= $A = \dfrac{(0.722*7+0.389*5+0.500*4)}{(7+5+4)} = 0.56$

$$A = \frac{\sum_{i=1}^{q} c_i(k)}{q}$$

- The average poor person is deprived in 56 percent of the weighted indicators

MPI= $H \times A$ = 0.45

5. Introduction to multidimensional poverty measures: Methodology

Interpretation MPI:

- The interpretation for the example is straightforward: in this society 80 per cent of people are MPI poor.

- According to the MPI, this means that they are in acute poverty.

- They are deprived at least either a) all the indicators of a single dimension or b) a combination across dimensions such as being in a household with a malnourished person, no clean water, a dirt floor and un-improved sanitation

- We also learn that—on average—the poor here are deprived in 56 per cent of the weighted indicators

5. Introduction to multidimensional poverty measures: Methodology

Interpretation MPI:

- The MPI represents the share of the population that is multidimensionally poor *adjusted* by the intensity of the deprivation suffered

- This adjustment is necessary because if we only look at H we merely know that 80 per cent of the population is poor. But are they all equally poor? Are they deprived in 100 per cent of all the considered deprivations? In this society, they are not.

- The average poor person is deprived in 56 per cent of the weighted indicators, so the intensity is 56 per cent. These are called "weighted" indicators, because to create the deprivation score c each deprivation is entered according to its relative weight

- The 80 per cent figure is "adjusted" by the intensity of poverty, and that is why the MPI is what Alkire and Foster (2007, 2011a) call the Adjusted Headcount Ratio. If there was a society with 80 per cent poor people, and all of them were deprived in **all** the indicators, then A would be 1, and thus the MPI would equal H

- Alternatively, if there was a society where 100 per cent of people were poor, then the MPI would be equal to A.

5. Introduction to multidimensional poverty measures: Methodology

Interpretation MPI:

- A different but related way of interpreting the MPI is to say that it reflects **the proportion of weighted deprivations that the poor experience in a society out of all the total potential deprivations that the society could experience**

- If everyone was deprived in all the considered indicators in a society the MPI would be 100 per cent.

- If, as in the example, the 80 per cent of people who are poor were deprived in all the considered indicators, the MPI would be 80 per cent.

- However, because they are on average deprived in 56 per cent of the weighted indicators, that society is deprived in 45 per cent of the total potential deprivations it could experience overall.

PART TWO
CONCEPTS AND MEASUREMENTS OF INCOME INEQUALITY

CHAPTER OUTLINE

In this chapter we will study

CONCEPTS AND MEASUREMENTS OF INCOME INEQUALITY

1. Definition of income inequality

2. Measuring income inequality

Why is there a renewed interest in inequality?

There is a renewed interest in inequality for a number of reasons……

- With more than a billion people living on less than one dollar per day, some evidence of increasing gaps in living conditions within and between countries and clear evidence of substantial declines in life expectancy or other health outcomes in some parts of the world, the related topics of inequality, poverty and well-being are core international issues.

- **First,** recent empirical work re-examines the link between inequality and growth. If at all, it tends to find a negative relationship, especially when looking at the impact of asset distribution and growth. They assert that the more equal the distribution of assets such as land, the higher growth rates tend to be.

- **Second,** with poverty reduction in many countries being slow at best, the scope for public policies to have a poverty-reducing impact through redistributive effects – from safety nets to social expenditures – needs to be examined.

- **Third,** several empirical studies also examine the impact of inequality – independent of the poverty level – on health outcomes, such as morbidity or mortality rates, or as a cause for violence

Why is there a renewed interest in inequality?

There is a renewed interest in inequality for a number of reasons……

Why inequality?

- If a single person holds all of a given resource, inequality is at a maximum. If all persons hold the same percentage of a resource, inequality is at a minimum.

- Inequality studies explore the levels of resource disparity and their practical and political implications…

- Economic efficiency?

- Welfare maximisation?

- Social justice
    - Rival theories of justifiable inequalities

1. Definition of income inequality

Equality of what?

- Process
- Outcomes
- Opportunities

Equality between whom?

- Individuals
- Genders, ethnic groups, other groups
- Generations
- Geographical areas
- Nations

1. Definition of income inequality

Types of inequality:

- **Economic inequality (income inequality):** refers to disparities in the distribution of economic assets and income. The term typically refers to inequality among individuals and groups within a society, but can also refer to inequality among nations.
- Economic inequality has existed in a wide range of societies and historical periods; its nature, cause and importance are open to broad debate.
  - A country's economic structure or system (for example, capitalism or socialism), ongoing or past wars, and differences in individuals' abilities to create wealth are all involved in the creation of economic inequality.
- **Social Inequality:** the unequal distribution of life chances within the population of a society.
  - Social inequality has existed since the dawn of civilization. Social scientists in the 20th century have examined inequality in the main dimensions of life, including income, race, gender, and, more recently, quality of life.

1. Definition of income inequality

What is inequality?

- Inequality means different things to different people and is and some times **broader concept than poverty** in that it is defined over the whole distribution, not only the censored distribution of individuals or households below a certain poverty line

Our primary interest is in economic inequality

- In this context, inequality measures the disparity between a percentage of population and the percentage of resources (such as income) received by that population.

- Income inequality refers to the extent to which income is distributed in an unevenly manner among the population

- The unequal distribution of household or individual income across the various participants in an economy.

- Income inequality is often presented as the percentage of income to a percentage of population.

1. Definition of income inequality

- Equality is at the core of the human development approach which intrinsically pursues the value of social justice

- Income inequality though represents one (very important) component of economic inequality defined by Ray (1998, p.p170) as:

  - "…the fundamental *disparity* that permits one individual certain *material* choices, while denying another individual those very same choices."

- What Ray is really saying is that those factors that determine material choices are of importance here such household wealth, income

- Inequalities refer to the uneven distribution of income across the population or individuals within society

- The gap between the rich is inevitably consequence of growth and development

- The high inequality raises a moral question about fairness and social justice

1. Definition of income inequality

What Is Inequality?

- Economic inequality is the fundamental disparity that permits an individual certain material choices, while denying another individuals those very same choices

- Inequality is a broader concept than poverty in that it is defined over the entire population, and does not only focus on the poor

- Inequality has been an ongoing concern for economists and scholars worldwide

- Inequality is a part of development economics

1. Definition of income inequality

Income inequality is the gap between rich and poor **i.e.** is the differences in the distribution of economic assets (wealth) and income within or between populations or individuals.

It is the state of an economy in which the shares of total income earned by the rich and poor are highly unequal

Economic inequality varies between societies, historical periods, economic structures and systems (for example, capitalism or socialism), ongoing and past wars, and between individuals' abilities to create wealth.

It can refer to cross sectional descriptions of the income or wealth at any particular period, and to the lifetime income and wealth over longer periods of time There are various numerical indices for measuring economic inequality.

INCOME INEQUALITY

According to the United Nations Human Development Report, the ratio of the income earned by the richest 10% to that of the poorest 10% of the population was 15.9 in the United States in 2007; that ratio was 4.5 in Japan, 9.4 in Canada, 17.7 in Singapore, and 40.6 in Brazil.

Economic policy makers can face a tradeoff between promoting equity and economic growth.
As income shares become more equal, the incentive for individuals to accumulate skills, work hard, and take risks might become smaller, thus shrinking the size of the economy.

2. Measuring income inequality

Why measure Inequality?

- Measuring changes in inequality helps determine the effectiveness of policies aimed at affecting inequality and generates the data necessary to use inequality as an explanatory variable in policy analysis.

- What inequalities are we interested in or concerned about – inequality of income, inequality of opportunity, inequality of wealth?

2. Measuring income inequality: Measuring of what?

Types of Asset income or....

- Shares
- Houses
- Bank deposits
- Land
- Building Society Accounts
- Currency holdings
- Buildings
- Machinery and Equipment
- Gold
- Etc.

- Income represents a FLOW
- Birr x per week, month, year, etc.
- Income can be in the form of:
  - Wages
  - Rents
  - Dividends
  - Interest
  - Pensions
  - Benefit payments
  - Income from self employment
  - Inheritance

2. Measuring income inequality

- Just as for measuring poverty, debates exist on how to measure income inequality

- Deciding on a standard measure is challenging because these measures are dependent on what society considers unequal

- Choosing a standard inequality measure is really a choice between alternative definitions of inequality rather than a choice between alternative measures of a single theoretical construct

- Relative measures of income inequality compare the income of one individual group with the income of another group.

  - These measures are most useful when analyzing the scope and distribution of income inequality.

2. Measuring income inequality

Some popular measures include:

- **Personal or size distribution of income**
    - Median Share of income
    - Range
    - The McLoone Index
    - Percentile, Quintiles and Deciles distributions
    - Lorenz Curve and the Gini Coefficient
    - Robin Hood Index
    - Atkinson Index
    - Theil's Entropy Measure
    - Coeficient of Variation
- **Functional distribution of income**

2. Measuring income inequality

Personal or size distribution of income (PSDIM)

- Personal or size distribution of income deals with the individual persons or households and the total income they receive

Functional or factor share distribution of income

- Functional or factor share distribution of income uses the share of total national income that each of the factors of production receives

  - Example: The theory of functional income distribution represents the percentage that labor receives as a whole and compares with the percentages of total income distributed in the form of rent, interest and profit

2. Measuring income inequality: PSDI Measures

Range

- The range is simply the difference between the highest and lowest observations (value): **The higher the range, the higher is the inequality**

Number of employees	Salary
2	$1,000,000
4	$200,000
6	$100,000
6	$60,000
8	$45,000
12	$24,000

In this example, the Range
= $1,000,000-$24,000
= 976,000

Cons
- Ignores all but two of the observations
- Does not weight observations
- Affected by inflation
- Skewed by outliers
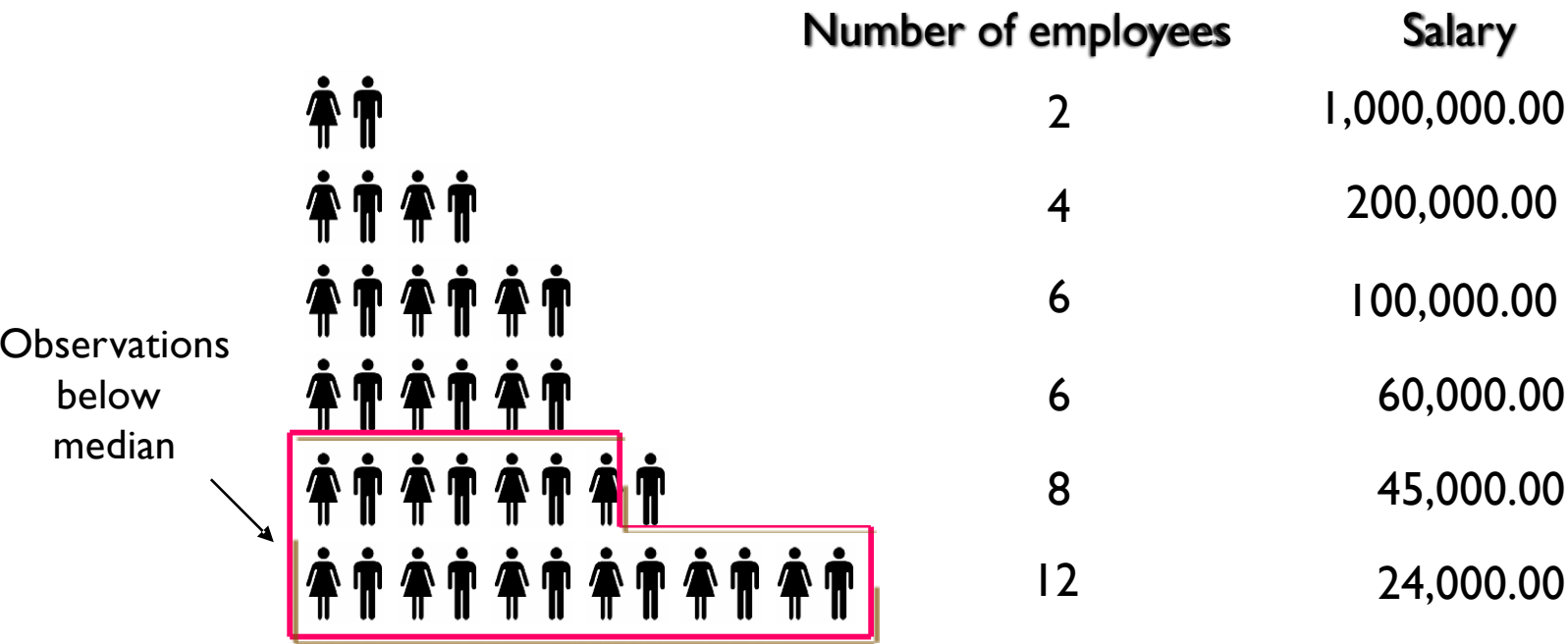
2. Measuring income inequality: PSDI Measures

Median Share of Income

- Median share of income refers to the proportion of income held by households whose incomes fall below the median household income. The measure is calculated as follows:

1. Determine median household income (e.g. $20,000).

2. Add together the incomes of the bottom half of all households in area being studied (e.g. $1,000,000).

3. Add together all household incomes in the area being studied ($5,000,000)

4. 4. Divide the total household income of the bottom half of households by the total household income of all households in that area ($1,000,000/$5,000,000).

- Therefore the median share of income is 20%. A proportion of 50% would mean no inequality.

- This measure is simple to calculate and uses readily available data. However, it is not sensitive to varying proportions of the income distribution within the upper or lower 50% of the distribution

2. Measuring income inequality: PSDI Measures

The McLoone Index

- The McLoone Index divides the summation of all observations below the median, by the median multiplied by the number of observations below median

	Number of employees	Salary
	2	1,000,000.00
	4	200,000.00
	6	100,000.00
	6	60,000.00
	8	45,000.00
	12	24,000.00

Observations below median

- In this example, the summation of observations below the median = 603,000, and the median = 45,000
- Thus, the McLoone Index = 603,000/(45,000(19)) = .7053

The higher index, the higher is the inequality

2. Measuring income inequality: PSDI Measures

Quintiles and Deciles(Using percentage share of income)

- We divide the population into 5 groups (Quintiles) or 10 groups (deciles), and consider about what percentage share of income that each group receives. Ideally, each group has to get income or benefit equally, but it does not like this due to uneven distribution which leads to inequality.

Income Category	Percentage share of income
(Q1)- **Lowest Quintile**-*Lowest*	20%
(Q2)- **Second Quintile**-*Low-mid*	20%
(Q3)- **Third Quintile**- *Middle*	20%
(Q4)- **Fourth Quintile**- *Mid-upper*	20%
(Q5)- **Highest Quintile**- *Upper*	20%

Income Category	Percentage share of income
Lowest deciles	10%
Second deciles	10%
Third deciles	10%
Fourth deciles	10%
Fifth deciles	10%
Sixth deciles	10%
Seven deciles	10%
Eight deciles	10%
Ninth deciles	10%
Highest deciles	10%

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2. Measuring income inequality: PSDI Measures

Income quintiles / quartiles /deciles

- "Quantiles" are a set of 'cut points' that divide a sample of data into groups containing (as far as possible) equal numbers of observations.

- Main steps

  - Divide population into 'groups' ranked from 'poorest' to 'richest' based on expenditure (or income)

    - Divide into 4 groups (25% of the population each): **quartiles**
    - Divide into 5 groups (20% of the population each): **quintiles**
    - Divide into 10 groups (10% of the population each): **deciles**

  - Sum for each group (equal proportion of the population) the total consumption (or income)

  - Calculate the share of the consumption expenditure for each specific group (quintile, quartile or decile) to the total consumption expenditure or income

- Usual indicators

  - Last quintile/decile - richest fifth/tenth of the population
  - First quintile/decile - poorest fifth/tenth of the population

2. Measuring income inequality: PSDI Measures

Indicator of distribution. Example of quintiles

- Income distribution: Share of **Poorest** Quintile

- Total income of the poorest quintile (20%), as a share of total income of the population

- Income distribution: Share of **Richest** Quintile

  - Total income of the richest quintile, as a share of total income of the population.

$$C_{(x)} = \dfrac{\displaystyle\sum_{i=1}^{m} y_i}{N \cdot \displaystyle\sum_{i=1} y_i}$$

Where **yi** is per capita income
- **N** is the total population
- **m** is the number of individuals in the lowest x %.

2. Measuring income inequality: PSDI Measures
Income per capita by Quintile

Region X and Y: Distribution of income(28 Days) by quintile and areas

Region X 2004/2005	Rural	Urban	Total	Region Y (2007)
Q1 - poorest	9.8	8.9	9.3	7.2
Q2	13.9	12.9	13.3	11.9
Q3	17.3	16.5	16.8	16.3
Q4	22	22	21.9	22.3
Q5 - richest	37	39.6	38.8	42.3
Total	100	100	100	100
Ratio Q5:Q1	3.8	4.4	4.2	5.9
Tshs (millions)	11316	9433	20750	

In **Region Y** the poorest 20 percent spent 7.2 percent of total income

In **Region X**, the richest 20% get on average nearly 40% of total income

The 20 percent richest get 42 percent of total income:This is **6 times more** than the poorest

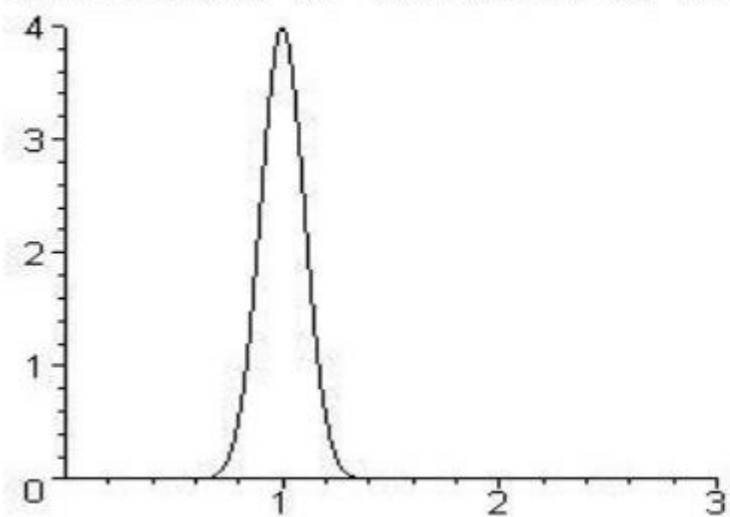# 2. Measuring income inequality: PSDI Measures

Coefficient of Variation (CV)

- The coefficient of variation (CV) is a simple statistical method of representing the inequality of an income distribution
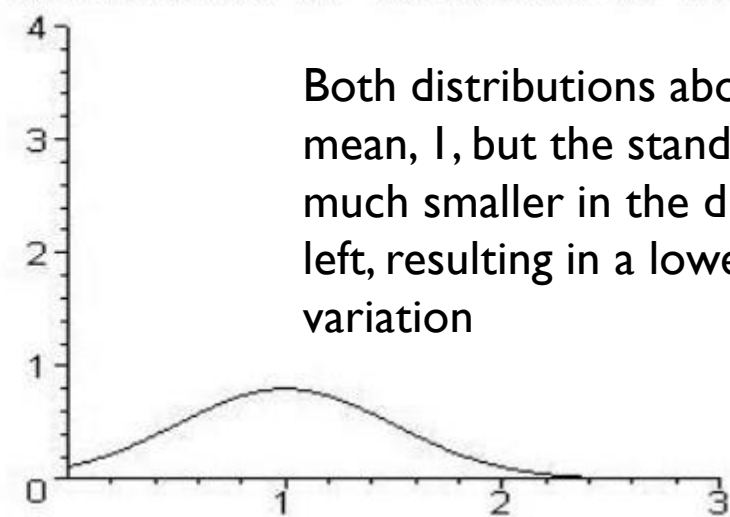
To calculate the Coefficient of Variation:

The higher index, the higher is the inequality

- Divide the standard deviation of an income distribution by the mean of the same distribution. Coefficients of Variation can be graphed as follows

Coefficient of Variation of 0.1

Coefficient of Variation of 0.5

Both distributions above have the same mean, 1, but the standard deviation is much smaller in the distribution on the left, resulting in a lower coefficient of variation

2. Measuring income inequality: PSDI Measures

- More <u>equal income distributions</u> will yield <u>smaller CV values</u> due to smaller standard deviations

  - For example, the graph on the left yields a smaller CV value because the standard deviation of the income distribution is smaller

- The coefficient of variation is simple to calculate but requires comprehensive individual data

  - Also, the mean and standard deviation used to calculate this measure are influenced by outliers such as high or low income values

  - Therefore, if income is not normally distributed, this measure would not be appropriate

  - No standard for an acceptable level of inequality, and it is not commonly used.

2. Measuring income inequality: PSDI Measures

Lorenz Curve and Gini Coefficient

The Lorenz Curve

> **Max Otto Lorenz** (September 19, 1876 in Burlington, Iowa – July 1, 1959 in Sunnyvale, California) was an American economist who developed the Lorenz curve in 1905 to describe income inequalities.

- Is a <u>diagram</u> to explain income inequality in a country

- The **Lorenz curve** is a graphical representation of the cu<u>mulative distribution function</u> of the empirical p<u>robability distribution</u> of wealth. It is often used to represent <u>income</u> distribution, where it shows for the bottom *x*% of households, what percentage *y*% of the total income they have

- A Lorenz curve shows the degree of inequality that exists in the distributions of two variables, and is often used to illustrate the extent that income or wealth are distributed unequally in a particular society

- Is based on two pieces of information, income and population

- Information is required on both and then formed into two variables that reflect the cumulative value of income and the population

2. Measuring income inequality: PSDI Measures

Diagrammatic way to depict the distribution of income in any society

- On the horizontal axis we sort the cumulative population in the ascending order of income, with the lowest income first followed by the second lowest and so on. Hence the first 20% of the population will necessarily be the poorest 20% of the entire population
  - Horizontal axis depicts cumulative percentages of population arranged in increasing order of income;
  - Vertical axis depicts percentage of national income accruing to any fraction of population

- Slope at any point gives the contribution of the person at that point to the cumulative share of national income

2. Measuring income inequality: PSDI Measures
The Lorenz Curve
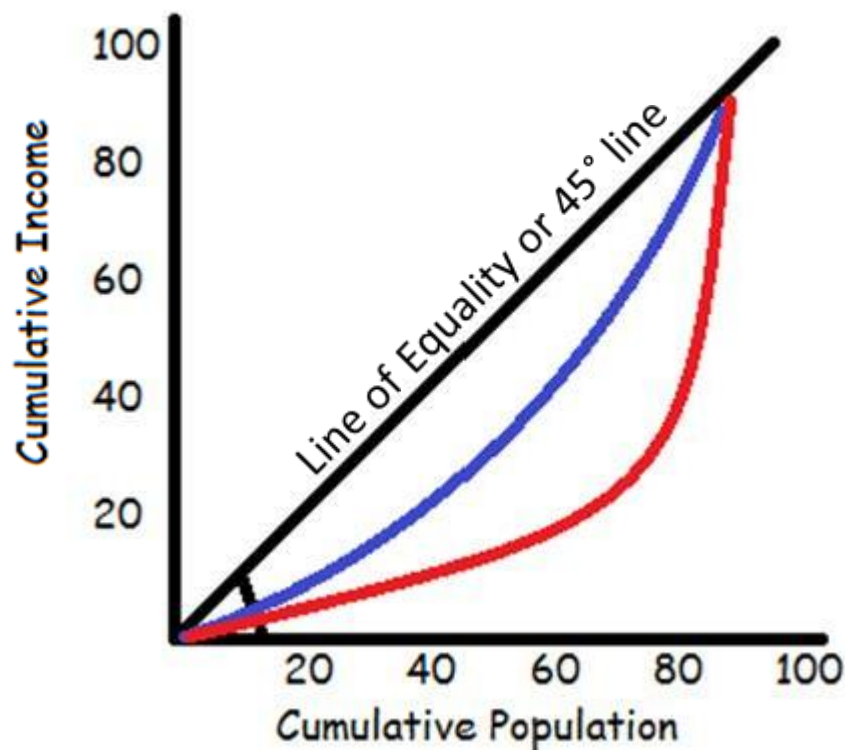
- The horizontal axis gives the percentage of households.
- The vertical axis gives the percentage of nation's income.
- The black line or 45-degree line is called line of equal distribution or egalitarian line
- Note that no nation has a Lorenz curve such as black line. The degree of inequality typically prevails

Perfect equality: Lorenz curve is 45° line
Perfect inequality: Lorenz curve is backward L along horizontal line and right axis

- **Lorenz Curve is always bowed to the right of the line of equality.**
- **The difference between the 45 degree line and the Lorenz curves depicts the level of inequality.**
  - **More skewed the curve, greater the Inequality.**

2. Measuring income inequality: PSDI Measures
The Lorenz Curve

An equality diagonal represents perfect equality: at every point, cumulative population equals cumulative income.

The Lorenz curve measures the actual distribution of income
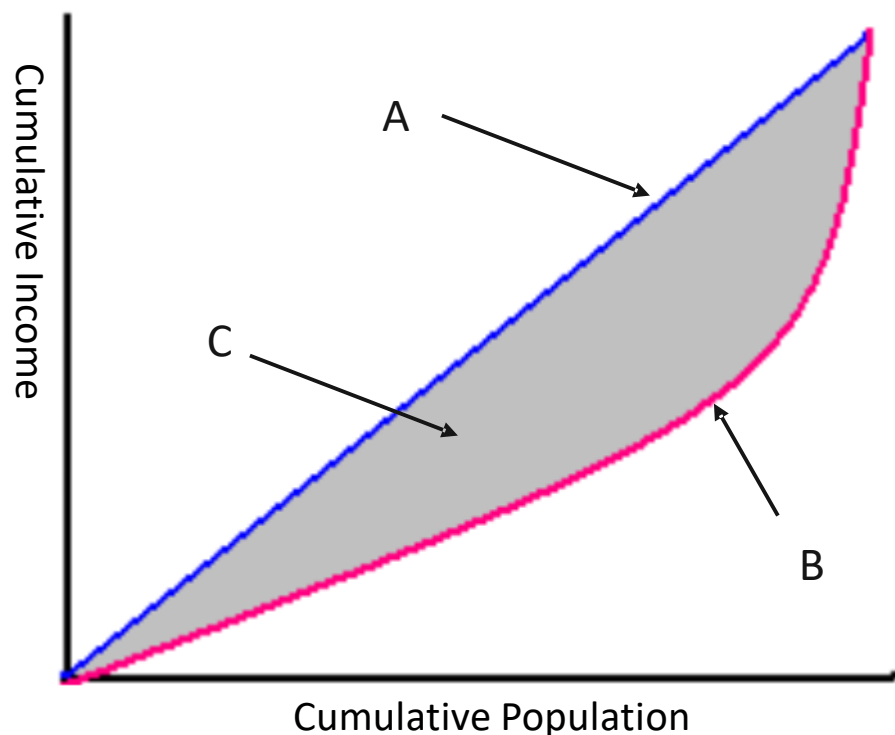
- A –Equality Diagonal Population = Income

- B – Lorenz Curve

- C – Difference Between Equality and Reality

2. Measuring income inequality: PSDI Measures

How to build Lorenz Curves

1. Arrange the data from lowest to highest

2. Calculate the total income

3. Divide into quintiles

4. Calculate the total income of each quntile and convert into %

5. Define the proportion of income owned by each quntile and the proportion on total population

6. Calculate the cumulative percentage of household income and population(Define the cumulative proportion of income and the cumulative proportion of population)

7. Define the line of equidistributed income

8. Plot the cumulative proportion of income against the cumulative proportion of population

2. Measuring income inequality: PSDI Measures

Example: Assume the following monthly Budget flow to Amhara region zones, define the Lorenz curve to understand the inequality

Zone	Budget
Wag hemra	1500.00
Bahir Dar	30000.00
South Gondar	16000.00
North Wollo	2000.00
East Gojjam	20000.00
Oromia	8000.00
Awi	9000.00
North Shewa	10000.00
North Gondar	12000.00
West Gojjam	15000.00

2. Measuring income inequality: PSDI Measures

Zone	Budget
Wag hemra	1500.00
North Wollo	2000.00
Oromia	8000.00
Awi	9000.00
North Shewa	10000.00
North Gondar	12000.00
West Gojjam	15000.00
South Gondar	16000.00
East Gojjam	20000.00
Bahir Dar	30000.00

1. Arrange the data from lowest to highest
2. Calculate the total income: $123,500.00

3. Divide into quintiles. 10/5 = 2 earners in each quintile.
- Wag and N/Wollo compose the lowest quintile or 20% of income earners;
- Oromia and Awi compose the second quintile or cumulative of 40% of income earners;
- N/Shewa and Gondar compose the third quintile, or a cumulative of 60% of income earners;
- W/Gojam and S/Gondar compose the fourth quintile, or a cumulative of 80% of income earners; and
- E/Gojjam and Bahir Dar are the fifth quintile or a cumulative of 100% of income earners

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2. Measuring income inequality: PSDI Measures

4. Calculate the total income and convert into % :

Quintle population	Income ($)	Income %
20	3500	0.028
20	17,000	0.138
20	22,000	0.178
20	31,000	0.251
20	50,000	0.404
TOTAL	123,5000	

5. Calculate the cumulative percentage of household income

Population QUINTLE	Cuml've Population	Income ($)	% Income	Cumulative frequency
20	20	3500	0.03	0.03
20	40	17,000	O.14	0.17
20	60	22,000	0.18	0.35
20	80	31,000	0.25	0.6
20	100	50,000	0.04	1

40% proportion of the budget is earned by the top 20% of the zones (E/Gojjam and Bahir Dar)

2. Measuring income inequality: PSDI Measures
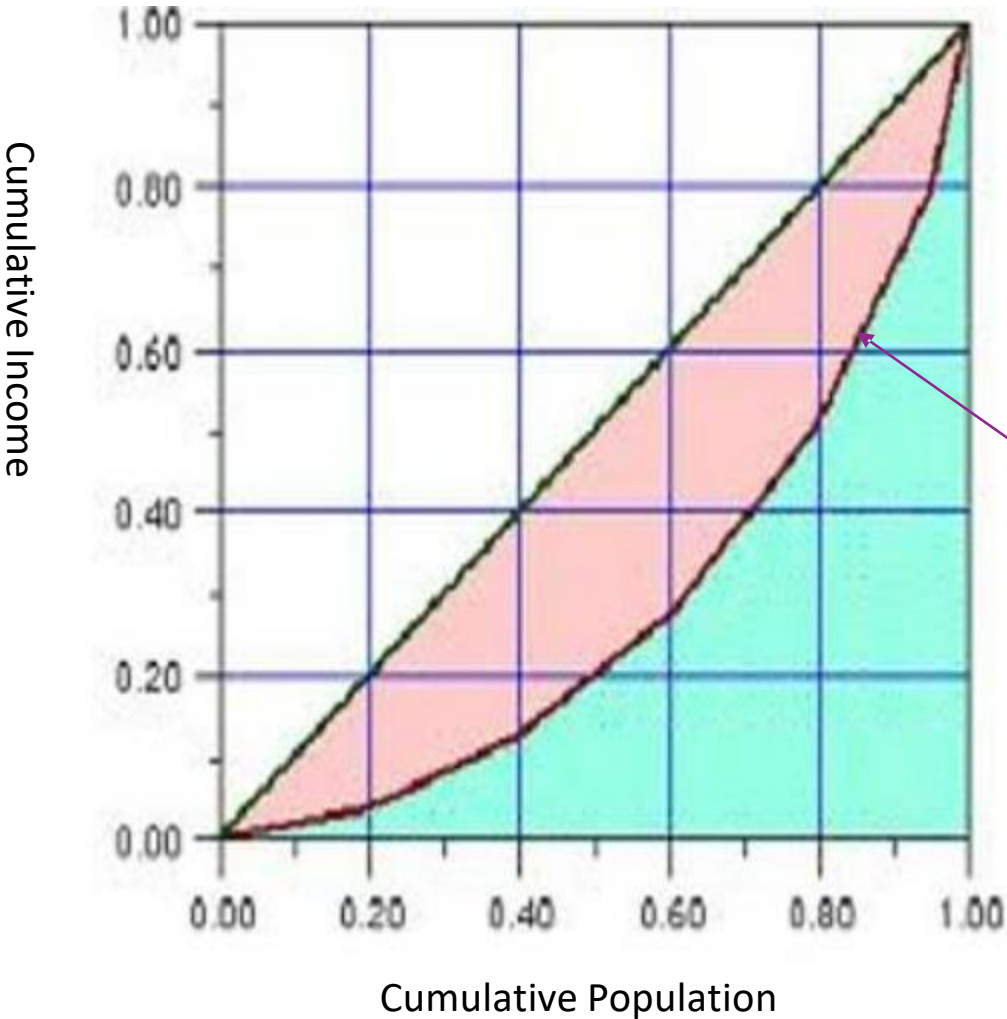
From the information in Lorenz Curve, we can say there is inequality among zones of the region

In this example, the Lorenz curve lies further below the line of equality. Now, the poorest 20% only earn 3% of the regional budget

2. Measuring income inequality: PSDI Measures

Gini Coefficient

- A Gini coefficient is a summary numerical measure of how unequally one variable is related to another. The Gini coefficient is a number between 0 and 1, where perfect equality has a Gini coeffecint of zero, and absolute inequality yields a Gini coeffecint of 1

- The Gini index measures the area between the Lorenz curve and the hypothetical line of absolute equality, expressed as a percentage of the maximum area under the line.

- Is measured graphically by dividing the area between the perfect equality line and the Lorenz curve by the total area lying to the right of the equality line in a Lorenz curve diagram
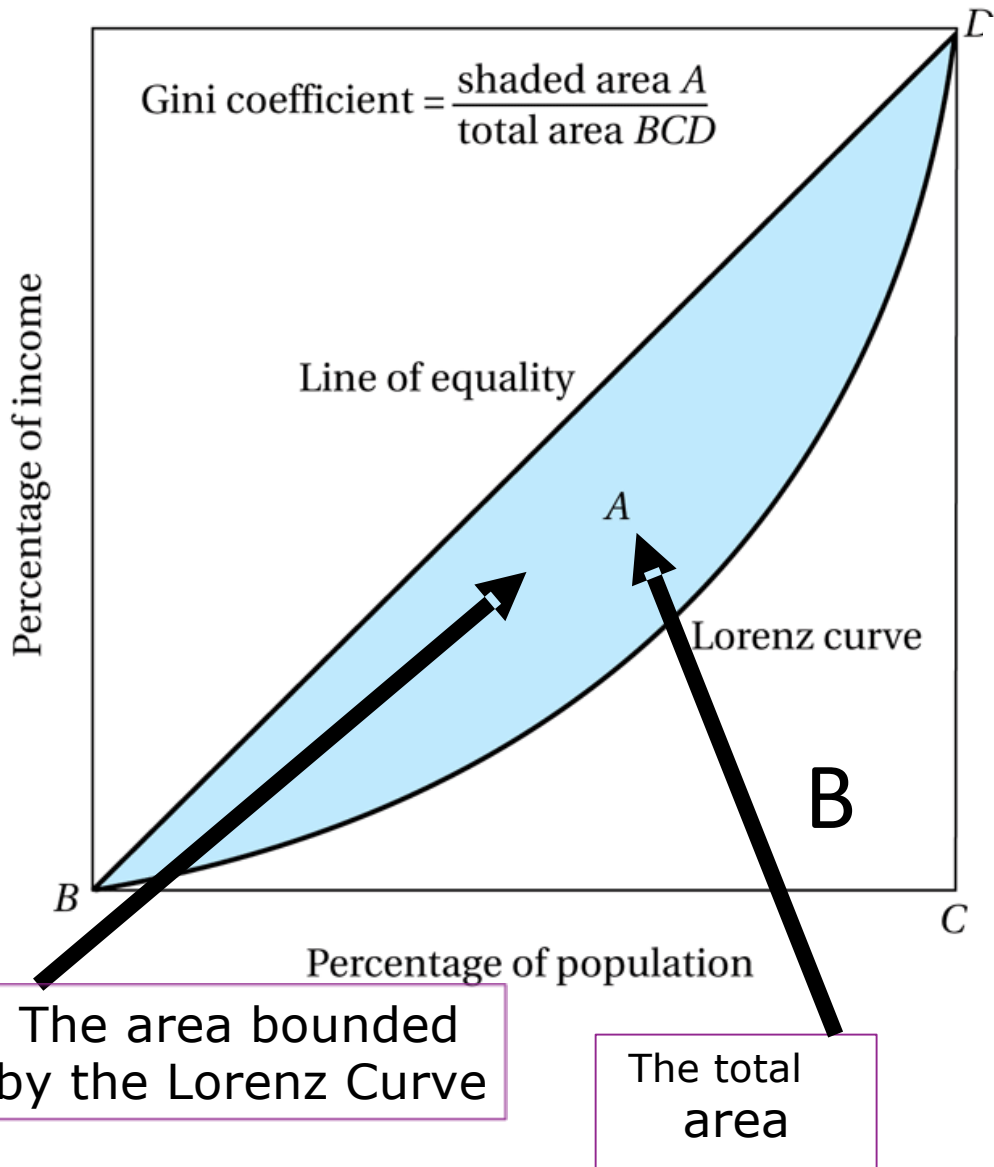
Corrado Gini 1884 - 1965

2. Measuring income inequality: PSDI Measures

Gini Coefficient

- To understand the Gini Coefficient, one must first understand the Lorenz Curve, which orders all observations and then plots the cumulative percentage of the population against the cumulative percentage of the resource

- Mathematically, the Gini Coefficient is equal to twice the area enclosed between the Lorenz curve and the equality diagonal.

- When there is perfect equality, the Lorenz curve *is* the equality diagonal, and the value of the Gini Coefficient is zero.

- When one member of the population holds all of the resource, the value of the Gini Coefficient is one.

2. Measuring income inequality: PSDI Measures

Gini coefficient = $\dfrac{\text{shaded area } A}{\text{total area } BCD}$

Line of equality

A

Lorenz curve

B

Percentage of income

B

C

Percentage of population

The area bounded by the Lorenz Curve

The total area

- $G := \dfrac{A}{A+B} = G = \dfrac{\text{concentration area}}{\text{Maximum concentration area}}$

- If $L(x) = $ Lorenz curve,

$$B = \int_0^1 L(x)\,dx$$

- Also, $A + B = 1/2$, so

$$G = 1 - 2B$$

✓ **A** is the area between the line of perfect equality and the Lorenz curve under study.
✓ **B** represents the area below the Lorenz curve but above the curve of complete inequality.

0 ▢ Gini coefficient ▢ 1:

    G = 0 for curve of perfect equality (since A = 0).
    G = 1 for complete inequality (since B = 0).

2. Measuring income inequality: PSDI Measures

Gini Coefficient -

- Another way to compute the Gini is directly from an algebraic formula. Given that the data is ordered from smallest to largest values of the variable of interest, the formula is:

$$G = \frac{2}{n^2 \bar{x}} \sum_{i=1}^{n} i(x_i - \bar{x})$$

$$G = \frac{\sum_{i=1}^{n} (2i - n - 1) x_i}{n \sum_{i=1}^{n} x_i}$$

Where;

- ○ x_i is an observed value(say income- the individual's variable value), n is the number of values observed(say households) and i is the rank of values in ascending order(individual's rank order number), $\bar{x}$ is the population average or mean

2. Measuring income inequality: PSDI Measures

Decision rule for inequality with Gini index value:

- A rule of thumb to decide the level of inequality is Where the Gini index is

    - Between 0.200 and 0.299, the level of inequality is **"low inequality";**

    - Between 0.300 and 0.399, **"medium inequality";**

    - Between 0.400 and 0.499, **"high inequality"** and

    - Where the gini index is above 0.500, **"very high inequality".**

2. Measuring income inequality: PSDI Measures

Example:

Zone	Budget(x)	i	n	xbar	2i	2i-n-1	(2i-n-1)*xi
Wag hemra	1500.00	1	10	12350	2	-9	-13500
North Wollo	2000.00	2	10	12350	4	-7	-14000
Oromia	8000.00	3	10	12350	6	-5	-40000
Awi	9000.00	4	10	12350	8	-3	-27000
North Shewa	10000.00	5	10	12350	10	-1	-10000
North Gondar	12000.00	6	10	12350	12	1	12000
West Gojjam	15000.00	7	10	12350	14	3	45000
South Gondar	16000.00	8	10	12350	16	5	80000
East Gojjam	20000.00	9	10	12350	18	7	140000
Bahir Dar	30000.00	10	10	12350	20	9	270000
SUM	123500.00						442500.00

442500.00/10(123500.00)
=0.358

- The Gini Coefficient is 0.36

- In this case the Region faces medium inequality
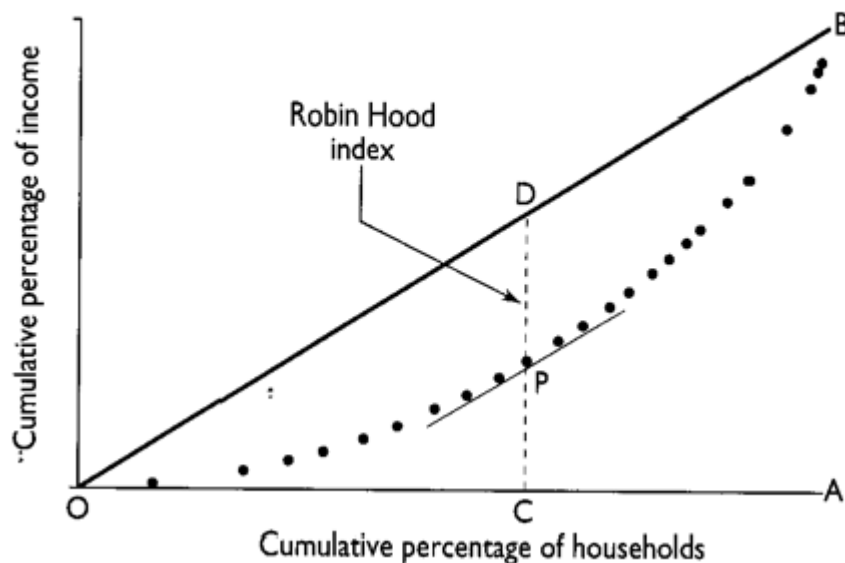
2. Measuring income inequality: PSDI Measures

Other Income Inequality Indices

Robin Hood Index, Atkinson Index, Theil's Entropy Measure,

Robin Hood Index

- The Robin Hood index is related to the Lorenz curve and the Gini coefficient. It measures the portion of total income that would need to be distributed in order for there to be perfect equality. This measure is equivalent to the maximum vertical distance between the Lorenz curve and the line of perfect equality (45° line) as shown in Figure

- The Robin Hood Index, also known as the Pietra ratio, represents the maximum vertical distance from the Lorenz curve to the 45° It is called the Robin Hood index because it can be interpreted as the proportion of income that has to be transferred from those above the mean to those below the mean in order to achieve an equal distribution

- The value of the index approximates the share of total income that has to be transferred from households above the mean to those below the mean to achieve equality in the distribution of incomes

2. Measuring income inequality: PSDI Measures

- The Robin Hood Index is easy to interpret and fairly easy to calculate once the Lorenz Curve has been calculated. However, much like the Gini, it not sensitive to income transfers between households on the same side of the mean income.

- As such, higher Robin Hood values indicate a more unequal society, wherein a larger share of income needs to be distributed to achieve equality.
- The Robin Hood index has been used effectively in several studies of the income inequality hypothesis. Unlike the Atkinson and GE indexes, the Robin Hood framework does not incorporate a sensitivity parameter.

2. Measuring income inequality: PSDI Measures

Other Income Inequality Indices

Robin Hood Index How to calculate

- Sort the distribution fro low to high

- Calculate the mean of the distribution

- Add all income (Y)

- Add the sub sample income of the poor and rich

- Take the difference between the average and the income of the poor and add it (X)

- RI=X/Y

2. Measuring income inequality: PSDI Measures

Robin Hood Index How to calculate

Zone	Budget(x)	Mean	Bellow Avarage Zones	Mean- Poor's inc
Wag hemra	1500	12350	1500	10850
North Wollo	2000	12350	2000	10350
Oromia	8000	12350	8000	4350
Awi	9000	12350	9000	3350
North Shewa	10000	12350	10000	2350
North Gondar	12000	12350	12000	350
West Gojjam	15000	12350		
South Gondar	16000	12350		
East Gojjam	20000	12350		
Bahir Dar	30000	12350		
SUM	**123500**			**31600**
			RI=31600 / 123500 =0.26	
SUM	**12350**			

2. Measuring income inequality: PSDI Measures

Atkinson's inequality measures

- Atkinson has proposed another class of inequality measures that are used from time to time

- This class also has a weighting parameter ε (which measures aversion to inequality) and some of its theoretical properties are similar to those of the extended Gini index

- The value of the Atkinson Index can vary between 0 and 1. Like the Gini Coefficient, the Atkinson index is most effectively used in comparisons between regions.

    - A lower Atkinson value represents an income distribution that is more equal. In addition, this measure incorporates a sensitivity parameter (ε) which can range from 0 to infinity.

    - As the sensitivity index approaches higher values, the Atkinson Index becomes more sensitive to changes at the lowest income groups.

    - As the sensitivity index approaches 0, the Atkinson Index becomes more sensitive to changes in the income position of the higher income groups in a distribution. It is common to see sensitivity values of 0.5, 1, 1.5 or 2.

2. Measuring income inequality

The Atkinson class is defined as follows

$$A_\varepsilon = 1 - \left[\frac{1}{N} \sum_{i=1}^{N} \left(\frac{y_i}{\bar{y}} \right)^{1-\varepsilon} \right]^{1/(1-\varepsilon)}, \quad \varepsilon \neq 1$$

Where y_i is the proportion of total income earned by the ith group, and e is the sensitivity parameter

$$I = 1 - \frac{\prod_{i=1}^{N}(y_i^{(1/N)})}{\bar{y}}, \quad \varepsilon = 1.$$

Where (I) represents the Atkinson Index and $\bar{Y}$ is the mean income

2. Measuring income inequality

- The Atkinson index allows for varying sensitivity to inequalities in different parts of the income distribution

- This was important to Atkinson, who was concerned with the inability of the Gini framework to give different parts of the income spectrum varying weights

- Therefore, his index incorporates a sensitivity parameter (e); which can range from 0 (meaning that the researcher is indifferent about the nature of the income distribution), to infinity (where the researcher is concerned only with the income position of the very lowest income group)

- An intuitive interpretation of this index is possible: Atkinson values can be used to calculate the proportion of total income that would be required to achieve an equal level of social welfare as at present if incomes were perfectly distributed.

  - For example, an Atkinson index value of 0.20 suggests that we could achieve the same level of social welfare with only 1–0.20 = 80% of income. The theoretical range of Atkinson values is 0 to 1, with 0 being a state of equal distribution.

2. Measuring income inequality

Theil's Entropy Measure

- Entropy means 'disorder' – deviations from perfect income equality.

- This measure is based on an income contribution or share that each individual or group holds. It involves complex mathematical calculations.
    - When individual data is available, each individual has an identical population share (1/N), so each individual's Theil's Entropy measure is determined by his or her proportional distance from the mean.
    - When individual data is not available, the Theil's Entropy measure can be adjusted for groups. The index has a potential range from zero to infinity with higher values indicating more equal distribution of income.

- This measure is useful in that it allows the researcher to understand the contributions to inequality by within group and between group components. However, there are a number of caveats with Theil's Entropy measure

2. Measuring income inequality

- The general formula is given by

$$GE(\alpha) = \frac{1}{\alpha(\alpha-1)} \left[\frac{1}{N} \sum_{i=1}^{N} \left(\frac{y_i}{\bar{y}} \right)^{\alpha} - 1 \right]$$

Where
- $\bar{Y}$ is the mean income per person (or expenditure per capita)
- GE generalized entropy (GE) inequality measures
- The values of GE measures vary between zero and infinity, with zero representing an equal distribution and higher values representing higher levels of inequality.
- The parameter ⬜ in the GE class represents the weight given to distances between incomes at different parts of the income distribution, and can take any real value.
- For lower values of ⬜, GE is more sensitive to changes in the lower tail of the distribution, and for higher

2. Measuring income inequality

- The most common values of α used are 0, 1, and 2. GE(1) is Theil's T index, which may be written mathematically, with individual level data Theil's T statistic of income inequality is given by the basic form of the Thiel Index:

$$T = \frac{1}{n} \sum_i \left(\frac{y_i}{\bar{y}} \right) \ln \left(\frac{y_i}{\bar{y}} \right)$$

Where
- n is the number of individuals in the population, y_i is the income of the person indexed by i, and $\bar{Y}$ is the population's average income $\bar{Y}$

The summation sign reinforces the idea that each person will contribute a Theil element.

- $y_i / \bar{Y}$ is the proportion of the individual's income to average income

- The natural logarithm of $y_i / \bar{Y}$ determines whether the element will be positive ($y/ybar > 1$); negative ($y_i / \bar{Y} < 1$); or zero ($y / \bar{Y} = 0$).

2. Measuring income inequality
Example:

$$T = \frac{1}{n}\sum_i \left(\frac{y_i}{\bar{y}}\right) \ln\left(\frac{y_i}{\bar{y}}\right)$$

Individual (1) n	Income (2) y_i	Average Income (3) $\bar{y}$	Ratio of income to average income (4) $\frac{y_i}{\bar{y}}$	Log (ratio of income to average income) (5) $\ln\left(\frac{y_i}{\bar{y}}\right)$	(6)=(4) x (5) $\left(\frac{y_i}{\bar{y}}\right)\ln\left(\frac{y_i}{\bar{y}}\right)$	Theil Index is sum of 6 divided by observations
1	300		0.170	-1.769	-0.302	
2	500		0.284	-1.258	-0.358	
3	1000		0.568	-0.565	-0.321	
4	2000		1.136	0.128	0.145	
5	5000		2.841	1.044	2.966	
		1760			Sum of values =2.132	**0.426**

2. Measuring income inequality

- Often, individual data is not available. Theil's T Statistic has a flexible way to deal with such instances.
- If members of a population can be classified into mutually exclusive and completely exhaustive groups, then Theil's T Statistic for the population (T) is made up of two components, the between group component ($T'g$) and the within group component ($T g$). Algebraically, we have:

$$T = T'_g + T^w_g$$

- When aggregated data is available instead of individual data, T'_g can be used as a lower bound for Theil's T Statistic in the population
- The between group elements capture each group's contribution to overall inequality
- The sum of the between group elements is a reasonable lower bound for Theil's T statistic in the population

2. Measuring income inequality

The between group element of the Theil index has a familiar form:

$$T'_g = \sum_{i=1}^{m} \left\{ \left(\frac{p_i}{P} \right) * \left(\frac{y_i}{\mu} \right) * \log 10 \left(\frac{y_i}{\mu} \right) \right\}$$

where *i* indexes the groups, p_i is the population of group *i*, *P* is the total population, y_i is the average income in group *i*, and *μ* is the average income across the entire population.

• Can decompose the Theil index into between group inequality and within group inequality.

• E.g. Look at income inequality within racial groups and then between racial groups.

2. Measuring income inequality

Example 2: The following example assumes that exact salary information is known for each individual

	Number of employees	Exact Salary
	2	$100,000
	4	$80,000
	6	$60,000
	4	$40,000
	2	$20,000

For this data, Theil's T Statistic 1

Individuals in the top salary group contribute large positive elements. Individuals in the middle salary group contribute nothing to Theil's T Statistic because their salaries are equal to the population average. Individuals in the bottom salary group contribute large negative elements.

2. Measuring income inequality

Theil's T Statistic

Pros

- Can effectively use group data

- Allows the researcher to parse inequality into within group and between group components

Cons

- No intuitive motivating picture

- Cannot directly compare populations with different sizes or group structures

- Comparatively mathematically complex

Summary of income inequality measures

Measure	Complexity of Calculation	Benefits	Caveats	Recommendation
Calculations based on Percentile distributions	easy	-data readily available -easy to interpret -allows for comparisons over time (including direction and magnitude) -used to calculate effectiveness of government transfers over time		use
Lorenz Curve and Gini Coefficient	complex but aided by statistical software	-a graphical representation of income inequality that can be compared over time and between geographic areas -simple to calculate -data readily available -can be calculated for individual and household level data -easily interpreted when compared to other Gini coefficients	-incapable of showing different kinds of inequality represented by various shapes of Lorenz curves -does not emphasize inequalities in the top or bottom of the spectrum (polarization) -shows the direction of income redistribution but does not indicate where the redistributions are occurring -ignores life cycle effects -does not allow for within or between income group comparisons	use

Summary of income inequality measures

Measure	Complexity of Calculation	Benefits	Caveats	Recommendation
Median share of Income	easy	-data readily available	-not sensitive to varying proportions of the income distribution within the upper or lower 50% of the distribution	use in combination with other measures
Robin Hood Index	easy if have Lorenz curve	-uses the same data needed to calculate the Lorenz curve -easy to interpret	-not sensitive to income transfers between households on the same side of the mean income	use together with the Gini coefficient
Atkinson Index	complex	-incorporates a sensitivity parameter directly into the equation.	-sensitivity parameter means that a subjective judgment has been made about inequality -not intuitive	do not use
Theil's Entropy Measure	complex	-shows the contributions to inequality by within group and between group components	-complex to calculate and interpret. -varies greatly when the distribution varies regardless of whether the change in distribution occurs at the top, middle or bottom -income redistributions will impact the calculation irrespective of whether the redistribution takes place between rich and poor or rich and middle -cannot directly compare populations with different sizes as calculation is dependent on number of individuals in the population or group	do not use
Coefficient of Variation	easy		-requires comprehensive individual data -not intuitive -cannot use if the income distribution is not normal	do not use

3. Characteristics of income inequality

Causes of income inequality

- **Economic Inequalities can occur for several reasons:**

  - Physical attributes – distribution of natural ability is not equal

  - Personal Preferences – Relative valuation of leisure and work effort differs

  - Social Process – Pressure to work or not to work varies across particular fields or disciplines

  - Public Policy – tax, labor, education, and other policies affect the distribution of resources

3. Characteristics of income inequality

Causes of Inequality

- Individual
  - Ownership of resources – housing, land, etc.
  - Qualifications
  - Motivation
  - Skills
  - Ability
  - Family size
- National
  - Factor endowments (land, labour, capital)
  - Size and quality of labour force
  - Climate
  - Stage of economic development
  - Economic Power – ability to be able to dictate terms with suppliers, buyers, etc.

3. Characteristics of income inequality

- Relation between economic growth and inequality…..
- Does growth affect the level of inequality?
- Does initial inequality affect growth?
    - Kuznets' Inverted- U Hypothesis…..
- Why is inequality bad?
- Inequality and poverty reduction…..
- How is poverty related to economic inequality?

More discussion in the coming chapter

PART THREE

INTRAHOUSEHOLD RESOURCE ALLOCATION

CHAPTER OUTLINE

In this chapter we will study

INTRAHOUSEHOLD RESOURCE ALLOCATION

1. Intrahousehold Resource Allocation Issues- An Introduction

2. Models of intrahousehold resource allocation

3. Gender and intrahousehold resource allocation

1. Intrahousehold Resource Allocation Issues- An Introduction

- Many key decisions relating to production, consumption, asset accumulation, education and fertility (to name but a few) occur within the household, and these decisions, in turn, affect intergenerational mobility as well as local economic development

- This makes it important to be able to understand the structure and formation of households, and how these might change over time, since this will in turn affect these key productive decisions

- The standard definition of a household is that of a group of individuals who live together under one roof, and share a common kitchen or cooking pot

1. Intrahousehold Resource Allocation Issues- An Introduction

- Many important decisions that affect development outcomes and the well-being of individuals are made by households and families

- The allocation of resources within the household is one of it and has recently become an important research issue

- The processes by which resources are allocated **among individuals and the outcomes of those processes are commonly referred to as "   intrahousehold resource allocation."**

- Since the early 1990s a growing literature has paid increasing attention to the role that intrahousehold resource allocation plays in affecting the outcome of development policy (see Strauss and Thomas 1995; Behrman 1997; Haddad, Hoddinott, and Alderman 1997 for reviews).

  - Many key decisions relating to production, consumption, asset accumulation, education and fertility (to name but a few) occur within the household, and these decisions, in turn, affect intergenerational mobility as well as local economic development

1. Intrahousehold Resource Allocation Issues- An Introduction

- The household is central to most policy initiatives aimed at reducing poverty, since it has long been thought that this is the most efficient way to transfer income and other resources towards those in need

- The household provides an important entry point for analysing poverty and inequality, since an individual's life chances are critically affected both by the material resources at the disposal of the household as well as the decisions made within the household concerning how those resources should be distributed

- Having detailed individual level data that allows one to determine the extent to which individuals have control over resources or transfers coming into the household, is crucial in any analysis that aims to understand the allocation of these resources, and what impact this has on individual welfare outcomes within the household

1. Intrahousehold Resource Allocation Issues- An Introduction

Why Intrahousehold Resource Allocation Issues?

- There has been an increasing recognition, that aspects of intrahousehold resource allocation issues are of potential importance for policymakers for at least two reasons.

  - **First**, paying attention to the individual-level welfare, rather than the household-level welfare, may affect the policymakers' views about whom and where the poor are

    - There is a possibility, for example, that some households whose average per capita incomes/expenditures are above the poverty line may still contain household members whose standard of living actually falls below the poverty line due to intrahousehold inequality in resource allocation (e.g., Haddad and Kanbur 1990).

  - **Second,** the way household members allocate resources among themselves could potentially affect the effectiveness of policy interventions and may even lead to unintended consequences for policymakers.

    - One classic example is the possible household responses to school feeding programs; there has been reported incidences that when children receive meals at school their food allocation at home is reduced in response in order to feed other household members in the household who do not receive meals at school (e.g., Beaton and Ghassemi 1982).

- This makes it important to be able to understand the structure and formation of households, and how these might change over time, since this will in turn affect these key productive decisions.

1. Intrahousehold Resource Allocation Issues- An Introduction

Four factors have contributed to the tremendous growth of research on intrahousehold issues in recent years:

(1) The development of new models of household decisionmaking;

(2) An increased awareness that paying attention to intrahousehold allocation issues matters in the design and implementation of development policy;

(3) The growing availability of data from developing and developed countries with which to test alternative household models; and

(4) The use of qualitative methods, arising from increased collaboration with anthropologists and other social scientists, to understand non-economic dimensions of human behavior.

1. Intrahousehold Resource Allocation Issues- An Introduction

What are resources?

- Resources are things like time, goods bought in the market, and goods produced at home to produce commodities that maximize some common welfare index

- Household members bargain over many different outcomes (resources), whether the bargaining is explicit or implicit

  - These outcomes may include consumption and expenditure, production (such as the use of inputs), labor allocation, asset ownership, children's health and education, decision-making, and violence within the household.

1. Intrahousehold Resource Allocation Issues- An Introduction

Aspects of Intrahousehold Differences

- Intrahousehold allocation mechanisms appear to be operating at different levels and several factors contribute to intrahousehold differences

Gender

- Gender is probably the most widely discussed aspect of intrahousehold differences
- Gender differences arise from the socially constructed relationship between men and women (Oakley 1972). Sex differences, on the other hand, are biological and innate.
  - Gender differences affect the distribution of resources between men and women and are shaped by ideological, religious, ethnic, economic, and social determinants (Moser 1989, 1993)
  - Being socially determined, this distribution can be changed through conscious social action, including public policy. Parental preferences with respect to child gender may significantly affect child well-being.
    - For example, in parts of South Asia where boys are valued more highly than girls (Miller 1997; Sen 1990), parents may value an improvement in a boy's well-being more highly than an equal improvement in a girl's well-being

1. Intrahousehold Resource Allocation Issues - An Introduction

Aspects of Intrahousehold Differences

Birth order

- A child's birth order may interact with the child's gender as well as family size, which is intimately linked with the stage of the parents' life cycle

  - First-born or low-birth-order children may have parents who are less experienced with child rearing, but later-born children must share parental resources with more siblings. Siblings may compete for scarce parental resources, with male siblings often favored; Garg and Morduch (1998) and Morduch (2000) present evidence of this pattern in rural Ghana.

    - Children may thus end up doing better if their siblings are sisters, since in many societies they have a smaller claim on parental resources, or, as in the case of Taiwan, older sisters may contribute to school fees for younger children (Parish and Willis 1993).

1. Intrahousehold Resource Allocation Issues- An Introduction

Aspects of Intrahousehold Differences

Relationship to the household head

- The importance of an individual's relationship to the household head differs across societies and cultures

- In polygamous societies, there may be significant discrimination against unfavored wives and their children, resulting in heavier domestic workloads, poorer access to education, and in some cases poorer levels of nutrition and health care (Bird and Shinyekwa 2005)

- For many women, polygamy can result in conflict, which contributes to increased domestic violence and eventually to household dissolution

- Whether a child is a biological offspring of the household head may also affect that child's welfare. In Africa, orphans are equally less likely to be enrolled in school relative to both non-orphans as a group and to the non-orphans with whom they reside (Case et al. 2003).

1. Intrahousehold Resource Allocation Issues- An Introduction

Aspects of Intrahousehold Differences

Age

- Age affects the distribution of resources not only to children, but also to older people

- Since old age is linked to diminishing physical strength, poor health, and disability, it increases dependence on other household members

- The resources required to care for older people compete directly with other household resource needs. If the household is poor, older individuals' health problems may be addressed only after other individuals' needs have been met.

Ethnic and religious differences

- Have a stronger impact on husband and wife's assets

2. Modeling Intrahousehold Resource Allocation Behavior

- Modeling household behavior has been central to microeconomics, and traditionally in the majority of studies (exclusively until the 1980s and many of them still today), household behavior is analyzed under the assumption that household members are in complete agreement as to how best to combine their time and other resources to attain maximum possible welfare among the members

- Traditional economic theory of how consumers spend their income has little to say about the behaviour of members of a household if there is more than one adult in the household

    - It is usually assumed that the household can be treated "as if" it were a single agent, allowing an application of the tools of consumer theory at the household level.

- Around mid 1960s and recently, different models of household behavior emerged such as

    - The unitary model

    - Collective models

    - Bargaining Models

2. Modeling Intrahousehold Resource Allocation Behavior

<u>The unitary model to Intrahousehold Allocation</u>

- The unitary model was introduced by Gary Becker around mid 1960s

- The unitary models also referred as "<u>Common Preference Model</u>" or the "<u>Benevolent Dictator "Model</u>" mainly describes how the household acts as one

- A key feature of the unitary model is that;

  - Resource allocation does not depend on the identity of the person receiving the income within the household, since all family members act as if they maximize a single utility function subject to a single budget constraint

  - In other words, the household can be characterized as one where individuals pool their resources and share the same preferences
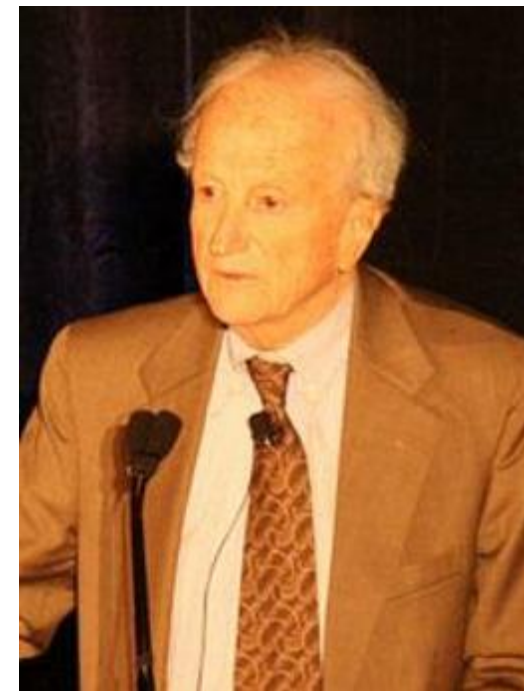
Gary Becker
1930-2014

2. Modeling Intrahousehold Resource Allocation Behavior

<u>The unitary model to Intrahousehold Allocation….</u>

A key feature of the unitary model is that;

- Household decisions are analysed as if they are made by a unique decision making unit to maximize some common welfare index.

  - In other words, they treated the household as a single production or consumption unit

- We call it the unitary model because this label describes how the household acts—as one with a single

- A key implication of this type of model is a specific notion of _income pooling_: that it does not matter who is contributing what to the pooled household budget, as this gives them no more say in how it is spent, so only its total size affects what is done with it.

2. Modeling Intrahousehold Resource Allocation Behavior

The unitary model to Intrahousehold Allocation

- According to Becker 1991 – 1992 Nobel Prize Winner in Economics- "revealed that

    - In accordance with a single set of preferences, the household combines time, goods purchased in the market, and goods produced at home to produce commodities that generate <u>utility for the household</u>".

        - The fundamental assumption in this model is that there are exists a p<u>arental   or household, welfare function i</u>n which all resources are pooled together- capital, labour, land and information

    - The development of these models also based on the strong assumption that in a utility maximizing household the actions of all household members are being determined by the **preference   of the head of the household**<u>. I</u>n this case the preference of the head becomes automatically the preference of the wh<u>ole   household</u>

- Virtually all poverty assessments carried out by the World Bank adopt the unitary model of the household in their analyses

2. Modeling Intrahousehold Resource Allocation Behavior

The unitary model to Intrahousehold Allocation

• In these approaches, it is assumed that household behavior would best be analyzed via a household utility function, , so the sub-utility functions, **U , are identical**

• This approach is often referred to as

  • The common preference model or The benevolent dictator model,

    • …based on the notion that either all the household members have the same preferences or there is a single decision maker who makes decisions for the good of the entire household

2. Modeling Intrahousehold Resource Allocation Behavior

The Unitary model representation/Theoretical foundation….

- Fundamental to the unitary model is the assumption that there exists a parental, or household, welfare function and that all resources----capital, labor, land, and information-are <u>pooled</u>

- A fundamental assumption of the unitary approach is that

    - The household preferences are assumed to be representable by a unique well-behaved utility function

        - To aggregate individual preferences into household preferences, it has to be assumed that either all of the members of the household have the <u>same utility function</u> or it has to be assumed that some rule exists for aggregating the utility functions of the household members

2. Modeling Intrahousehold Resource Allocation Behavior

The Unitary model representation/Theoretical foundation….

- Assume that the household consist of two household members, male(m) and female(f), that both work in the market. Household members gain utility from private consumptions goods x^i, $i = f$,m, for female and male household member respectively and from the joint consumption of the good produced in the household G . That is individual utilities are defined and the household utility function in the unitary framework is the following:

$U_i\,(x_i$, x_j ,$G)$, $i \neq j$ and

$U = u(x^f, x^m,G)$ Where;

   x_i is privately consumed market goods

   G Jointly consumed produced good in the household

   m,f male and female members of the household

   u is a strongly quasi-concave, increasing and twice continuously
      differentiable function of its arguments

2. Modeling Intrahousehold Resource Allocation Behavior

The Unitary model representation/Theoretical foundation……

- By setting the total time available for each household member equal to one, $T = 1$, and arranging the uses of income on the left hand side of the budget constraint and the sources of income on the right hand side of the budget constraint we get the household full budget constraint as:

$$x^f + x^m + pG \leq w^f + w^m \equiv Y$$

Where; $w^f + w^m \equiv Y$ is the household potential income. That is, Y is the income that would occur if both household members allocate all the time available into market work.

- The prices of the market goods consumed privately are normalized to one.
- The inputted price of the household public good G is denoted by p which depends on the wages of the household members, that is $p(\hat{w}^f, w^m)$

2. Modeling Intrahousehold Resource Allocation Behavior

The Unitary model representation/Theoretical foundation…..

- The household maximization problem outlined above produces Marshallian demand functions of the following form:

$$X^i = x^i(Y, p), \quad i = f, m$$
$$G = g(Y, p)$$

- It is seen that the increase in the market wage of either of the household members induces positive income effect for household consumption of the private goods as well as for the household public good

2. Modeling Intrahousehold Resource Allocation Behavior

The unitary model to Intrahousehold Allocation: CRITICISM

- Even though the unitary model of the household continues to be a strong approach in modeling household decision making, the model has been criticized and rejected by many researchers in many countries (Horney and McElroy, 1980; Browning *et al.*, 1994; Strauss *et al.,* 1995; Haddad *et al.,* 1997)

- It has been widely criticized for two main reasons:

  - First, if individual members have different preferences, then these divergent preferences must be aggregated in some manner, and there are theoretical difficulties associated with this process.

  - Second, various researchers (Doss 1996; Wolf 1997) have argued that within a household there exist multiple voices and an unequal distribution of resources, and thus the household is a site of conflict as well as cooperation

  - The model's failure to recognize this complex reality has led to a limited understanding of intrahousehold allocation and decision making, and multiple types of policy

2. Modeling Intrahousehold Resource Allocation Behavior

The unitary model to Intrahousehold Allocation: CRITICISM……

- Haddad, Hoddinott, and Alderman (1997) argue that using the unitary model of the household as a guideline for **policy prescriptions** may lead to four types of policy failures

  1. The effect of public transfers may differ, depending on the identity of the income recipient. If this is so, targeting transfers to the household may not result in the desired consequences, if transfers directed to the husband or the wife have different impacts.
  2. The response of nonrecipients of the income transfer must also be considered. If households reallocate resources away from the transfer recipient to compensate for the transfer receipt, the intended effect of the income transfer may not be realized.
  3. At the project level, the unitary model predicts that it does not matter to whom policy initiatives are addressed, since information, like other resources within the household, will be shared. However, numerous examples, many from Sub-saharan Africa, have shown that targeting one individual, rather than the other, has led to nonadoption of particular policies or unintended consequences of policies adopted.
  4. Adherence to a unitary model of the household disables many policy levers that could be brought to bear on development problems.

2. Modeling Intrahousehold Resource Allocation Behavior

The unitary model to Intrahousehold Allocation: CRITICISM……

- This approach has been strongly criticized for not being able to capture the process of household decision-making. Based on its strong assumption, it is questioned if in real life the household head is all that altruistic

- Furthermore, the feminists and Institutional economists have been criticising the unitary models for failing to deal with individuals that make up family, and also in recognising some of the key aspects like gender and age based power relations that are important aspects in structuring resource allocation.

THIS CONTRIBUTED TO THE EMERGENCE OF OTHER MODELS

Bargaining Models

- **The cooperative models**

- **The non- cooperative approach**

Collective Models

2. Modeling Intrahousehold Resource Allocation Behavior

<u>The Bargaining model to Intrahousehold Allocation: non-unitary model</u>

- As the name suggests, bargaining models interpret the intra-household allocation of resources as an outcome of bargaining processes among the members of a household;

  - The models therefore recognize individual members of a household as separate agents <u>with their own preferences and utility functions</u>.

  - The bargaining perspective allows one to distinguish between command over goods and services established by social norms or habits versus these outcomes being determined by contestation and bargaining

  - Bargaining models differ in their assumptions regarding the sources of a person's bargaining power, but they each typically emphasize access to economic resources, such as earnings or wealth, as a critical source of a person's bargaining power (Iversen, 2003).

2. Modeling Intrahousehold Resource Allocation Behavior

The Bargaining model to Intrahousehold Allocation: non-unitary model

- The initial work to develop a bargaining approach to modelling household behaviour was done by McElroy and Horney (1981) and by Manser and Brown (1980). They formulate a bargaining framework in which household decisions are made through a <u>cooperative Nash game</u>
  - The Nash solution is the outcome that maximizes the product of the gains to cooperation under the household budget constraint.
  - Game theory analyzes how people make decisions using rational choice theory when the outcome depends on what a small number of others do, making it an obvious candidate for modeling interactions in the family.
- In contrast to unitary models, household bargaining models in economics, like many sociological models, explicitly take the view that the <u>family</u> <u>can be a place of both conflict and cooperation (</u>Bennett et al., 2012; Nyman & Dema, 2007; Sen, 1990)

2. Modeling Intrahousehold Resource Allocation Behavior

The Bargaining model: Theoretical foundation

- Using the definitions and notation of the example presented in the case of the unitary household model the household consumption allocation problem is now the following:

$$\underset{x^f, x^m, G}{Max} \; N = \left[u^f\left(x^f, x^m, G\right) - d^f\right] \times \left[u^m\left(x^f, x^m, G\right) - d^m\right]$$

$$s.t$$

$$x^f + x^m + pG \leq w^f + w^m \equiv Y \qquad \text{(N)}$$

where

$d^i, i = f, m,$ is household member $i's$ threat point or disagreement point.

This is the outcome that results if the household members fail to cooperate

The Nash solution(N) is the outcome that maximizes the product of the gains to cooperation under the household budget constraint

2. Modeling Intrahousehold Resource Allocation Behavior

The Bargaining model: Theoretical foundation…..

- Geometrically the Nash solution is the tangential point(T) of the utility possibility frontier and the hyperbola:

$$N = \left[u^f\left(x^f, x^m, G\right) - d^f \right] \times \left[u^m\left(x^f, x^m, G\right) - d^m \right] = \text{constant}$$

farthest away from the conflict point $\left(d^f, d^m\right)$.

- The Marshallian demands, resulting from the household problem (N) are of the following form:

$$X^i = x^i\left(Y, p, d^f, d^m\right), \quad i = f, m$$
$$G = g\left(Y, p, d^f, d^m\right)$$

2. Modeling Intrahousehold Resource Allocation Behavior

The Bargaining model to Intrahousehold Allocation

- These cooperative Nash-bargaining models of marriage and household behavior treat marriage as a cooperative game, in which each household member has a utility function and an outside option, the so called threat point, which is interpreted as the utility of remaining single or of getting divorced

- Spouses with conflicting interests and preferences are assumed to resolve their differences in ways prescribed by the Nash or some other explicit bargaining solution.

- Outcomes of intra-household resource allocation depend on the household members' bargaining power, which is determined by their access to extra-household resources, namely their labor and non-labor income.

  - The threat point in such a cooperative game is described as the outcome that would occur in the absence of agreement, usually specified as the value of divorce, or alternatively, a non-cooperative equilibrium within the marriage, defined in terms of traditional gender roles and gender role expectations

2. Modeling Intrahousehold Resource Allocation Behavior

The Bargaining model to Intrahousehold Allocation….

- The models assume that the household operates in an agreement that household members participate in the decision-making.

- The members are able to bargain and the difference between men and women are mainly based on their bargaining power and/or willingness to bargain for their own interests, rather than who makes the decision.

- In the cooperative approach, individuals have a choice of remaining single or of forming a household or other grouping.

  - **The cooperative models** assume that individuals choose to form a household or other grouping when the advantages associated with being in a household outweigh those derived from being single.

2. Modeling Intrahousehold Resource Allocation Behavior

The Bargaining model to Intrahousehold Allocation…..

- In cooperative bargaining models, household members have their own utility function and negotiate with one another to achieve a _Pareto- efficient_ outcome,

    - …one in which one person cannot achieve greater utility without the utility of the other being reduced; the long-term nature of relationships between members of a household, by reducing the gains from short- term game playing, is used to justify the assumption that an efficient or cooperative outcome is reached…

- "Fall Back Position or Threat Point": This is the point that shows how individuals within the household would fare if the cooperation broke down. In this case, the outcome of the bargaining process is becoming more favourable to the individuals whom when the cooperation fails they will be in a better fall back position. (Himmelweit, S. 1998 pg 200- 215)

- In these models the process of decision making is more democratic as compared to the Unitary models but power with the process tends to favour those who have better fall back position when the arrangement does not work

2. Modeling Intrahousehold Resource Allocation Behavior

The Bargaining model to Intrahousehold Allocation……

"Fall Back Position or Threat Point":

- Power within households is also influenced by the way people take into account the contribution they or other household members are making and this has influence in determining their fall back position
    - The division of the gains from marriage, then, can be modeled as a function of the "fallback" or "threat point" position of each member: itself a function of extra environmental parameters (EEPs) such as laws concerning access to common property and prohibitions on women working outside the home (McElroy 1990).
    - The vast majority of bargaining models rely on a Nash solution (Nash 1953)

- Figure bellow is drawn for a couple, with the man's utility measured along the horizontal axis and the woman's measured on the vertical axis.
    - The area inside the curve shows the combination of levels of utility for the couple of all feasible outcomes, with the frontier from W to M giving the Pareto-efficient outcomes that bargaining should be able to achieve

2. Modeling Intrahousehold Resource Allocation Behavior

The Bargaining model to Intrahousehold Allocation….

A HOUSEHOLD'S UTILITY POSSIBILITY
FRONTIER WITH THE OUTCOME OF A BARGAINING MODEL.
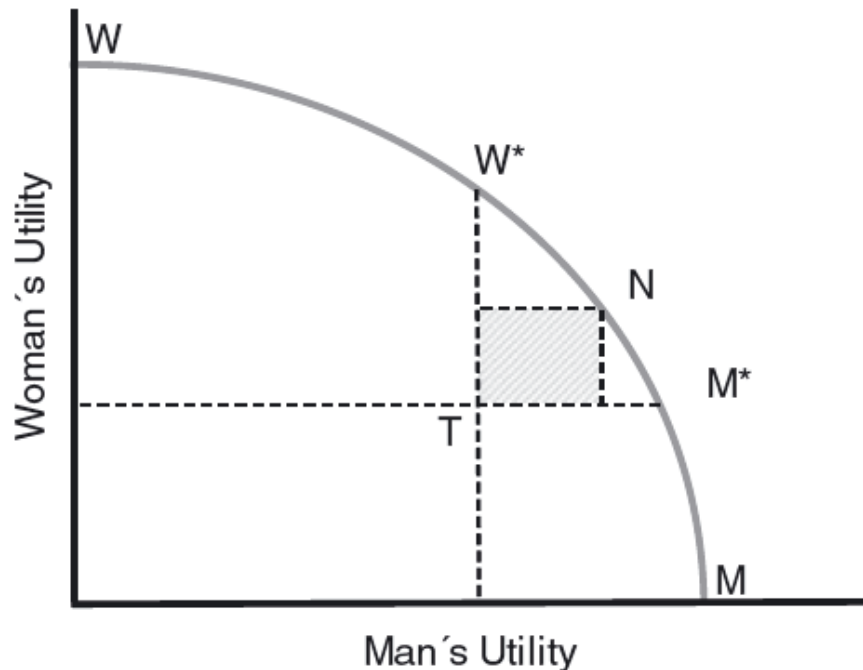
- Figure: Shows that there are many possible Pareto-efficient outcomes, varying in the extent to which they favor each household member; those nearer W favor the woman more and the man less than those nearer M. The eventual outcome depends on relative bargaining power.

- In these models, the bargaining power of an individual is determined by his or her utility at the "threat point," shown as T in Figure 1, the utility level that each individual would achieve if cooperation broke down.

- Neither will agree to an outcome that will make him or her worse off than at the threat point, so the woman will not agree to outcomes below M*, and the man will not agree to outcomes to the left of W*; the range of possible Pareto-efficient bargaining outcomes is therefore restricted to between W* and M*.

2. Modeling Intrahousehold Resource Allocation Behavior

The Bargaining model to Intrahousehold Allocation….

- The outcome is specified to be the so-called *Nash bargaining solution*:

- The outcome, N, on the frontier that maximizes the product of the two partners' gains in utility terms over the threat point (represented for any outcome by the area of the rectangle drawn between it and the threat point and shown on Figure above for outcome N).

- The better off individuals are at the threat point, T, the more bargaining power they have and so the better the outcome, N, will be for them.

    - The resource theory of power, influential within sociological perspectives on intrahousehold distribution, draws on the same insight (Bennett, 2013).

2. Modeling Intrahousehold Resource Allocation Behavior

The Bargaining model - non-cooperative approach

- The cooperative household bargaining models have been criticized for treating individual household members ~~symmetrically~~ with respect to their right and ability to enter into the household bargaining process.

- Furthermore the models have also been criticized for <u>not elaborating clearly the household resource allocation process</u> (Katz 1997 PP25)

- The key weakness of these models lies on its failure to deal with individual <u>who make up the family, lack of recognition of</u> ~~systematic~~ <u>gender and age base power relations</u> that are the key aspects in structuring household's resource allocation

- Then follows **The non-cooperative approach**

- **The non-cooperative approach** (Kanbur 1991; Lundberg and Pollak 1993) relies on the assumption that individuals cannot enter into binding and enforceable contracts with each other and thus that an individual's actions are conditional on the actions of others

2. Modeling Intrahousehold Resource Allocation Behavior

The Bargaining model - non-cooperative approach

- The implication is that <u>not all non- cooperative models produce Pareto- efficient outcomes</u>

- They choose it when the advantages associated with being in a household outweigh those derived from being single

- While all cooperative models are Pareto efficient, only some noncooperative ones exhibit this property; so not all of them would be included here
    - Instead, they would be part of the group of noncollective models, i.e., those that do not satisfy Pareto efficiency.

- Noncooperative models, <u>do not assume that the household reaches Pareto efficient allocations in</u> either production or consumption, but instead provides a framework for testing these assumptions

2. Modeling Intrahousehold Resource Allocation Behavior

The Collective model to Intrahousehold Allocation

- One class of models which allow differing preferences and only assume that allocations are made in such a fashion that the outcomes are Pareto optimal or Pareto efficient are the so-called collective models
    - A Pareto optimal allocation is reached when one individual within the household can only be made betteroff at the expense of another household member
    - **Pareto efficiency**, or **Pareto optimality**, is a state of allocation of resources in which it is impossible to make any one individual better off without making at least one individual worse off.]
- Collective models typically assume that different household members have different preferences and/or different "bargaining powers," and intrahousehold resource allocation outcomes emerge as a result of interactions among those elements (e.g., McElroy and Horney 1981; Manser and Brown 1980; Chiappori 1988; Lundberg and Pollak 1993; Carter and Katz 1997).

2. Modeling Intrahousehold Resource Allocation Behavior

<u>The Collective model to Intrahousehold Allocation</u>

- Collective models (such as Chiappori 1988, 1992) have emerged as an alternative to unitary models

- Collective models, in which household decisions emerge from bargaining among members of the household, resulting in pareto efficient outcomes. These models allow different preferences among household members but decisions are made to achieve Pareto efficient outcomes

- If one is willing to put more structure on the decision-making process, two subclasses of collective models emerge, one rooted in cooperative and the other in noncooperative game theory(bargaining models)

- Collective model posits that individuals within households have different preferences and do not pool their income. Moreover, the collective model predicts that intrahousehold allocations reflect differences in preferences and "bargaining power" of individuals within the household

2. Modeling Intrahousehold Resource Allocation Behavior

The Collective model to Intrahousehold Allocation

- The collective model predicts that bargaining power determines the share of resources allocated to an individual within the household

- All collective models have two common features:

  - First, they allow different decisionmakers to have different preferences, and,

  - Second, they do not require a unique household welfare index to be interpreted as a utility function, thereby allowing the index to be dependent on prices and incomes as well as "tastes" (Chiappori 1992).

  - As a consequence, the collective model permits public policy to affect the *rules* of intrahousehold allocation

2. Modeling Intrahousehold Resource Allocation Behavior

The Collective model to Intrahousehold Allocation

- The only assumption is that household decisions are Pareto efficient

- In contrast to the Nash bargaining approach no restrictions is imposed on which point on the Pareto frontier is chosen by the household.

- Pareto efficiency only requires that chosen consumption bundles are such that an individual's welfare cannot be increased without decreasing the welfare of the other household member

2. Modeling Intrahousehold Resource Allocation Behavior

The Collective model to Intrahousehold Allocation

- The Pareto optimal allocation of consumption can be found as solution to the following maximization problem:

$$\underset{x^f,x^m,G}{Max} \ u^f\left(x^f,x^m,G\right)$$

$$s.t \qquad\qquad\qquad\qquad (P)$$

$$u^m\left(x^f,x^m,G\right) \geq \bar{u}^m$$

$$x^f + x^m + pG \leq w^f + w^m = Y$$

- The first constraint is the Pareto constraint, where u^m is some required utility level for the husband. Thus the wife's welfare is maximized subject to some pre allocated welfare level of the husband and household full budget constraint. By varying u^m, all Pareto efficient outcomes can be traced. As long as the household members' individual utility functions are strongly concave and the household budget constraint defines a convex set, the utility possibility set, describing all the attainable outcomes, is strictly convex.

2. Modeling Intrahousehold Resource Allocation Behavior

The Collective model to Intrahousehold Allocation

- As long as the household members' individual utility functions are strongly concave and the household budget constraint defines a convex set, the utility possibility set, describing all the attainable outcomes, is strictly convex. This means that it is possible to characterize all the Pareto efficient allocations as stationary points of a linear social welfare function for some positive welfare weights for both household members (Chiappori, 1988, 1992; Vermeulen, 2002).

- In the collective model the household consumption allocation problem can therefore be defined as solution to the following problem:

$$\underset{x^f,x^m,G}{Max}\ \Omega = \theta u^f\left(x^f,x^m,G\right)+\left(1-\theta\right)u^m\left(x^f,x^m,G\right)$$

$$s.t. \hspace{5cm} (C)$$

$$x^f + x^m + pG \leq w^f + w^m = Y$$

where

- q is the weight given for the wife's preferences in the household utility maximization process. The household full budget constraint defines the Pareto frontier for given utility functions for the spouses.

2. Modeling Intrahousehold Resource Allocation Behavior

The Collective model to Intrahousehold Allocation

- The outcome of household's utility maximizing process will be located on this frontier. The welfare weight q determines the final location on this Pareto frontier

- The welfare weights are the normalized Lagrangian multipliers of the maximization problem in (P) and in general they will depend on prices and income.

  - In the framework of the current example the welfare weight is a function of prices and household income

  - Since the prices for private consumptions are normalized to unity and the imputed price for the domestic good depends on the household members' hourly wages we have q (w^f, w^m, Y) for the case considered here.

- The Marshallian demands resulting from the household consumption maximization problem (C) are of the following form:
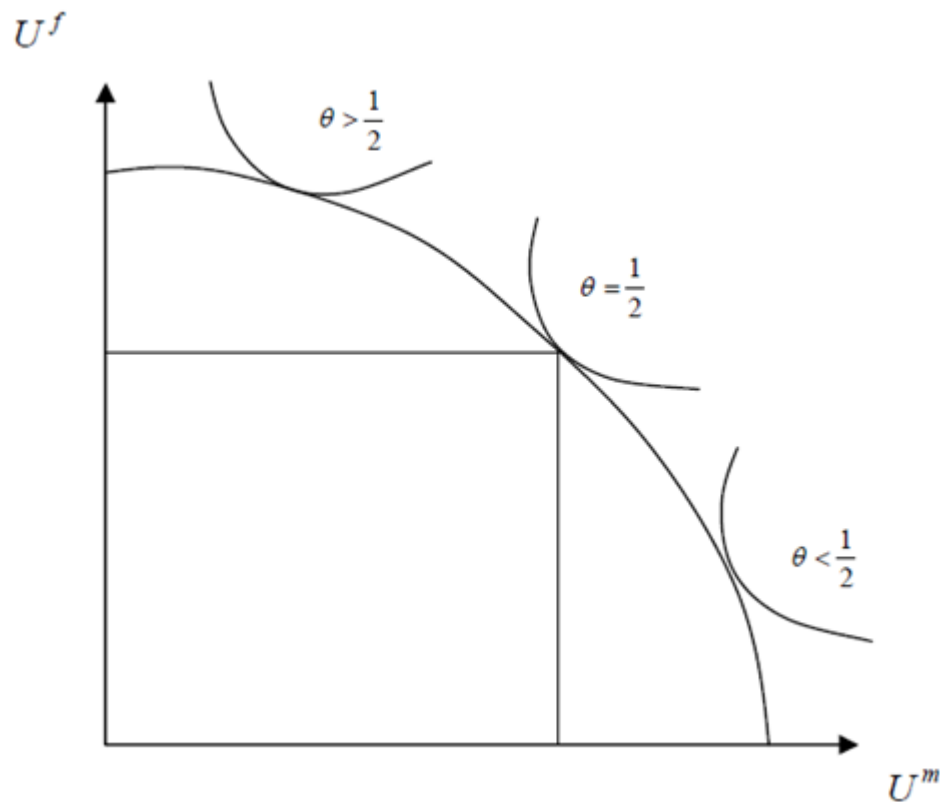
$$X^i = x^i\left(Y, p, \theta\left(w^f, w^m, Y\right)\right), \ i = f.m$$

$$G = g\left(Y, p, \theta\left(w^f, w^m, Y\right)\right)$$

2. Modeling Intrahousehold Resource Allocation Behavior

The Collective model to Intrahousehold Allocation

Household consumption allocation in the collective model can be understood graphically as follows;

- The welfare weight q (w^f, w^m, Y) for the wife is bounded between zero and unity and gives the influence of the wife on the household demands.

- For the extreme where q =1 the household utility is determined as W =U^f implying female dictator household

  - And when q =0 the household utility is determined as W = U^m implying male dictator household instead.

- For intermediate values, the household behaves as if each person has some decision power.

2. Modeling Intrahousehold Resource Allocation Behavior

The Collective model to Intrahousehold Allocation

- On each line, the point of tangency, q >1/2, q =1/2, q <1/2 , would be the outcome actually chosen (among feasible outcomes, no other outcome within the frontier achieves that level of weighted total utility, and no outcome achieving a higher level is feasible). Point q <1/2 , the point of tangency of the line representing Pareto weights that are relatively higher for a man, gives the outcome that is better for him than q >1/2; Outcome q >1/2 is better for the woman than q <1/2

- When such distribution factors change, the set of Pareto- efficient outcomes (the frontier in Figure above) is unchanged. But a change in a distribution factor will cause a shift in the relative power of household members, altering the relative weight of individual utility functions (the slope of the tangents in Figure above) and consequently changing which Pareto-efficient outcome the household chooses

- Collective models can allow for any factor not affecting individual preferences influencing the Pareto weights and thus the outcome of a collective model.

    - These can include factors that enter the family budget constraint and therefore shift the range of possible outcomes, such as individual wage rates, prices of purchased goods, and individual or household nonlabor incomes

3. Gender and intrahousehold resource allocation

Relevance of Intrahousehold Issues to Policy

- The ultimate object of concern of redistributive policies, in developing or developed countries, is the welfare of individuals

- Most empirical studies of poverty and inequality assume an equal sharing of resources between all household (or family) members

- In such studies, household members are assumed to "pool" their individual resources (e.g. earnings, government transfers and unearned income) and these pooled resources are redistributed equally based on need.

- The focus was on measuring inequality and poverty among households than gender disaggregated

3. Gender and intrahousehold resource allocation

Relevance of Intrahousehold Issues to Policy

- In particular, attempts to assess how much of the family resources are dedicated to each member, and to evaluate individual poverty in this way, are relatively rare

- In some occasions, researchers have used anthropometric information (e.g., caloric intake or body mass indexes) to proxy individual nutrition in very low-income countries

  - This type of research has revealed a very substantial level of intra-household inequality

- Traditional economic theory of how consumers spend their income has little to say about the behaviour of members of a household if there is more than one adult in the household

  - It is usually assumed that the household can be treated "as if" it were a single agent, allowing an application of the tools of consumer theory at the household level

3. Gender and intrahousehold resource allocation

Why Do Gender Differences Matter?

- Gender issues are central to the attainment of development goals and poverty reduction and play a prominent role in the Millennium Development Goals (MDGs)

    - Out of eight goals, four are directly related to gender: achieving universal primary education, promoting gender equality and empowering women, reducing infant and child mortality, and improving maternal health

- Gender also plays an important role in goals related to reducing poverty and eradicating hunger; combating HIV/AIDS, malaria, and other diseases; and ensuring environ- mental sustainability

- Given these linkages, it is difficult to see how it would be possible to meet the MDGs without addressing gender

3. Gender and intrahousehold resource allocation

<u>Why Do Gender Differences Matter?</u>

- The poverty reduction agenda in particular would benefit from attention to gender issues

  - One study (Klasen 1999, cited in World Bank 2001) estimates that if the countries in South Asia, Sub-Saharan Africa, and the Middle East and North Africa had started with the gender gap in average years of schooling that East Asia had in 1960 and closed that gender gap at the rate achieved by East Asia from 1960 to 1992, their per capita income could have grown by an additional 0.5 to 0.9 percentage points per year—substantial increases over actual growth rates

  Simulations from comparable studies using nationally representative samples from Egypt (1997) and Mozambique (1996) have shown that mothers' education is crucial
  - In Egypt, increasing mothers' schooling from "none" to "less than primary" to "completed primary schooling reduces the proportion of the population below the poverty line by 33.7 percent.

- *Women's status and child nutrition:* Evidence   from   a wide range of developing countries shows that women's status and control of resources within marriage has significant impacts on two aspects of the next generation's human capital—children's nutritional status and educational attainment

3. Gender and intrahousehold resource allocation

Gender, Intra-household Decisions and Subsidies

- Gender equality and women's empowerment are increasingly recognised as an integral aspect of development alongside central policy objectives such as the achievement of Millennium Development Goals
- There is a large and growing literature on resource allocation processes within households and the associated gender dimensions
- Çağatayand Ertürk(2004) argue that social inequalities, including those based on gender differentiation, hamper the development process and dampen economic growth

- According to Senguino (2000) the state of gender relations is readily observable in several economic arenas: a) job segregation within the paid labour market, b) the division of labour between paid and unpaid labour, c) the distribution and control of income andresourceswithinthe household, d) access to the distributions by the state, such as access to education and social safety net programmes, and e) credit in financial markets.
- The effect of gendered economic opportunities is such that the pattern of benefits is extremely skewed with men continually – either directly or indirectly – obtaining much of the credit, monopolising contacts with extension agents and more likely to have access to scarce production inputs such as fertilizer (Sender 2003).

3. Gender and intrahousehold resource allocation

Gender, Intrahousehold Decisions and Subsidies

- There are several distinct, though related, areas of gender-based differentiation within the household:

    - Access to productive resources;

    - Control over family labour;

    - Inequality and rigidities in gender divisions of labour, particularly with regard to reproductive responsibilities; inequality in consumption; and gender differentials in responsibility for household expenditure.

- These factors interact with gendered conditions of access to markets (see next section) and public institutions, which may reinforce gender biases within the household

- Socio-cultural and ideological norms about appropriate roles and behaviour for women and men constrain women's scope for independent activity, e.g. through limitations on their mobility.

3. Gender and intrahousehold resource allocation

<u>Gender</u> <u>Intra-household resource allocation poverty and inequality</u>

In the 1980s, a burgeoning literature developed challenging orthodox economic models of the household from a gender and development or feminist perspective (e.g. Harris, 1981….).

- There is now a large body of empirical evidence from developed and developing countries, much of it anthropological in nature, which challenges assumptions of a unitary household based on a western nuclear model, insulated from market relations and operating on altruistic principles.

- Bargaining and 'co-operative-conflict' models of the household, which allow for a gender analysis, are now widely accepted, although they remain difficult to operationalise for predictive or modelling purposes (e.g. Jones, 1983; Sen, 1990; Dasgupta, 1993).

- These analyses of intra-household processes raises two questions about gender and poverty.
    - First, do women and men, in the same household, experience poverty differently?
    - Second, how does household poverty effect distribution within the household; is there, for example, a tendency for gender discrimination to increase as households get poorer?
    - The answer to the first is clearly affirmative and various facets of men's and women's differential experience of poverty is happning

3. Gender and intrahousehold resource allocation

Gender Intra-household resource allocation poverty and inequality

- It is now widely recognised that there are inequalities in resource allocation within households and that the well-being of individual household members cannot necessarily be read off from the overall status of the household.
    - For these reasons, the literature on gender relations and the household has an important bearing on analyses of gender and poverty and on the kinds of interventions which are appropriate and effective in combating poverty
- Three key issues will be examined in this context:

    - Intra-household resource allocation;

    - The question of female headship of households, widely perceived to be correlated with poverty; and

    - The inter-generational transmission of poverty within the household (i.E. From parents to children)

3. Gender and intrahousehold resource allocation

<u>Gender</u> <u>Intra-household resource allocation poverty and inequality</u>

- Regardless of the measure chosen, the distribution of power and resources within the household almost always favors men

- In four countries— Bangladesh, Ethiopia, Indonesia (Sumatra), and South Africa—Quisumbing and Maluccio find that men bring more assets to marriage, in terms of both physical and human capital, than do women.
    - Smith et al. use data from 40 Demographic and Health Surveys in developing countries to construct an index of women's relative decision making power within the household and of societal gender inequality.
    - They find that women tend to be less educated than their husbands, with the difference being greatest in South Asia and the smallest in Latin America.

3. Gender and intrahousehold resource allocation

<u>Gender</u> <u>Intra-household resource allocation poverty and inequality</u>

- Women marry at younger ages in South Asia and at older ages in Latin America.
- Differences in the preferred numbers of girls and boys by region are similarly largest in South Asia and smallest in Latin America, and it is also in South Asia where boys are most preferentially treated with respect to preventive health care.
- This evidence suggests that son preference may be greater in countries where women have lower status. Based on these measures, Smith et al. ranked countries in terms of women's decisionmaking power and societal gender inequality.
  - Women have the lowest status in South Asia, followed by Sub-Saharan Africa, and then Latin America and the Caribbean.

3. Gender and intrahousehold resource allocation

Programs and Policies to Increase Women's Intra-household Resources use

- Public policies to increase women's resources and improve women's status are of two types:

  - (1) policies that aim to eradicate discrimination and

  - (2) policies that promote more active "catch-up" in women's status by explicitly targeting women

    - Evaluations of the latter type of program have shown that they can be effective in improving not only woman-specific outcomes such as earnings and decision making power and status within the household, but also child-specific outcomes such as diet, child nutrition, and a whole range of other outcomes

PART FOUR
LINK BETWEEN POVERTY, INEQUALITY AND GROWTH

CHAPTER OUTLINE

In this chapter we will study

LINK BETWEEN POVERTY, INEQUALITY AND GROWTH

- Relation between economic growth and inequality

  - Is growth good for the poor?

- Relation between economic growth and poverty

  - How does inequality affect poverty?

- Relation between inequality and poverty

1. Link between poverty, inequality and growth

- There needs to analysis of inequalities and poverty in relation to economic growth

- The debate on the relationship between poverty, inequality and economic growth is characterized by confusion and strong, polarized positions

  - Some consider economic growth to be the key for the reduction of poverty,

  - While others argue that it tends to lead to marginalization and greater inequality and poverty

- Relation in conflict?

  - Relation between economic growth and inequality

  - Relation between economic growth and poverty

1. Link between poverty, inequality and growth

The Growth Controversy: Seven Critical Questions

1. What is the extent of relative inequality, and how is this related to the extent of poverty?

2. Who are the poor and what are their economics characteristics?

3. Who benefits from economic growth?

4. Does rapid growth necessarily cause/require greater income inequality?

5. Do the poor benefit from growth?

6. Are high levels of inequality always bad?

7. What policies can reduce poverty?

2. Relation between economic growth and inequality

The Poverty, Inequality and Growth Triangle
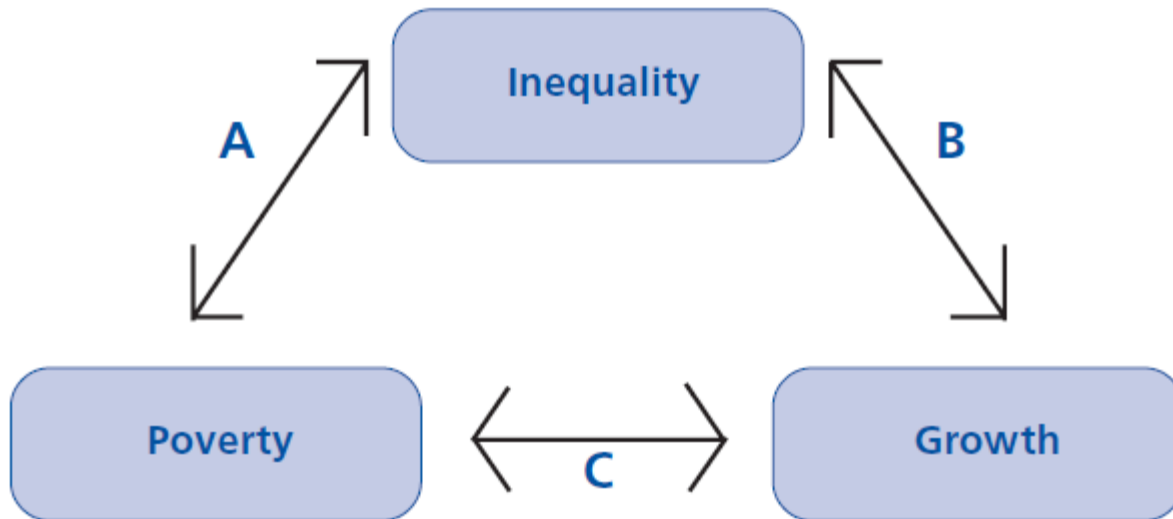
- Poverty, inequality and growth interact with one another through a set of two-way links
- Some of these links (A, B and C in the Figure) can be explored separately, but often one influences another causing indirect effects.

- For instance inequality can indirectly influence poverty as inequality affects growth (B) and growth in turn influences poverty (C)

2. Relation between economic growth and inequality

### Does growth affect the level of inequality? The classical view

- The classical study of Kuznets on the effect of growth on inequality states that, at the initial stages of the development process, inequality rises with growth; then, at later stages, inequality starts to decrease with further expansion of the economy
- The early literature on the evolution of income inequality used to be dominated by the Kuznets hypothesis, suggested by Kuznets (1955) in his presidential address to the American Economic Association.
  - According to this hypothesis, income tend to be distributed relatively equally in the poorest countries. As these countries begin to undergo economic development, their income distribution becomes more unequal. which then provided the "Kuznets's curve" or inverted-U curve. Since then, many studies attempted to assess the relationship between growth and inequality
  - This deterioration in equality is likely to be arrested and reversed again after these countries reach a certain threshold of economic development and aggregate affluence better termed as trickle down effect. Thus, both mature industrialized economies and pre industrial societies are postulated to have more egalitarian income distribution than countries at intermediate levels of economic development.

2. Relation between economic growth and inequality

Does growth affect the level of inequality? The classical view

• Kuznets curve (Kuznets 1955) implies that a change in inequality is a result of the expansion of a high-income modern sector of the economy at the expense of a low-income traditional sector

• This sectoral shift is supposed to result in an inverted 'U' shape of inequalities over time

The "Inverted-U" Kuznets Curve
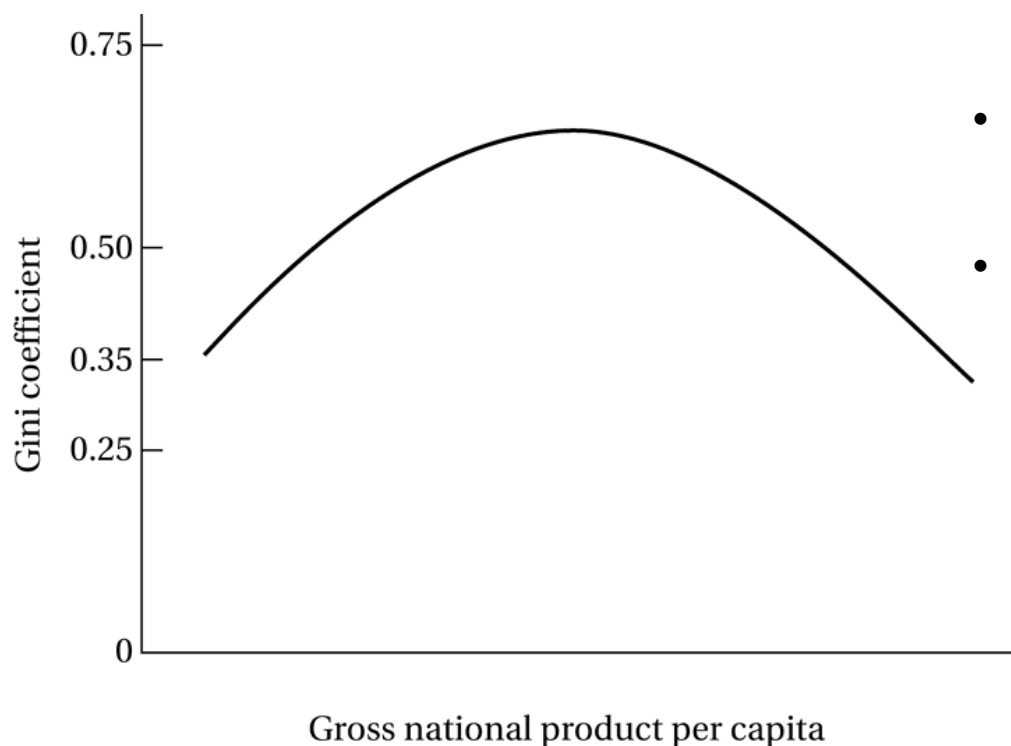
• Initially , development is low and there is no inequality (the whole society is poor)

• Intermediary stage: inequality rises with first steps of industrialization

• In the end, the economy would move from a situation of poverty with low inequality, to a situation of development with low inequality; the increase and reduction in inequality would be the transition between these two points

2. Relation between economic growth and inequality

Does growth affect the level of inequality? The classical view

- The literature contains arguments for and against the relevance and explanatory power of this general relationship (for reviews, see, for example, Ferreira 1999; Arjona, Ladaique and Pearson 2001)

- Some authors criticise the inevitability of the process (like Deininger and Squire 1997, or Atkinson 1999), while others question the direction of causation (see Ravallion and Chen 1997, for example)

- Nowadays, the dominant view is that there is no clear relation between development and inequality (across countries or though time), although not all economist agree

2. Relation between economic growth and inequality

Does growth affect the level of inequality? The recent view

- Virtually all recent evidence has rejected the Kuzent's pattern

- Recent empirical studies investigating cross-country relationships between the rate of growth and inequality conclude that growth tends to be di<u>stribution   neutral </u>on average: among growing economies, inequality tends to fall about as often as it rises (Ravallion 2004).

- In the more recent literature, as Ravallion (2004) puts it, empirical findings show vi<u>rtually   zero correlation</u>.

- Economic growth may be accompanied by a reduction in inequality or an increase (with equal probability) (for surveys, see Ravallion and Chen 1997; Dollar and Kraay 2002).
  - However, while growth seems to be distribution neutral on average, the absolute poverty-reducing effects of growth seem to be demonstrated by many studies (for recent examples, see Ravallion 2004; World Bank 2005a; 2005b)
  - The mechanism underlying this, however, needs to be clarified further, paying special attention to the role of various institutions channelling growth to societal developments.

2. Relation between economic growth and inequality

<u>Does growth affect the level of inequality? The recent view</u>

- Deininger and Squire (1996; 1998), for example, detect no statistically significant link between income and distribution in 80% of cases, with the rest being evenly split between a positive and a negative effect.

- The consensus is that inequality is no more likely to rise than it is to fall in periods of economic growth and increasing inequality is not an inevitable consequence of early growth.

- It is not the rate of economic growth or the stage of economic development but the kind of economic growth which affects inequality.

- Despite a growing body of literature on the topic, the links between growth and inequalities are far from clear

2. Relation between economic growth and inequality

Impact of Inequality on Growth

- There is as yet no consensus throughout the economics profession on the relationship between income inequality and growth

- Early thinking on the effects of inequality on growth suggested that greater inequality might be good for growth, for example by redistributing income to the rich, who save, from the poor, who do not.

  - This view implied a trade-off where more growth could be bought for the price of more inequality, with ambiguous effects on poor people.

  - The classical approach (Kaldor, 1957 and Bourguignon, 1981) suggests that the marginal propensity to save of the rich is higher than that of the poor, implying that a higher degree of initial inequality will yield higher aggregate savings, capital accumulation, and growth.

2. Relation between economic growth and inequality

Impact of Inequality on Growth

- In contrast, the modern approaches emphasize the main four channels through which income inequality lowers growth:
    1. The impact of inequality on encouraging rent- seeking activities that reduce the security of property rights;
    2. Unequal societies are more prone to difficulties in collective action—possibly reflected in political instability, a propensity for populist redistributive policies, or greater volatility in policies—all of which can lower growth;
    3. The median voter in a more unequal society is relatively poorer and favors a higher (and thus more inefficient) tax burden; and
    4. To the extent that inequality in income or assets coexists with imperfect credit markets, poorer people may be unable to invest in their human and physical capital, with adverse consequences for long-run growth.

2. Relation between economic growth and inequality

Inequality Matters for Poverty

- Poverty is Very Sensitive to Distribution Changes: The Theory is small changes in income distribution can have a large effect on poverty.
  - A simple arithmetical example can help visualise this.
    - Imagine a country where the share of national income that goes to the poorest 20% of the population increases from 6% to 6.25%. A change in income distribution of one quarter of one percent would barely affect the Gini coefficient, but for the poor this represents a 4% increase in their total income.
      - Such a small redistribution would have the same effect on poverty as doubling the annual growth of national income from 4%, which is the projected growth rate of many African countries, to 8%, which is necessary to achieve the income poverty Millenium Development Goal (MDG) from White and Anderson (2001).

2. Relation between economic growth and inequality

Inequality Matters for Poverty

Table 1   **The Effect of Small Changes in Distribution on Poverty Measures**

	Headcount (*Incidence*)	Poverty Gap (*Depth*)	Poverty Gap Squared (*Severity*)	Gini
1	0.20	0.10	0.052	0.324
2	0.40	0.08	0.018	0.312
3	0.30	0.09	0.029	0.318

Source: Creedy, J. (1998).

- Changes in income distribution have even larger effects on measures of the depth and severity of poverty, as confirmed by evidence from Cote d'Ivoire and Bangladesh (Wodon, 1999).
- Again, a numerical example helps to show the importance of distribution for poverty

In Table 1, distribution 1 has only half the headcount of 2, and compares favourably with 3, but its poverty gap and gap squared are higher than those in either 2 or 3. This is only because its Gini coefficient is marginally higher. Similarly, distribution 2 has lower poverty gap and poverty gap squared measures than 3, although its headcount is considerably higher. Again this is due to very marginal changes in the Gini coefficient.

2. Relation between economic growth and inequality

<u>Relative Importance of Growth and Inequality in Reducing Poverty</u>

- It is now clear that income distribution and economic growth both matter for poverty reduction. But what is their relative importance (i.e. links A and C in the Figure above)? This has been the subject of much recent research. Some stylised facts are emerging:

- Overall the growth effect dominates. However, this is not true in all cases or for all groups of countries

  - Inequality has been more important in reducing poverty than growth in a quarter of the case studies cited in White and Anderson (2001).

  - The dominance of growth overall may also be partly due to the growth focus of policies over the last 20 years and the weight given to cross-country studies looking at average effects across countries (the lack of time-series analysis has largely been due to insufficient data over time).

  - Arguably there is unused potential for reducing poverty in implementing distribution policies.

2. Relation between economic growth and inequality

Relative Importance of Growth and Inequality in Reducing Poverty

- Growth is less effective in reducing poverty in high inequality countries (McKay, 1997; and, Hanmer and Naschold, 2000).

- This should come as no surprise as what matters for poverty reduction is not the rate of growth, but the distribution-corrected rate of growth (Ravallion, 2001).

- In some high inequality countries, particularly those with low rates of growth, this means that changes in income distribution may be more effective in reducing poverty than growth (Hanmer and Naschold, 2000)

- Growth is less effective in reducing poverty in the least developed countries than in other developing countries (Naschold, forthcoming).

- This may be because the effect of growth on poverty reduction increases with average income (Heltberg, 2001).

- As the effect of inequality does not vary with the level of income, the relative importance of inequality for reducing poverty is greater in the poorest countries.

2. Relation between economic growth and inequality

Relative Importance of Growth and Inequality in Reducing Poverty

- Sub-Saharan Africa and least developed countries will not be able to get close to meeting the income poverty MDG through growth alone (Hanmer and Naschold, 2000; and, Naschold, forthcoming). Improvements in distribution are needed in addition.

- The effects of income distribution on increases in poverty in Africa may have been understated. Overall in sub-Saharan Africa, greater inequality may have increased poverty more than the lack of growth.

- There is also some evidence that growth has a larger effect in rural areas, while distribution has a larger effect in urban areas (Ali and Thorbecke, 2000).

- The relative effects of growth and distribution also vary depending on what measure of poverty is used.

- Distribution effects are much larger when using relative poverty indicators (Ali and Thorbecke, 2000), whereas growth effects tend to dominate changes in absolute poverty.

2. Relation between economic growth and inequality

- **Inequality Matters for Poverty Reduction**

- Two channels through which inequality impacts poverty reduction (Ravallion 1997; Bourguignon 2002; Lopez and Servén 2006):
  - The level of inequality determines what the share of the poor in the growth process will be.
    - In countries with high initial inequality, the poor tend to have a lower share of the gains from growth.
      - This suggests that high initial inequality could hurt the pace of poverty reduction by lowering the growth elasticity of poverty reduction.
- Inequality also matters for poverty through the induced growth argument
- This argues that higher inequality may entail a lower subsequent rate of growth in income, and consequently lower rate of progress in reducing absolute poverty. In the induced growth argument, there are two links – one from initial income distribution to growth, and the other from growth to poverty reduction.

2. Relation between economic growth and inequality

Growth Matters for Poverty Reduction:Is Growth Good for the Poor?

- Growth is clearly very important for poverty reduction, but so is inequality.

- Growth is less effective in reducing poverty in high inequality states as   high inequality reduces growth elasticity of poverty. In high inequality states, particularly those with low growth rates, changes in income distribution are more effective in reducing poverty than growth.

- Growth is less effective in reducing poverty in less developed states. Effect of growth on poverty reduction increases with average income.

- As the effect of inequality does not vary with level of income, the relative importance of reducing poverty is greater in poorest states.

- Growth has a larger effect in rural areas, while distribution has a larger effect in urban areas.

- Distribution sensitive measures of poverty like PG place more weight on changes in distribution of income than growth.

1. Link between poverty, inequality and growth

Is Growth Good for the Poor?

- No, if it's
    - Jobless
        - Is growth labor-intensive?
    - Ruthless
        - Does inequality worsen?
    - Voiceless
        - Does democracy expand?
    - Rootless
        - Are people able to retain their cultural identity?
    - Futureless
        - Does growth squander resources for future generations?

1. Link between poverty, inequality and growth

Is Growth Good for the Poor?

- Yes, if it is accompanied by

  - Expanded opportunity

    - Are the losers compensated by the winners?

    - Is competition open and fair?

    - Are services (education, health, transportation, communication) good and reliable?

  - Macroeconomic stability

    - Are the costs of stabilization worth the benefits?

  - Specialization in the country's comparative advantage

PART FIVE
POVERTY REDUCTION
STRATEGIES

CHAPTER OUTLINE

In this chapter we will study

POVERTY- REDUCTION STRATEGIES

- **Poverty-reduction strategies global and in Ethiopia**

1. Poverty-reduction strategies

Growth and Poverty Reduction: Pro-poor growth?

(i) What is pro-poor growth?

- Definition of Pro-Poor Growth: "**…growth that leads to significant reductions in (*absolute*) poverty**" (OECD 2001, and UN 2000)

- Too broad for economists since what definition of poverty do researchers use?   Kraay (2004) makes this point in his World Bank Working Paper No. 3225,

"When is Growth Pro-Poor?"

- A basic idea from the works of White and Anderson (2001) and Kakwani and Pernia (2000) is that any increase in growth should benefit the poor *more* than the rich.

- This really is "inequality-reducing" growth rather than pro-poor growth – is concerned with *relative poverty*.

- The question is, *"Should new growth benefit the poor more, thus increasing their incomes and thus reducing inequality, whilst the rest of society sees little income improvement?"*

1. Poverty-reduction strategies

Growth and Poverty Reduction: Pro-poor growth?

If, 'Yes'

- Then could have the issue of national income increasing by 5% but income of the poor increasing by 7%:

- The poor in the second scenario are *absolutely* better off, but are *relatively* worse-off compared to the non-poor: In the first scenario the poor are absolutely worse-off compared to scenario 2, but are relatively better off.

(Q) So which one is better?

- (A) In poor countries better absolute improvements preferred to relative improvements, at least initially…..

- Problem with the above 'inequality-reducing' scenario is that we do not know whether following an inequality-reducing growth plan will result in lower growth or higher growth.

- So we want to have improvements in both absolute levels of income (absolute poverty tackled) and relative levels of income (relative income of poor improves and income inequality declines?).

(1) This means that the incremental increase in the level of income to the poor>incremental increase in the level of income for all of society,

1. Poverty-reduction strategies

Growth and Poverty Reduction: Pro-poor growth?

Definition 3

- Take an 'international' norm of median income shares of the bottom 20% and 40% (can choose any %).

- Issue here is that "if the poor's share *currently* exceeds the international norm then their share of incremental income can be less than their current share and thus qualify as PPG"

1. Poverty-reduction strategies

Growth and Poverty Reduction: Pro-poor growth?

Another Definition of Pro-Poor Growth:

- "…*focuses on accelerating the rate of income growth of the poor and thus increase the rate of poverty reduction*" (Ravallion and Chen, 2003)

- Pro-Poor Growth = F(GDP growth)

- Changes in income equality have an ambiguous effect on pro-poor growth since can impact on GDP growth.

- Thus, if pro-poor growth is to accelerate then need to accelerate growth but also need to enhance and make poor households aware of the opportunities growth generates.

- Hence there is no one agreed definition of what PPG actually is….hence a huge debate as to whether PPG has occurred or not!!

1. Poverty-reduction strategies (PRS)

- PRS approach was initiated by the IMF and World Bank in 1999
  - Importance of country ownership of reform programs and need for a greater focus on poverty reduction

- Five core principles underlie the PRS approach
  - Country-driven
  - Result-oriented
  - Comprehensive
  - Partnership-oriented
  - Long-term perspective

1. Poverty-reduction strategies (PRS)

- A variety of approaches

but some common features:

- PRSPs

    - process is coordinated by a single unit

    - role of donors is influential and increasingly coordinated

    - consultation is mandatory

- PRS outside of the PRSP framework

    - better integrated within existing government structures

    - donor-government relationship is not uniform

    - less established participation standards

The Range of Policy Options: for Pro-Poor Growth

Key Directions of *Action Plan*

- *Prevent poverty* - Prevent people from living in poverty

- *Reduce poverty* - Increase the proportion of the population with incomes above poverty-level

- *Alleviate poverty* - Decrease the depth of poverty and improve the quality of life for people with low income

The Range of Policy Options: for Pro-Poor Growth

Two elements of strategy:

1. Promote market oriented economic growth

2. Direct investment on basic health, education of the poor

- Recommendation of Washington Consensus

  - Macroeconomic stability, more openness to trade and investment, increase public investment on infrastructure, and credit, etc

  - Combine this with labor-intensive demand growth that would benefit the poor.

- Economic growth will lead to poverty reduction-World Bank Approach. "Trickle down Approach"

- Human Development Report approach sees problems with economic growth approach. HDR argues it can be jobless, ruthless, voiceless, and rootless, & futureless or unsustainable.

The Range of Policy Options: for Pro-Poor Growth

1. Achieve Sustained Economic Growth Exceeding population growth rates;

• Permitting rising levels of personal or family income and tax revenues;

• Permitting significant levels of domestic & national savings [Note: this is a necessary but insufficient condition for enduring reductions in poverty]

The Range of Policy Options: for Pro-Poor Growth

2. Strive for "Equity with Growth"

–Make the growth process compatible with equity, that is poverty reduction, improved income distribution and human development for low income groups

–Focus sharply on the poorest.

–HOW?

3. Emphasize Investment in Human Development

–Fairly Allocated

–Education, Health, Nutrition, Clean Water, Sanitation,

–Family Planning

–Build the capabilities of the state to provide necessary public goods   [i.e. effective and efficient Tax Administration

–Plus effective and incorruptible public administration.]

The Range of Policy Options: for Pro-Poor Growth

4. Increase Demand for the abundant resource of the poor, namely labour, [i.e. rapid job creation]

- *[Difficult for Africa now due to China's manufacturing dominance due to cheap labour, mega-economies of large scale, undervalued exchange rate……..]*

- Improve the appropriateness of technology;

- At an Appropriate Time, Switch from Import Substituting Industrialization to Job-creating Export Promotion

- Promote labour intensive public works and infrastructure, especially that serving the needs of the poor;

The Range of Policy Options: for Pro-Poor Growth

5. Invest in the Physical Assets of the Poor

- Support the "Informal Sector" [in various ways;]
  - Note the role of "Micro-credit"

- Support Urban Development for low income neighbourhoods [water, sanitation, sidewalks, streets, electricity, security, etc.]

- Support Agriculture and Rural Development, focusing on low income rural peoples

- Rural roads; water & sanitation; drainage & irrigation; electrification in time

- Avoid hyper-concentrated urbanization and "First City" Bias

- Promote Agriculture & Rural Development
  - Regional Development;

The Range of Policy Options: for Pro-Poor Growth

6. Redistribute Assets

• Land Reform of various sorts;

• Democratic ownership patterns;

• Cooperative Property forms

• Taxation towards equity

• Favour small & local enterprise?

• Democratization of private ownership

• ☐Support Territorial Claims of Indigenous Peoples;

The Range of Policy Options: for Pro-Poor Growth

7. Construct Safety Nets and Transfers as possible [for middle income countries]

• Target the neediest groups;

• Support Human development –promoting activities

• [e.g. as in Brazil under Lula, financial support for the poorest families that keep their children in school;

• or as in Chile, where school lunches programs are provided in low income neighbourhoods]

THE END   THE END

POVERTY AND DEVELOPMENT

INEQUALITY AND POVERTY ANALYSIS IN STATA

INEQUALITY ANALYSIS IN STATA

Data description

Suppose that we are asked to study inequality and poverty in one of the region of a country Lolo, with four administrative zones: Zone-1, Zone-2, Zone-3, Zone-4. The following information are also available

Variable code and description

Code	Description
HHCODE	Household Code
ZONE	Zone the HH is living (1=Zone1, 2=Zone2, 3=Zone3, 4=Zone4
TEXPD	Total monthly HH expenditure in Birr
FOOD	Food expenditure
EDUCEX	Expenditure for Education
ENWA	Expenditure for Energy and water
OTHER	Other Expenditures
SAVE	Saving

Data Analysis

- We want the following inequality analysis

    - Drawing a Lorenz curve

    - Calculating inequality indices
        - Gini

        - Generalized Entropy

        - Atkinson

- How do we do it in stata?

- We use user written programs

glcurve, ineqdeco or ineqdec0

Data Analysis

Drawing a Lorenz curve

Sintax:

This is small L not the stand slash

glcurve x, gl(gl1) p(p1)

OR

glcurve x, gl(gl1) p(p1)
twoway line gl1 p1

Where x is your expenditure, income or other inequality related variable

Data Analysis

Drawing a Lorenz curve for our data
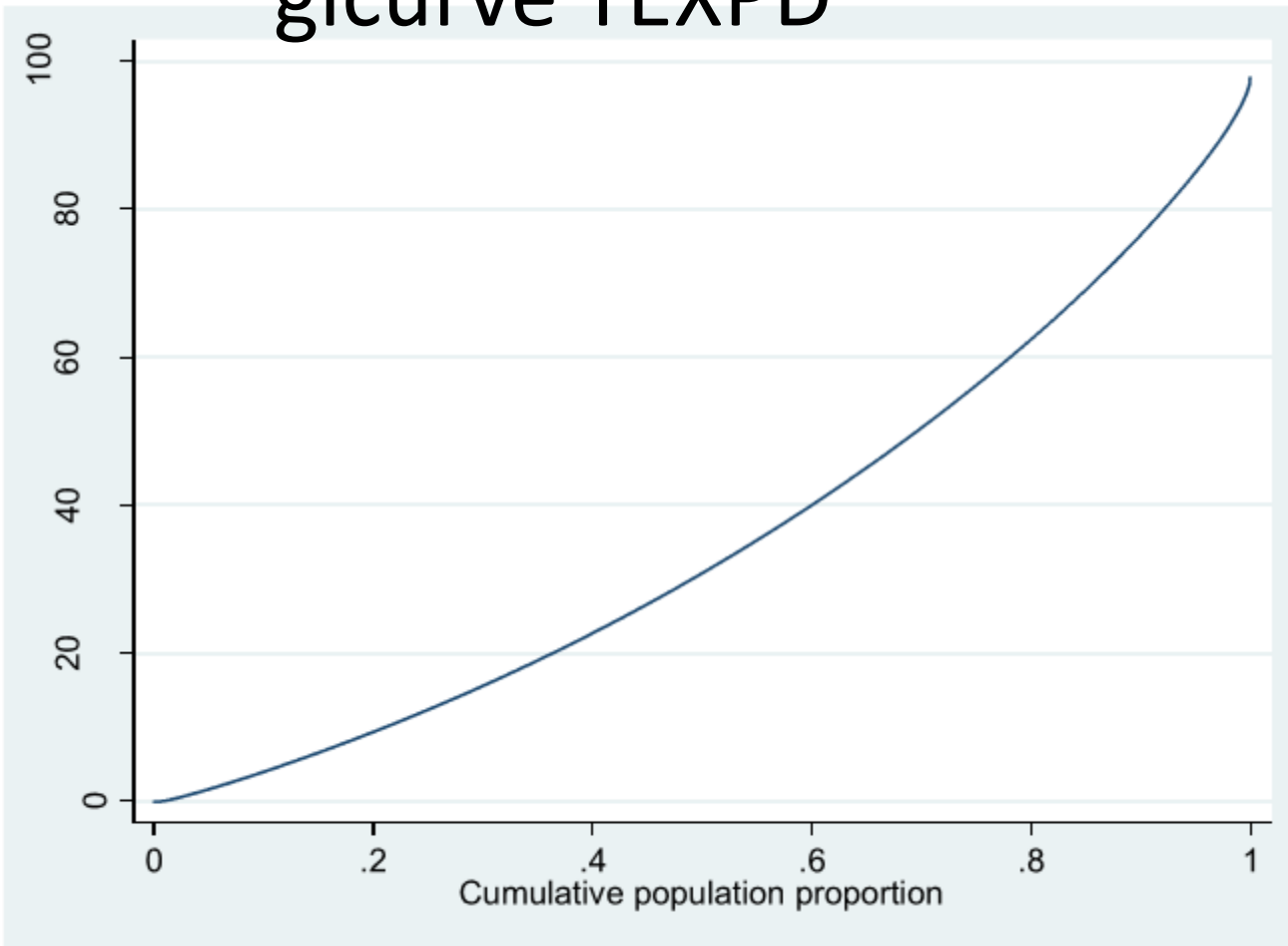
glcurve TEXPD

OR

This is small L not the stand slash

glcurve TEXPD , gl(gl1) p(p1)
twoway line gl1 p1

Data Analysis

Drawing a Lorenz curve for our data

glcurve TEXPD

Data Analysis

Drawing a Lorenz curve for our data

glcurve TEXPD , gl(gl1) p(p1)

twoway line gl1 p1
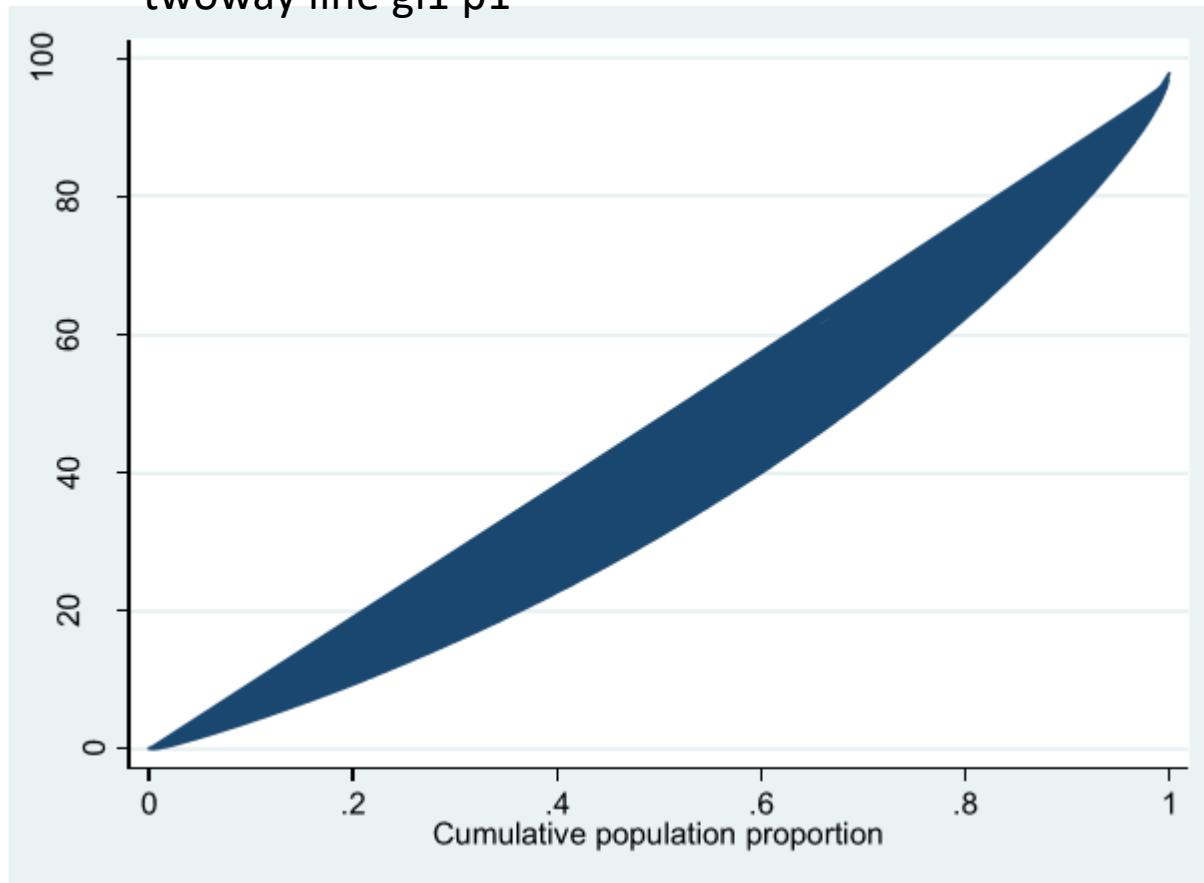
Interpretation
The visual observation of the curve shows lower or moderate inequality

Data Analysis

Calculating inequality indices [Gini, Generalized Entropy, Atkinson]

- Calculating inequality indices using user written **ineqdeco, ineqdec0, and ineqfac** commands

Indices calculated:

- Gini

- Generalized Entropy, $a = -1, 0, 1, 2$

- Atkinson , $e = 0.5, 1, 2$, plus

- optional decompositions by population subgroup, and

Data Analysis

Calculating inequality indices [Gini, Generalized Entropy, Atkinson]

Contrasting with ineqdeco with ineqdec0

- ineqdec0 allows zero and negative values, but only reports results for subset of indices (percentile ratios, $I2$, Gini)

- We then mostly use **ineqdeco**

- **Ineqfac: ineqfac** provides an exact decomposition of the inequality of total income into inequality contributions from each of the factor components of total income. More specifically, given the set of factors

- **facvars = {factor_1 factor_2 ... factor_F},**

Data Analysis

Calculating inequality indices [Gini, Generalized Entropy, Atkinson]

```
. ineqdeco TEXPD

Warning: TEXPD has 20 values < 0. Not used in calculations

Percentile ratios


All obs        p90/p10      p90/p50      p10/p50      p75/p25


               3.178        1.821        0.573        1.916


Generalized Entropy indices GE(a), where a = income difference
 sensitivity parameter, and Gini coefficient


All obs        GE(-1)       GE(0)        GE(1)        GE(2)         Gini


               0.19133      0.12327      0.13595      0.25783      0.26735


Atkinson indices, A(e), where e > 0 is the inequality aversion parameter


All obs        A(0.5)       A(1)         A(2)


               0.06112      0.11597      0.27675
```

Lower inequality because Gini is less than…

Data Analysis

Calculating inequality indices [Gini, Generalized Entropy, Atkinson]

- We can examine differences in inequality by Zone group using the command **ineqdeco TEXPD , by(ZONE)**

```
Subgroup indices: GE_k(a) and Gini_k


Zone the
HH is
living        GE(-1)       GE(0)        GE(1)        GE(2)         Gini

  Zone 1     0.16692      0.08428      0.08649      0.13489       0.21734
  Zone 2     0.17179      0.12547      0.13309      0.18248       0.26921
  Zone 3     0.16336      0.09921      0.09542      0.10707       0.23705
  Zone 4     0.19543      0.16110      0.21470      0.65039       0.30616
```

Zone4 is with higher inequality

Data Analysis

Inequality decomposition by factor components

Syntax:

ineqfac x1 x2 x3…..

For our data:

ineqfac FOOD EDUCEX ENWA OTHER SAVE

Data Analysis

```
. ineqfac FOOD EDUCEX ENWA OTHER SAVE

Inequality decomposition by factor components

Factor        100*s_f         S_f      100*m_f/m        CV_f    CV_f/CV(Total)

FOOD          76.5399       0.5675      77.9344       0.9267       1.2498
EDUCEX        30.5651       0.2266       7.0518       6.1095       8.2394
ENWA          -5.8607      -0.0435      18.3515       1.0293       1.3881
OTHER          0.3614       0.0027       1.0625       6.1406       8.2813
SAVE          -1.6057      -0.0119      -4.4002      -0.7910      -1.0668

Total        100.0000       0.7415     100.0000       0.7415       1.0000

Note: The proportionate contribution of factor f to inequality of Total,
      s_f = rho_f*sd(f)/sd(Total). S_f = s_f*CV(Total).
      m_f = mean(f). sd(f) = std.dev. of f. CV_f = sd(f)/m_f.
```

- According to the Shorrocks decomposition rule, food has the largest proportionate inequality contribution of all the components, some 77% of total inequality. The second largest proportionate contribution is from Education, 28%
- Observe that Other and Save have an equalizing effect on total inequality, though relatively small ones.

INCOME POVERTY ANALYSIS IN STATA

Data Analysis

- We want the following income poverty analysis

  - three poverty indices from the Foster, Greer and Thorbecke (1984) class,

  - FGT(a), plus related statistics (such as mean income among the poor).

  - FGT(0) is the headcount ratio (the proportion poor);

  - FGT(1) is the average normalized poverty gap;

  - FGT(2) is the average squared normalized poverty gap

Data Analysis

- How do we do it in stata?

- We use user written programs

Syntax:

povdeco varname [weights] [if exp] [in range] [, pline(#) varpline(zvar) bygroup(groupvar) summarize]

Options:

bygroup(groupvar) requests inequality decompositions by population subgroup, with subgroup membership summarized by groupvar.

<u>Data Analysis:</u> Calculating income poverty

Or: Let us assume poverty line(Z) is Z where z is some quantitative amount

povdeco x [aw = wgtvar], pline(z)

povdeco x [aw = wgtvar], pline(z) by(groupvar)

- For our data let us say Z (monthly poverty line) is 58.00 birr

- What is headcount ratio, poverty gap, and squered poverty gap

Data Analysis: Calculating income poverty

```
. povdeco TEXPD, pline(58)

Warning: TEXPD has 20 values < 0. Used in calculations

Foster-Greer-Thorbecke poverty indices, FGT(a)


   All obs          a=0              a=1              a=2

                 0.20139          0.03947          0.02674


FGT(0): headcount ratio (proportion poor)
FGT(1): average normalised poverty gap
FGT(2): average squared normalised poverty gap
```

The overall proportion of the population poor is 20.1%, poverty gap 3.9%, squared 2.7%

Data Analysis: Calculating income poverty

For subgroup

povdeco TEXPD, pline(58) by(ZONE)   OR

povdeco ZONE, pline(58) by(ZONE)

```
Subgroup poverty 'share', S_k = v_k.FGT_k(a)/FGT(a)

Zone the
HH is
living              a=0           a=1           a=2

   Zone 1       0.37485       0.38395       0.39311
   Zone 2       0.10448       0.10514       0.10576
   Zone 3       0.31437       0.31071       0.30695
   Zone 4       0.20630       0.20019       0.19418
```

ZONE1 is with the highest share followed by zone3

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MULTIDIMENSIONAL POVERTY ANALYSIS IN STATA

Data description

Suppose that we are asked to study **Multidimensional Poverty** in one of the region of a country Lolo, with four administrative zones: The following information are also available

Variable code and description

Code	Description
HHCODE	Household Code
ZONE	Zone the HH is living (1=Zone1, 2=Zone2, 3=Zone3, 4=Zone4
ADTEDU	Adult education deprivation (0= ND, 1=D)
CHLDEDU	Child Education Deprivation(0= ND, 1=D)
UNDTENDEATH	Under 10 Death(0= ND, 1=D)
NUTRITIONDEP	Nutritional Deprivation(0= ND, 1=D)
ELCDEP	Electricity deprivation(0= ND, 1=D)
SanDEPV	Sanitation deprivation(0= ND, 1=D)
WATDEP	Water deprivation(0= ND, 1=D)
ENERDEP	Cooking fuel Deprivation(0= ND, 1=D)
FLDEP	Floor deprivation(0= ND, 1=D)
ASDEP	Asset ownership deprivation(0= ND, 1=D)

Data Analysis

- We want the following Multi dimensional poverty analysis
  - H : Multidimensional Deprivation Headcount
  - A: Average Deprivation Share Among Poor
  - M0 : Adjusted Multidimensional Deprivation Headcount

- Given a poverty cutoff and suitable set of indicators and weigths, the command mpi computes the following output:
- H: The multidimensional-poverty headcount (the share of the deprived individuals in the reference population)
- A: The intensity of multidimensional poverty (the average percentage of simultaneous deprivations suffered by the individuals identified as multidimensionally poor)
- M0: The MPI or Adjusted Headcount Ratio, M0 = H*A, which simultaneously accounts for both the frequency of deprived individuals and the intensity of their multiple deprivations

<u>Data Analysis:</u> Calculating Multidimensional poverty

- How do we do it in stata?
- We use user written programs

Syntax:

mpi d1(varlist) [d2(varlist) … w1(numlist) w2(numlist) …] [if] [in] [weight], cutoff(real) [by(varname)]

Where

- d1…. are the dimensions (education, health, living standard)

- w1 are the weights under each dimension

<u>Data Analysis:</u> Calculating Multidimensional poverty

options   Description

Main

  d1(varlist), ...   List of deprivation domains, each domain should be composed of at least 1 indicator.

  cutoff(real)   Poverty cutoff, the percentage of weighted indicators required to identify who is multidimensionally poor.

Optional

  w1(numlist), ...   List of weights that are applied to the list of deprivation domains. The default option is equal weighting across domains.

  by(varname)   Provide an exact decomposition of M0, H and A across the categories of varname.

Data Analysis: Calculating Multidimensional poverty

mpi d1(ADTEDU CHLDEDU) d2(UNDTENDEATH NUTRITIONDEP) d3(ELCDEP SanDEPV WATDEP ENERDEP FLDEP ASDEP), cutoff(0.33)

Index	Total
H	.3678
A	.4497
M0	.1654

Indicator	Total
ADTEDU	.1407
CHLDEDU	.05905
UNDTENDEATH	.03643
NUTRITIONDEP	.2312
ELCDEP	.01382
SanDEPV	.1189
WATDEP	.0691
ENERDEP	.121
FLDEP	.1131
_H	.09673
Total	1

H : Multidimensional Deprivation Headcount : Moderate

A: Average Deprivation Share Among Poor

M0 : Adjusted Multidimensional Deprivation Headcount

Data Analysis: Calculating Multidimensional poverty

Further decomposition by Zone

mpi d1(ADTEDU CHLDEDU) d2(UNDTENDEATH NUTRITIONDEP) d3(ELCDEP SanDEPV WATDEP ENERDEP FLDEP ASDEP), cutoff(0.33) by(ZONE)

```
Decomposition of M0 by subgroups

MPI by: ZONE
```

	Level 1	Level 2	Level 3	Level 4	Total
H	.44	.3262	.3462	.3793	.3716
A	.4646	.4508	.446	.4552	.4545
M0	.2044	.1471	.1544	.1727	.1689
pop share	.2182	.2332	.2594	.2893	1

Zone1 is more MPI poor

Data Analysis: Calculating Multidimensional poverty

Further decomposition by Zone

mpi d1(ADTEDU CHLDEDU) d2(UNDTENDEATH NUTRITIONDEP) d3(ELCDEP SanDEPV WATDEP ENERDEP FLDEP ASDEP), cutoff(0.33) by(SEX)

```
Decomposition of M0 by subgroups
_____

MPI by: SEX
```

	Level 1	Level 2	Total
H	.2828	.4581	.3716
A	.4459	.4597	.4545
M0	.1261	.2106	.1689
pop share	.4938	.5062	1

Women are more MPI poor than male