LECTURE 7

INCOME DISTRIBUTION AND GROWTH:

THE TWO-WAY INTER-RELATIONSHIP

(LECTURE 7 AND 8 WILL BE PRESENTED JOINTLY)

A. Introduction

B. Inter-Relationships Within Countries

*** Effects of Growth on Distribution:**

Theory and Evidence

***Effects of Distribution on Growth:**

Theory* and *Evidence

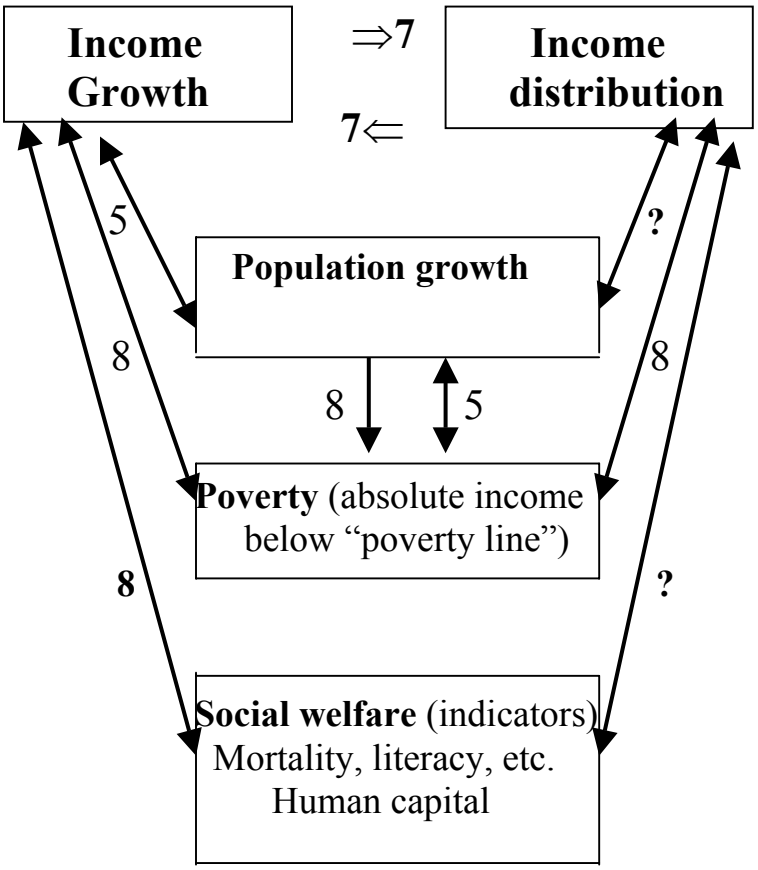
C. Global Income Distribution over Time—

Relative and Absolute

Literature referred to, see last slide

[7.2] The Growth, Distribution, Poverty, Population Complex

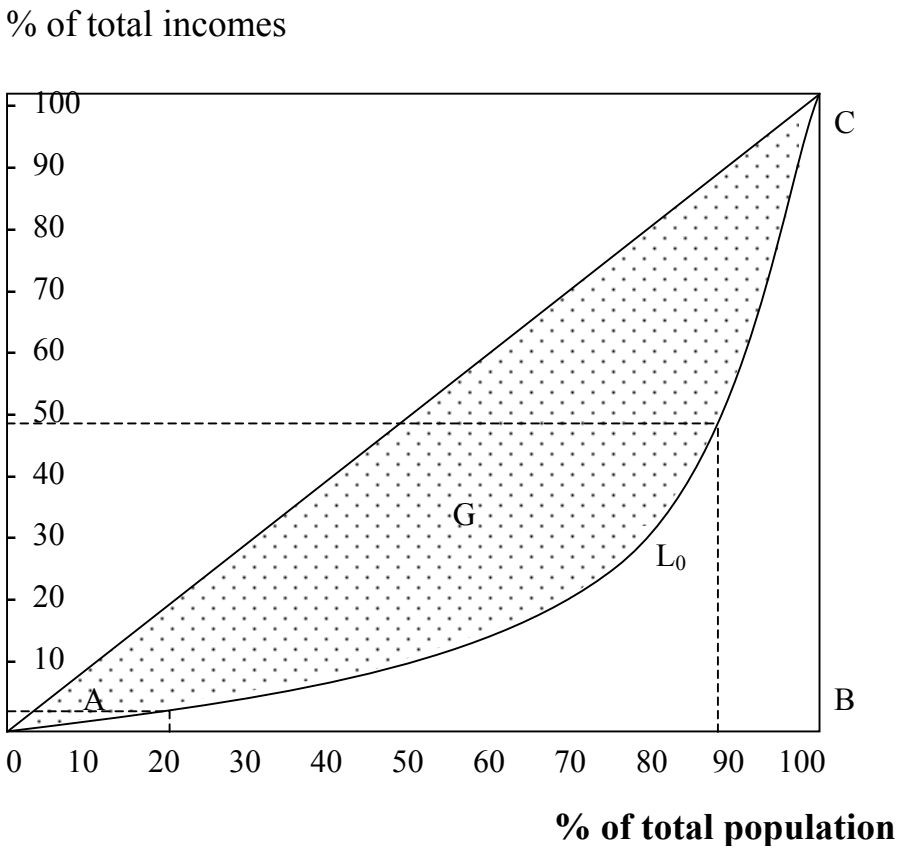
Even if one is *not* concerned with **income distribution** from a **normative perspective**, the effect of growth on distribution has to be assessed if there are **causal effects** in both directions (feedback effects):



Numbers in graph indicate in which lecture the issue is addressed

[7.3] Measurements of Inequality

Figure 7.1. Lorentz diagram showing the <u>relative</u> distribution of income in a country (or across countries)



Most measures of Income Distribution can be related to the Lorentz Curve, such as **Gini** and **Rich/Poor Income Ratios**

[7.4] Selected Inequality Measurements and Indicators

1) The GINI coefficient (graphically area **a** as share of triangle **b** in [7.3]) (0<GINI<100)

2) Share of total incomes of the richest 10 % of population as a ratio to the incomes of the poorest 10 % (or the 20% richest to 20% poorest)

The choice of measurement depends upon what **question** it is intended to shed light on. If, for instance the question is how the poorest stand in relation to the richest, the 10 to 10 ratio may be useful. The choice of measurement is usually **ad hoc** and the ranking of countries may be sensitive to the choice of measurement (see [7.5]).

Limitations with the Gini:

1) Two **different** distributions can yield exactly the same GINI coefficient

2) Gives only information on the shape of the **entire distribution**, not on how the poorest, for instance, relate to the mean or to the better off.

3) Very **insensitive** to changes in the lower tail

4) **Real** income distribution within (and across) countries should ideally take variations in **prices** (e.g. of food) into consideration, which is seldom done

[7.5] Table 7.1. Income distribution within selected countries with different measures

Country (year)	GNP/ capita ($PPP)	% share of total income of rich and poor 10 per cent of population		Ratio rich/ poor	GINI
	2001	Rich 10	Poor 10	(2)/(3)	
	(1)	(2)	(3)	(4)	(5)
Most uneven					
Cent African Rep	1,300	47.7	0.7	**68**	**61**
Brazil	7,070	47.6	0.9	**53**	**60**
Colombia	6,790	46.1	1.1	**42**	**57**
South Africa	10,910	45.9	1.1	**42**	**57**
Relatively even					
China	3,950	30.4	2.4	**13**	**40**
India	2,820	33.5	3.5	**19**	**38**
Bangladesh	1,600	28.6	3.9	**7**	**34**
Tanzania	520	30.1	2.8	**11**	**38**
Developed countries					
USA	34,280	30.5	1.8	**17**	**41**
UK	24,340	27.3	2.6	**11**	**36**
Japan	25,550	21.7	4.8	**5**	**25**
Sweden	23,800	20.1	3,7	**5**	**25**

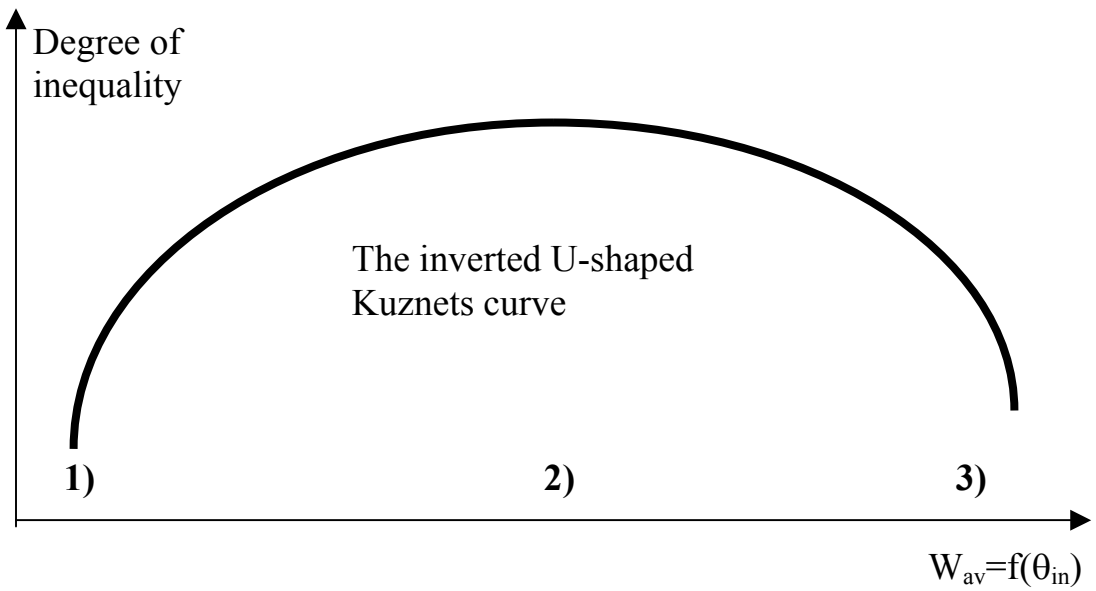
Sources: *World Development Report* 2000/01, Table 5, and *World Development Indicators*, 2003, Table 1.

Developments *over time* for some 40 countries, see Li, et al, 1999

[7.6] Effect of Economic Growth on Income Distribution

Three hypotheses:

<u>Hypothesis 1</u>: the Kuznets ‘ inverse U-curve (see [7.7])



Phase 1) All labour in agriculture (even distribution within=all equally poor)

Phase 2) Labour allocated evenly between agriculture and industry, **assuming industry wages to exceed ag wages** (e.g. due to minimum wage legislation or trade union power). Large inequality due to income differences between agriculture and industry

Phase 3) Almost all labour in industry (even distribution within=almost all equally “rich”)

[7.7] Effects of Economic Growth on Income distribution (cont'd)

<u>Hypothesis 2</u>: Growth always leads to increased inequality

Growth in market economies can not take place without a worsening of the income distribution (cf. Ray, ch 7).

1) Wealth and other income-generating **assets are unevenly distributed** historically and only the rich can save and invest, meaning that income growth goes to the **initially rich**.

2) **Technological progress** is inherently biased in favour of the skilled and educated, whose marginal product goes up the most, while the unskilled falls behind.

3) Only the rich can put up **collateral** and have access to **credit** for investment (cf. Grameen Bank and its >1000 offsprings) (Also see Morduch, 1999). Muhammad Yunus first economist to receive the Nobel *Peace* Prize!

[OH 7.8] Grameen Bank

In 2006, Muhammad Yunus and Grameen Bank shared the Nobel Peace Price.

Set up in Bangladesh in 1970s. Features:

* Provides **micro loans** to poor people (mainly women) at low interest rates and short pay-back periods.

* No collateral, relies on **group solidarity**; each group (<10 persons) is jointly responsible for paying back.

* When interest payments and pay backs are made, the group is entitled to **larger loans**.

Micro-credit institutions enormously popular and are now found aplenty in **almost all** developing countries.

Successful? World Bank evaluations say **evidence is scarce**, but do not dismiss that micro-credit can be helpful for poor people.

[7.9] Effects of Economic Growth on Income distribution (cont'd)

<u>Hypothesis 3</u>: There is no general linkage from growth to income distribution; growth affects distribution through many channels.

Variables expected to **reduce inequality?**

1) Public health care provision (with a lag);
2) Primary/secondary school enrolment (with a lag);
3) Openness to trade;
4) Rule of law and democracy;
5) Financial market access for the poor.

Variables expected to **increase inequality?**

6) Share of oil and minerals in exports;
7) Macroeconomic instability (e.g. inflation);
8) Corruption;

There are many hypotheses, and also a few attempts to **model** these relationships, but only one "mechanism" at the time ⇒ empirical problem to find out what mechanisms predominate (also see Dollar and Kraay 2002 and Aghion et al, 1999).

[7.10] Effects of Economic Growth on Income Distribution: Empirical Findings, Cross-Country Observations

Reduced form Tests of the Kuznets curve:

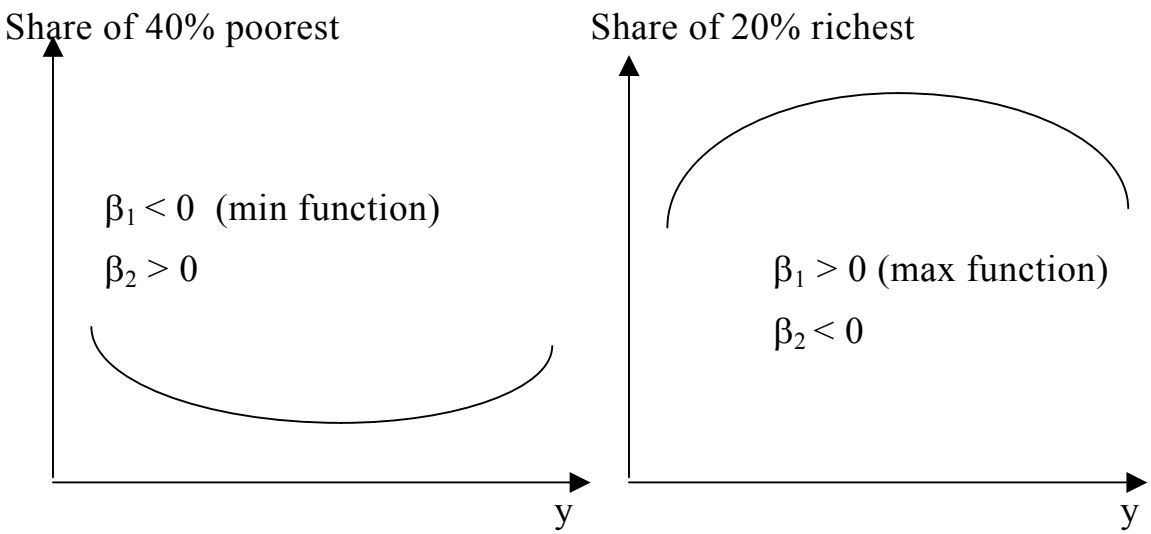
1) Deninger and Squire (1998)

Base model:

$$\mathbf{s_i = \alpha + \beta_1 y + \beta_2 y^2 + D + \varepsilon \quad (quadratic)}$$

where $s_i = 1,....5$ (is the share of five **income quintiles** in total incomes in respective country). **D** is a dummy distinguishing different types of countries (rich vs poor), or by region; **y** is per capita income.

Figure 7.4. Expected Income Shares with Higher per capita Income



[7.11] Results from Deninger and Squire (1998)

Result: Confirms earlier findings of an **inverted** U-shaped relationship, but **weak significance**

[Results in a graph to be presented in class]

Reservations:

1) When controlled for **regional-specific** differences, significance disappears ("Latin America effect")

2) Sensitive to **alternative specifications** of the estimated function (.e.g. inverse or quadratic specification)

3) Few other explanatory factors than income and investment (**omitted variable bias?**) (e.g. trade regime and human capital)

4) No **robustness** test

5) **Cross-section**; time-series inferences difficult to draw

[7.12] Effects of Growth on Income Distribution:

Further Empirical Findings

Figure 7.5: Results from Dollar and Kraay (2002)

[Pasted graph to be shown in class]

Figure 7.6. Results from Barro (2000) on the basis of panel data

[Pasted graph to be shown in class]

Barro's investigation is the most extensive one so far using cross-country observations (i.e. a panel)

The main conclusions to be drawn from the **cross-country and panel** studies are:

1) There is a **weak support** for the Kuznets (1st) hypothesis.

2) There is **no support** for the (2nd) hypothesis that as countries grow richer, income distribution will inevitably become more uneven.

3) Cross-country evidence is **not sufficient** to allow strong conclusions.

4) **Omitted variable bias** - 3rd hypothesis? (OH 7.13)

[7.13] Other factors than income that affects income distribution

Studies: Li et al (1998) and Barro (2000)

Li et al tests the following base model on panel data from 49 countries:

$$GINI = \alpha + \beta_1 MYSC_{60} + \beta_2 CIVLIB + \beta_3 LDGINI + \beta_4 FNDP + \mu,$$

where $MYSC_{60}$ is the initial mean years of **schooling** (more schooling, Gini lower (more equal distribution)

CIVLIB is the **civil liberty** index (more liberty, more equal).

LDGINI is the Gini distribution of **land (**more uneven land distribution, Gini higher).

FNDP is a measure of **financial development** (the more well developed financial sector, the lower Gini).

They find the expected significant effects (Table 6) and conduct a series of further robustness tests (Table 8) in which only one more variable turns out significant and robust: **initial income per capita (higher income, Gini lower**). Other variables, such as investment ratio, urbanisation, and trade openness turned out non-significant and non-robust.

[OH 7.13a] **Other factors than income that affects income distribution (cont'd)**

Omitted variables?

Interesting variables **not included**: share of exports from minerals and oil, GNI/C squared, and corruption index. Could be a nice **Master level thesis** to undertake a study including these variables!

Interesting study from UNU-WIDER on the curse of richness in the form of valuable raw materials!

Concluding remark on cross-country studies:

The underlying hypotheses are that as income grows in individual countries, income distribution is affected (one way or the other). The proper tests should hence be made on **time-series** data for countries.

[7.14] Effects of Growth on Income Distribution (cont'd)

Time series-estimates; Deninger and Squire (1996, 1998), Li (1998)

Time series data (observations for more than one year) available only for about 40 countries for relatively short periods (about 40 years)

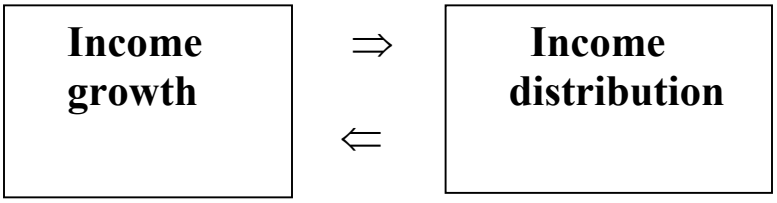
In Deninger and Squire's **test** (1998, Table 7) on time series data, only 5 countries (Brazil, Hungary, Mexico, Philippines and Thailand) had a statistically significant **inverted** U-curve development. Another 4 countries had a statistically confirmed development of a U-curve **proper**, signifying that first income distribution became more even and then more uneven (Costa Rica, India, United States and UK). The remaining 30 countries had **no statistically significant change** in either direction.

A more recent investigation of income distribution in China (Ravallion and Chen 2007) shows that it has become significantly more uneven over the 1982-2001 period. Gini increased from 28 to 40. Recent evidence from India confirms the increase in inequality in all dimensions (Sen and Himashu 2004). More than half the population in all developing countries has hence seen distribution deteriorate!

(It may also be that changes are **reversed**: In the US, income and wealth distribution grow more unequal up to around 1870, then declined over the period up to 1970; and then became considerably more unequal again. Contradicts the Kuznets hypothesis!

[7.15] The Reverse Relationship: Effects of Income Distribution on Growth—Theory

Note that even if one is ***not*** concerned with income distribution from a **normative perspective**, the effect of growth on distribution has to be assessed if there are **causal** effects in **both directions** (feedback effects):



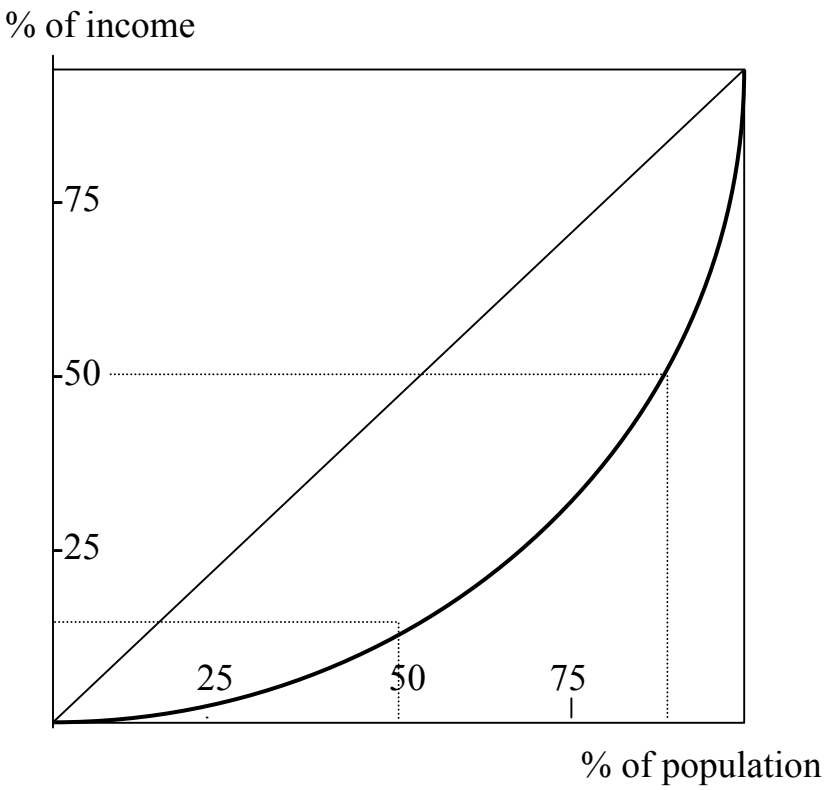
Four main **mechanisms** through which **income distribution** may affect economic **growth** (Barro, 2000, pp. 5-8):

1. Through demand for **redistribution policies** that induces distortions [7.16]
2. Through **savings** and investment [7.17]
3. Through imperfections in **credit markets** and markets for human capital creation
4. **Social unrest** (civil strife and war)

[3 and 4 are not explicitly dealt with here; see Barro, 2000].

[7.16] Income Distribution: Effects on Growth (cont'd)

Figure 7.7. Median voter type of model and redistribution

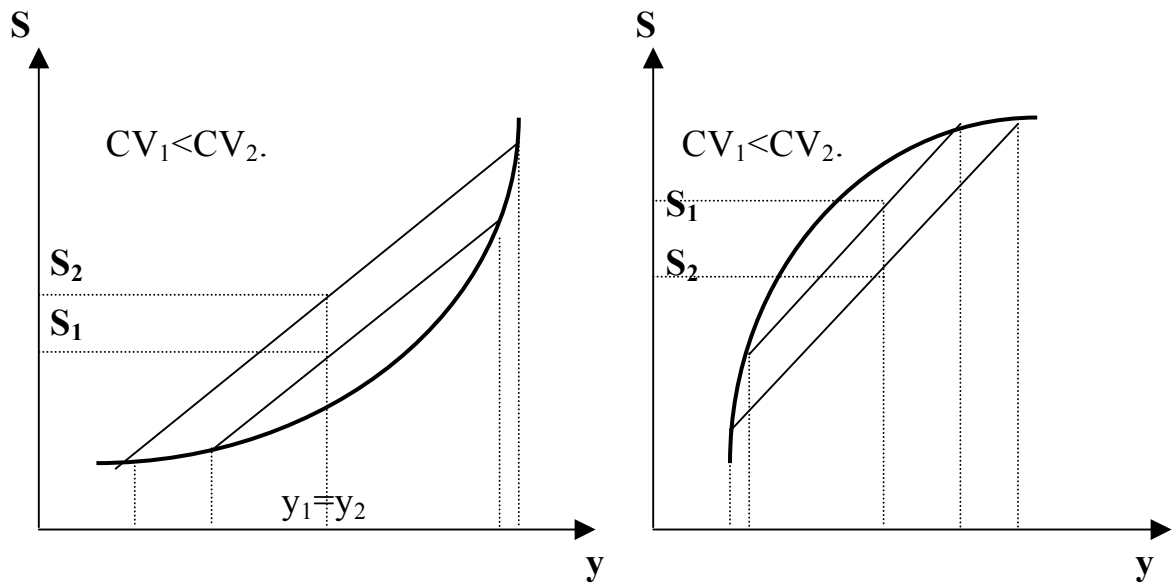


The Figure depicts a situation with a relatively **uneven distribution** in a country. Half the population only have some 15% of total incomes and about 12% of the population have half of all incomes.

Since **median** income (50th percentile) is lower than **average** income, more than half the population will favour redistribution, from the rich with above average income, to those below. **If** accomplished through taxation that distorts the **allocation** of factors of production and/or reduces the **investment** ratio, income redistribution will lead to lower growth.

[7.17] Income Distribution: Effects on Growth (cont'd)

Figure 7.8: Different savings functions and income distribution



(1) Kaldor/Stiglitz; the rich save more

(2) The rich saves less (or abroad!)

Assumptions:

1) Two countries with the **same** per-capita income ($y_1=y_2$)

2) The income are assumed to be more **equally distributed in country 1** (as measured by the coefficient of variation ($CV=\sigma/y$); that is $CV_1<CV_2$.

Outcomes:

1) When the rich save proportionally **more** (the savings function is **convex**), the more uneven distribution (country 2), the higher the savings ratio.

2) When the rich saves proportionally **less** (the savings function is **concave**), the more even distribution (country 1), the higher the savings ratio.

[7.18] Income Distribution: Effects on Growth: Empirics

Up to rather recently, the **conventional view** was that an **uneven distribution of incomes was beneficial for subsequent growth**, mainly through the Kaldor/Stiglitz savings/investment mechanism [7.17], although very little empirical evidence was available.

In the mid 1990s, several independent studies, based on cross-country regressions and new data on income distribution, came to the **opposite result**: even income distribution enhances growth in subsequent periods!

[Regression results from Clarke (1995) will be shown in class]

These results corroborated that the four "mechanisms" identified by Barro (see [7.15]), seem to dominate. Barro (2000) extended the analysis by using **panel data** and examined the relationship **distinguishing between low- and high income countries.**

His results **confirmed** the findings of earlier studies, but only for **developing** countries. For the **rich countries**, he found that inequality in income distribution has a positive effect on subsequent growth.

[7.19] Summary of Inter-linkages between Income Distribution and Economic Growth at the Level of Countries

1) Effects of Growth on Distribution

a) No strong evidence on inverted U-shape on cross-country data

b) No systematic effect of growth on income distribution <u>in any direction</u>, either on <u>cross-country</u> or <u>time-series</u> data

2) Effects of Distribution on Growth

a) Significant and <u>robust correlation</u> between initial equality and subsequent growth among <u>developing countries</u>

b) <u>Size of effects</u>. Countries with one SD of income inequality below the average have between 1.3 and 2.5 percentage points <u>higher growth</u> than countries with 2 SD above the mean.

c) <u>Policy implications</u>: (1) not necessarily to redistribute income through government action, but rather for (2) governments to follow income-distribution friendly growth strategies.

[7.20] World Income Distribution — Which Way?

(Svedberg, 2004)

A. World income distribution has deteriorated dramatically according to some—improved according to others

Study	Period	Distribution	Results
UNDP 1999	1960-1995	Ratio rich 20% /poor 20%	Drastic increase in ratio
World Bank 2000/01	1960-1997	Ratio rich 5%/ poor 5 %	Drastic increase in ratio
Firebaugh 1999 Schultz 1998 Melchior 2000 Sala-i-Martin 2002	1960-1988 1960-1988 1965-1997 1970-1998	Various ratios and Gini	Slight *fall* in Gini and in ratios

(Graphic presentation of main results in [7.21])

B. Main reasons for differences in results:

*** Different ratios are used and, hence, countries covered**

*** Measures of income differs (PPP or unadjusted)**

*** Definition of distribution differs (ratios vs Gini)**

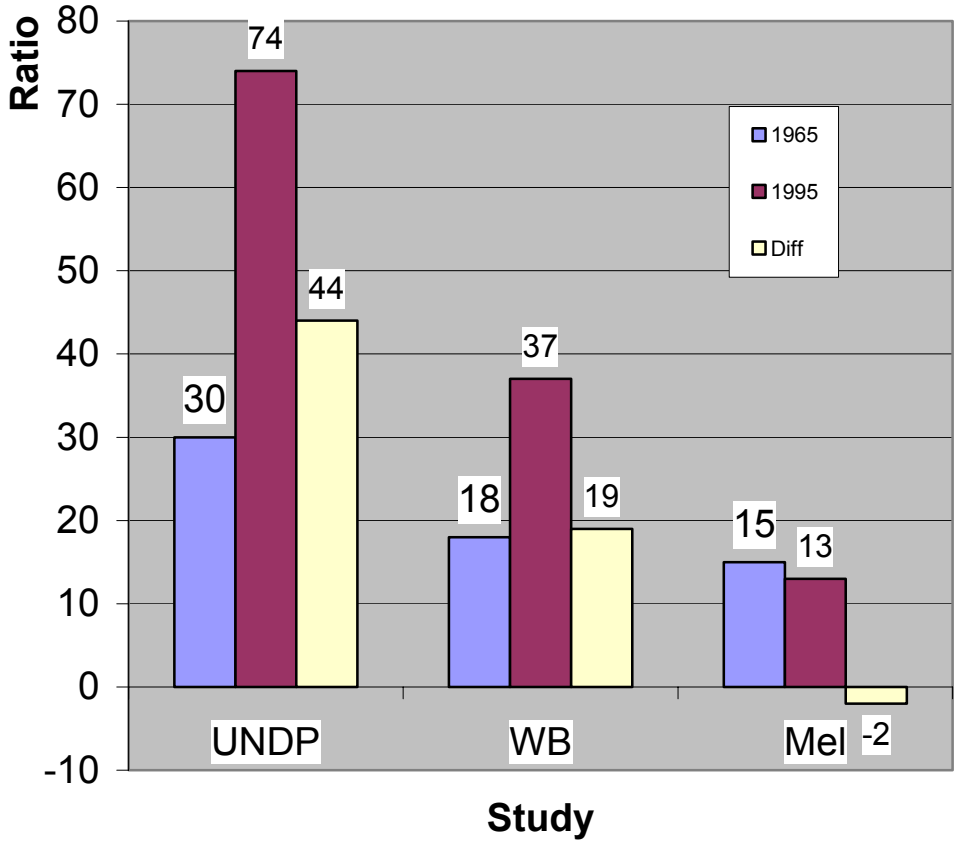
Other reasons:

*** Different years of comparison**

*** Data sampling differ (two years or time series)**

[7.21] World Income Distribution — Which Way? (cont'd)

Figure 7.9. Ratio of per capita income in the richest and the poorest countries, selected studies, 1965 and 1995



[7.22] World Income Distribution — Which Way? (cont'd)

Charateristics and Flaws in the Various Studies

1) UNDP

a) Per-capita incomes in the countries with the 20% richest population to per-capita income in the countries with 20% poorest population

b) **No adjustment** for PPP in income data

c) Comparison of two **random** years

2) World Bank

a) Per-capita incomes in the 20 countries with the highest income as a ratio to the 20 countries with the lowest incomes (irrespective of the size of the population) (and **ad hoc exclusion** of China!)

b) Adjustment for **PPP** in income data

c) Comparison of two **random** years

3) Melchoir and Sala-i-Martin (and several other studies)

a) Per-capita incomes in the countries with the 20% richest to the per-capita income in the countries with 20% poorest (same as UNDP)

b) Adjustment for PPP in income data (same as World Bank)

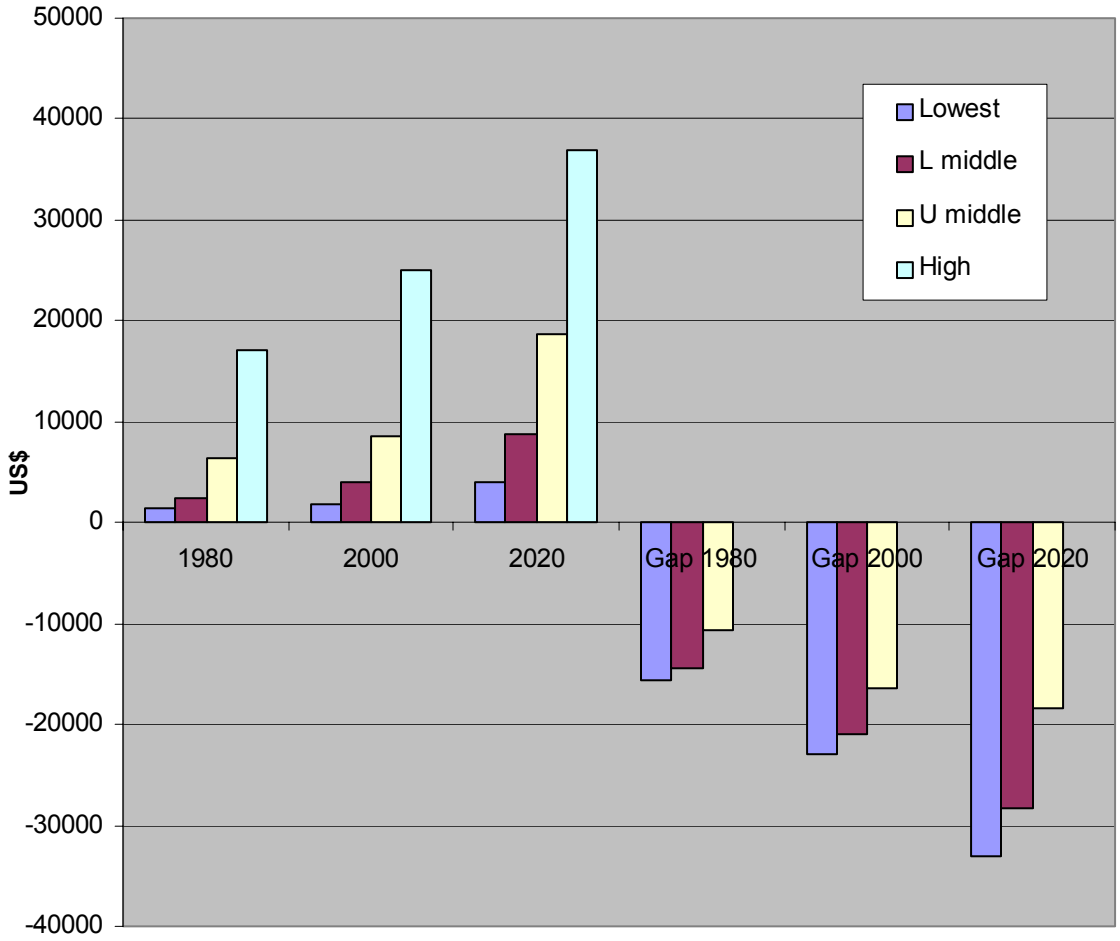
c) Estimates for every single year 1965-1997

Tentative conclusions from the Melchior and Sala-i-Martin studies (the most reliable):

* **Distribution deteriorated before 1965 but has been rather stable since**
* **Distribution in the bottom end deteriorated (SS Africa)**

[7.23] More or less unchanged relative distribution across countries, but growing absolute income gaps

Figure 7.10. Absolute income and income gaps between developing countries, by income group, and the high income countries in 1980, 2000 and projection for year 2020 (real per-capita income in US$, PPP-adjusted)



Year of per-capita income and gaps

[7.24] Comments to Figure 7.10

The two most **left-ward** sets of bars show actual per-capita incomes in **1980 and 2000**, in four broad groups of developing countries, differentiated by income level, as estimated by the World Bank.

The third set of bars from the left depicts projections of per-capita incomes, based on the assumption that between 2000 and 2020, per-capita income will grow by **4% annually in all the three categories of developing countries**, while only by **2% in the high income countries**.

The two next sets of bars as we move to the right in the figure show the **actual absolute income gaps in 1980 and 2000**. These gaps have increased for all three groups of developing countries. Finally, the **projected** income gaps in year **2020** are found in the right-most part of the figure. The projected **absolute gaps** will tend to grow notably even though the **relative growth** rate is assumed to be **twice as high** in the developing countries as compared to rich countries.

In the growth literature, when developing countries are growing faster in **relative** terms, this is referred to as "**convergence**", or that they are "**catching up**". Without bringing in the time dimension for this process explicitly, this terminology is misleading. If the relative growth rate is higher in poor countries than in rich countries, they will eventually "catch up", but this may take many generations and in between, the **absolute income gaps will inevitably increase** (also see the graphs on projected growth in the US and India in lecture 1).

Literature to be read:

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Perotti. R. (1996), 'Growth, Income Distribution and Democracy', *Journal of Economic Growth*, Vol.1, No.2, pp.149-187.

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