

Lecture 8

Inequality and development

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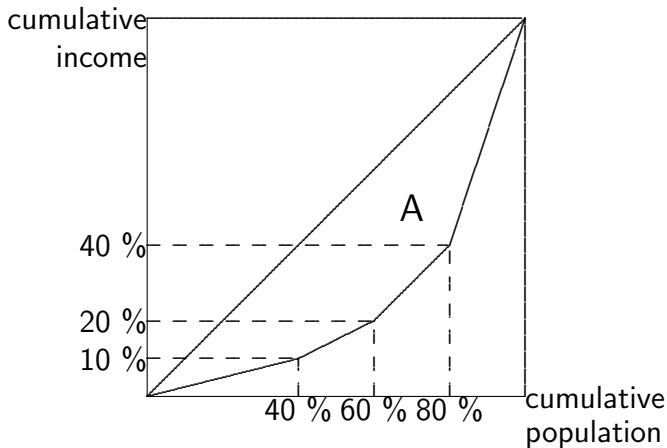
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Inequality and Development: Interconnections

- ▶ Readings:
 - ▶ Ray Chapter 7
 - ▶ Galor (2012) Inequality, Human Capital Formation and the Process of Development
- ▶ How is inequality related to development?
 - ▶ Two way causal relationship
- ▶ Economic development → inequality
 - ▶ Kuznets' inverted U-hypothesis
- ▶ Inequality → economic development
 - ▶ The Classical approach
 - ▶ The Political Economy approach
 - ▶ The Credit Market Imperfections approach
 - ▶ The Unified Theory of Inequality and Growth

Measuring inequality

The Lorenz curve and the GINI coefficient

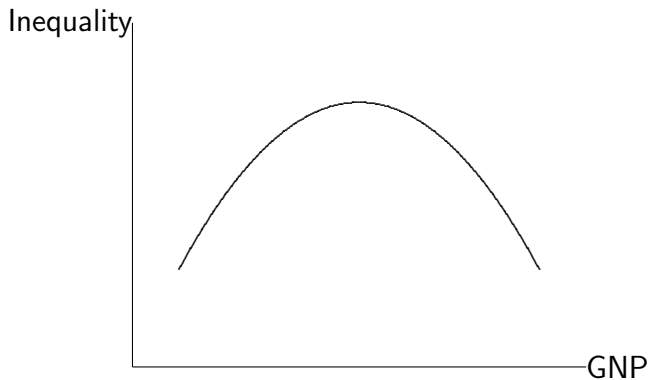


$$GINI = 2A$$

How does economic development affect inequality?

Kuznets' curve

Kuznets' inverted U-hypothesis (1955): as the economy grows inequality first increases and then decreases



Kuznets' curve: Mechanisms

- ▶ Kuznets (1955):
 - ▶ movements of workers from agriculture to industry
 - ▶ industrial sector characterized by higher mean income and a higher degree of inequality
 - ▶ when industry is small this leads to increased inequality
 - ▶ as the industry grows inequality starts decreasing
- ▶ Uneven and compensatory changes (Ray):
 - ▶ Growth is uneven: one sector takes off creating inequality (Uneven changes)
 - ▶ Later, income spreads through the economy (Compensatory changes)

Testing the inverted U-hypothesis

- ▶ Data limitations
- ▶ Kuznets (1955):
 - ▶ used the ratio of the income share of the richest 20 % to the poorest 60 %
 - ▶ compared a small set of developing countries to a small set of developed countries
- ▶ Paukert (1973):
 - ▶ used the GINI
 - ▶ cross-section of 56 countries

Testing the inverted U-hypothesis

Problem

- ▶ Countries may not have the same inequality-income relationship
- ▶ The Latin effect: Most high-inequality middle-income countries are Latin American
 - ▶ are there other structural reasons for high inequality in Latin America?

Solution

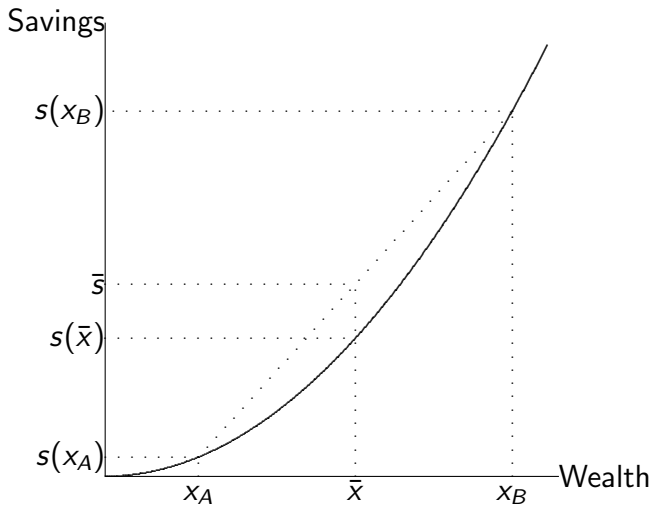
- ▶ Inclusion of country-specific intercept dummies
 - ▶ requires data for several points of time
 - ▶ Deininger and Squire (1998) find that the inverted U vanishes

How does inequality affect economic development?

The Classical approach

- ▶ Inequality is beneficial for growth
- ▶ Marginal savings rate increases with wealth
- ▶ Inequality channels resources towards individuals whose marg. propensity to save is higher
 - ▶ higher aggregate savings
 - ▶ more capital accumulation
 - ▶ economic growth

The Classical approach



The Classical approach

“The underdeveloped countries must consciously accept a philosophy of growth and shelve for the distant future all ideas of equitable distribution and welfare state. It should be recognized that these are luxuries which only developed countries can afford.”

-Mahbub ul Haq (1966)

The Political Economy approach

- ▶ Inequality is harmful for growth
- ▶ Alesina and Rodrik (1994) and Persson and Tabellini (1994): Fiscal policy explanation
 - ▶ Redistribution policies (taxes) chosen by the median voter
 - ▶ In an unequal society the median voter is poorer than the mean
 - ▶ Taxes imposed on the margin are distortionary and slows growth
- ▶ Alternative mechanism (Saint-Paul and Verdier 1996):
 - ▶ The decisive voter is not the median voter
 - ▶ In an unequal society the decisive voter tends to be richer than the mean
 - ▶ preventing efficient redistribution policies

The Political Economy approach: Evidence

- ▶ Endogeneity problem
 - ▶ Use initial inequalities in wealth
- ▶ Alesina and Rodrik (1994) and Persson and Tabellini (1994): Negative relationship between inequality and growth
 - ▶ Poor evidence for the particular mechanism
- ▶ Deininger and Squire (1998): evidence against the fiscal policy explanation
 - ▶ Negative relationship between inequality and growth in undemocratic countries
 - ▶ No significant relationship in democratic countries
- ▶ Perotti (1996): Inequality associated with lower taxes which is associated with lower growth

The Credit Market Imperfections approach

- ▶ In the presence of credit market imperfections inequality leads to under-investment in growth-enhancing activities
- ▶ Galor and Zeira (1988, 1993): investment in human capital
- ▶ Banerjee and Newman (1993): investment in entrepreneurial activities

The Galor Zeira Model

Production

- ▶ Output is produced in two sectors:
- ▶ Skilled labor sector: neoclassical technology

$$Y_t^s = F(K_t, L_t^s) \equiv L_t^s f(k_t); \quad k_t \equiv K_t/L_t^s$$

- ▶ Unskilled labor sector: linear technology

$$Y_t^u = aL_t^u$$

Factor prices

- ▶ Perfect competition

- ▶ wage:

$$w_t^u = a$$

$$w_t^s = f(k_t) - f'(k_t)k_t \equiv w^s(k_t)$$

- ▶ interest rate: $r_t = f'(k_t)$
- ▶ Producers can borrow and individuals can lend at constant world interest rate $r_t = r$
- ▶ This determines the capital intensity and the skilled wage

$$k_t = f'^{-1}(r) \equiv k$$

$$w_t^s = w^s(k) \equiv w^s$$

$$w_t^u = a \equiv w^u$$

Individuals

Overlapping generations: each individual

- ▶ has one parent and one child
- ▶ leaves a bequest to the child
- ▶ lives in two periods:
- ▶ in the first period
 - ▶ consumption is integral in parent's consumption
 - ▶ may choose to work as unskilled and save, or invest in acquiring skill
- ▶ second period:

$$u_t = \alpha \log c_{t+1} + (1 - \alpha) \log b_{t+1}$$

$$c_{t+1} + b_{t+1} \leq \omega_{t+1}$$

- ▶ maximizing wealth ω_{t+1} gives max utility

Occupational choice

- ▶ Investment in human capital characterized by:
 - ▶ imperfect capital markets: $r < i$
 - ▶ fixed cost

$$h = \theta w^s + (1 - \theta)w^u$$

- ▶ Wealth of an unskilled worker:

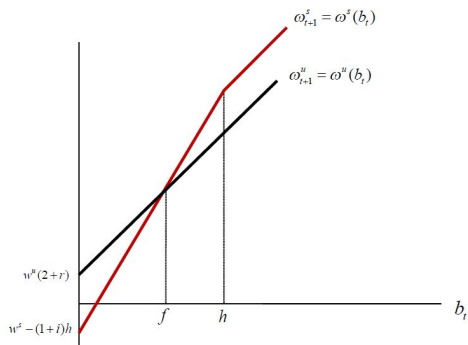
$$\omega_{t+1}^u = w^u + (1 + r)w^u + (1 + r)b_t \equiv \omega^u(b_t)$$

- ▶ Wealth of a skilled worker:

$$\omega_{t+1}^s = \begin{cases} w^s - (h - b_t)(1 + i) & \text{if } b_t < h \\ w^s + (b_t - h)(1 + r) & \text{if } b_t \geq h \end{cases}$$

Occupational choice

- ▶ Acquire education if
$$\omega_{t+1}^s = \omega^s(b_t) > \omega_{t+1}^u = \omega^u(b_t)$$
- ▶ Assumptions: Education is
 - ▶ profitable for those who can finance the entire cost
 - ▶ not profitable for those who have to borrow the whole amount



Short-run effects: skill composition

- ▶ Income distribution translates directly into the distribution of bequests
- ▶ Distr. of bequests affects occupational choice in the short run

$$l_{t+1}^u = \int_0^f D_t(b_t) db_t$$
$$l_{t+1}^s = \int_f^\infty D_t(b_t) db_t$$

- ▶ Occupational choice today determines
 - ▶ GNP today
 - ▶ the income distribution in next period

Dynamics

The evolution of bequests is determined by the sequence $\{b_t\}_{t=0}^{\infty}$ such that

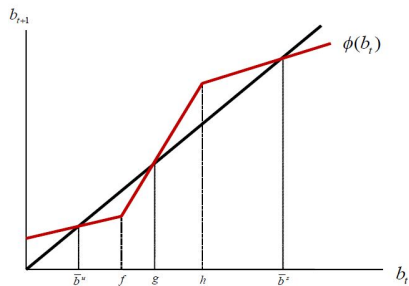
$$b_{t+1}^s = \phi(b_t) \equiv \begin{cases} (1 - \alpha)[w^u(2 + r) + (1 + r)b_t] & \text{if } 0 \leq b_t \leq f \\ (1 - \alpha)[w^s - (h - b_t)(1 + i)] & \text{if } f \leq b_t \leq h \\ (1 - \alpha)[w^s + (b_t - h)(1 + r)] & \text{if } h \leq b_t \end{cases}$$

$\phi(b_t)$ is piecewise linear:

$$\phi'(b_t) = \begin{cases} (1 - \alpha)(1 + r) & \text{if } 0 \leq b_t \leq f \\ (1 - \alpha)(1 + i) & \text{if } f \leq b_t \leq h \\ (1 - \alpha)(1 + r) & \text{if } h \leq b_t \end{cases}$$

Dynamics

Multiple locally stable ss-equilibria



g is locally unstable:

$$\lim_{t \rightarrow \infty} b_t = \begin{cases} \bar{b}^u & \text{if } b_t < g \\ \bar{b}^s & \text{if } b_t > g \end{cases}$$

Long-run effects: skill composition

- ▶ Distr. of bequests today determines the long-run skill composition

$$\lim_{t \rightarrow \infty} l_{t+1}^u = \int_0^g D_t(b_t) db_t \equiv \bar{l}^u$$
$$\lim_{t \rightarrow \infty} l_{t+1}^s = \int_g^\infty D_t(b_t) db_t \equiv \bar{l}^s$$

- ▶ Over time, society will be segmented into a group of rich and a group of poor.

Skill composition and GNP

- ▶ GNP will consist of wage and capital income of both the young and the old:

$$\begin{aligned}\bar{Y} &= \left(\overbrace{w^u}^{I_1^u} + \overbrace{w^u + (\bar{b}^u + w^u)r}^{I_2^u} \right) \overbrace{(1 - \bar{I}^s)}^{\bar{I}^u} \\ &\quad + \left(\overbrace{w^s + r(\bar{b}^s - h)}^{I_2^s} \right) \bar{I}^s \\ &= w^u(2 + r) + r\bar{b}^u \\ &\quad + ((w^s - rh) - w^u(2 + r) + r(\bar{b}^s - \bar{b}^u))\bar{I}^s \\ \frac{\partial \bar{Y}}{\partial \bar{I}^s} &= (w^s - rh) - w^u(2 + r) + r(\bar{b}^s - \bar{b}^u) > 0\end{aligned}$$

Long-run effects on GNP

- ▶ Income per capita is higher the larger the fraction of skilled workers
- ▶ The fraction of skilled workers is higher the lower the threshold level of bequests, g
- ▶ This threshold level is lower
 - ▶ the lower the cost of education
 - ▶ the lower the interest rate for borrowers
 - ▶ the higher the wage of skilled workers
 - ▶ the higher the propensity to bequeath

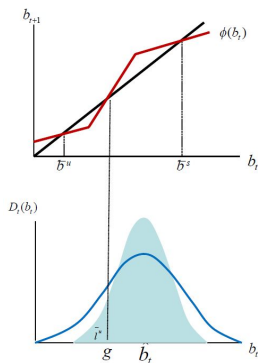
Income distribution and economic growth

Does inequality hurt economic growth in the Galor-Zeira model?

Income distribution and economic growth

Does inequality hurt economic growth in the Galor-Zeira model?

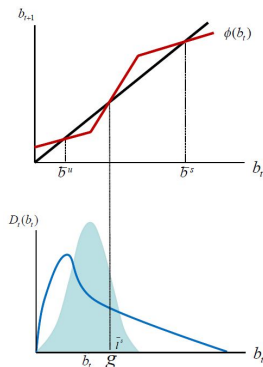
1) For a rich economy inequality may hurt growth



Income distribution and economic growth

Does inequality hurt economic growth in the Galor-Zeira model?

2) For a poor economy inequality may enhance growth



Robustness

- ▶ Are the qualitative results robust to changes in the basic assumptions?
 - ▶ labor-augmenting technological progress
 - ▶ general utility function of consumption and bequest (or the child's utility)
 - ▶ endogenization of factor prices
 - ▶ an increasing savings rate allows for divisible investment in human capital.
 - ▶ alternative types of credit market imperfections

The Galor Zeira model: Evidence

- ▶ Perotti (1996):
 - ▶ Inequality associated with lower levels of human capital formation
 - ▶ Lower levels of human capital formation associated with lower growth

The unified theory of inequality and growth

- ▶ Galor and Moav (2004)
- ▶ Reconciliation of
 - ▶ the Classical approach (inequality channels resources towards people with a high marginal propensity to save, increasing capital accumulation → growth)
 - ▶ the Credit Market Imperfections approach (in sufficiently wealthy economies equality alleviates adverse effects of credit constraints on human capital formation → growth)

The unified theory of inequality and growth

- ▶ The effect of inequality on growth depends on the relative return to physical and human capital
- ▶ Where the relative return to physical capital is high inequality is beneficial for growth
 - ▶ Inequality channels resources to towards people with a high marg. propensity to save
- ▶ Where the relative return to human capital is high inequality is harmful for growth
 - ▶ Equality alleviates adverse effects of credit constraints on human capital formation
 - ▶ Diminishing returns to human capital → investments should be spread among individuals

The unified theory of inequality and growth

- ▶ Early industrialization: physical capital prime engine for growth
- ▶ Later: human capital prime engine for growth
- ▶ Relative return to physical capital decreased
- ▶ The impact of inequality on growth went from positive to negative

The unified theory of inequality and growth: Model

- ▶ Capital accumulation determined from domestic savings (endogenous r)
- ▶ Savings rate increasing in wealth
- ▶ No borrowing
- ▶ Investments in human capital divisible, and subject to decreasing returns
- ▶ Homogeneous group of rich and poor

The unified theory of inequality and growth: Model

- ▶ Capital-labor ratio starts out below \tilde{k} : no investments in human capital
 - ▶ All bequests are invested in physical capital
 - ▶ Only the rich leave bequests \rightarrow inequality growth-enhancing
- ▶ As physical capital accumulates k exceeds \tilde{k}
 - ▶ The rich starts investing in education in addition to physical capital

The unified theory of inequality and growth: Model

- ▶ Physical accumulates further $k > \hat{k}$: Wages increase sufficiently to make poor people able to acquire some education
 - ▶ Marginal return from education higher for the poor
→ redistribution growth-enhancing
- ▶ As wages increase further, credit-constraints are no longer binding
 - ▶ Inequality no effect on growth

The Unified Theory: Evidence

- ▶ Becker et al. (2011):
 - ▶ Investigates empirically the role of education in the process of industrialization in Prussia
 - ▶ Finds that education played an important role
 - ▶ The role of education has been intensified in later stages of industrialization

Historical evidence

- ▶ Agrarian economies and early industrialization characterized by low skill requirements
- ▶ Capital accumulation and technological progress made skilled labor
 - ▶ more valuable for capitalists → lobbied for provision of public education
 - ▶ more costly for land-owners → lobbied against

Historical evidence

- ▶ Concentration of land ownership associated with lower levels of investments in human capital
 - ▶ Concentration of power among those who have interests in opposing provision of public education
- ▶ In several countries education reforms have followed land reform
- ▶ These countries have experienced rapid economic growth

Relevance for LDC's

- ▶ International capital inflows diminishes the positive role of inequality
- ▶ Adoption of new technology has increased the return to human capital
- ▶ Given credit constraints, equality has a positive effect on growth

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