AGRODEP Training Session

"Poverty measurement and analysis"

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International Food Policy Research Institute (IFPRI), Dakar
April 24–27 2012

Session 6

Pro-poor growth

Content

Notions of pro-poor growth

The pro-poor growth measurement toolkit

The ‘Non-anonymous approach’

[outline]

Notions of pro-poor growth

The pro-poor growth measurement toolkit

The 'Non-anonymous approach'

The issue

Does economic growth benefit the poor? If yes, by how much? How to assess the 'pro-poorness' of growth?

Technically, this is a normative evaluation of the change in the income (or expenditure or welfare) distribution from one period F_0 to another F_1, $W(\Delta_F)$.

Assessment on the basis of

- summary indicators
- graphical tools

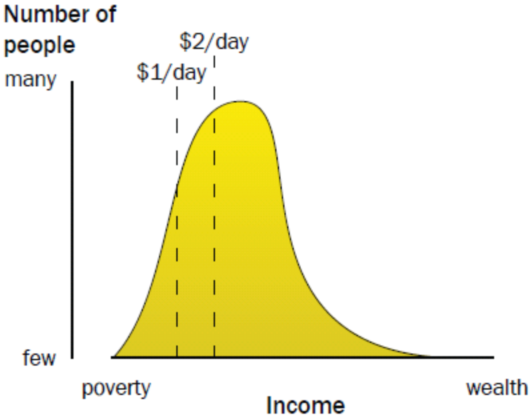
Differing views...

Relatively abundant recent methodological literature: see Kakwani & Pernia (2000), Ravallion & Chen (2003), Son (2004), Kakwani & Son (2008), Duclos (2009), Essama-Nssah & Lambert (2009)

But discussion of baseline definition of what is pro-poor growth? remains unclear (at least IMHO!)
Literature refers to

- So-called 'absolute perspective': growth is said to be 'pro-poor' if economic growth goes with poverty reduction (often linked to Ravallion & Chen, 2003)
  - closely linked to poverty reduction targets
- So-called 'relative perspective': growth is said to be 'pro-poor' if incomes of the poor grow proportionately more than for the non-poor
  - closely linked to inequality reduction targets

Absolute or relative?



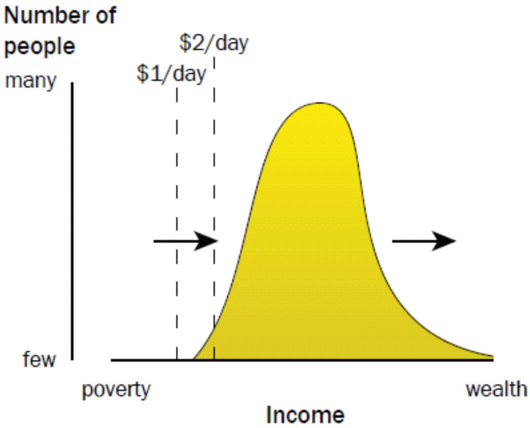
Income distribution in a developing country with a large incidence of poverty

Wealth is very unevenly distributed, with many people struggling with low income.

http://www.grida.no/graphicslib/detail/pro-poor-growth-absolute-and-relative-definition_10c0

Absolute or relative?

The absolute case



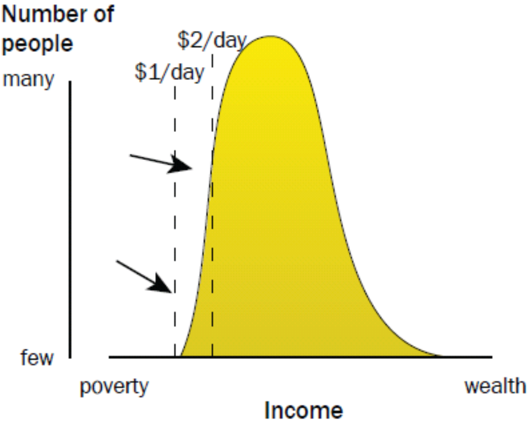
Pro-poor growth, Absolute definition

The poor benefit from growth in the economy, and no consideration is given to the income distribution.

http://www.grida.no/graphicslib/detail/pro-poor-growth-absolute-and-relative-definition_10c0

Absolute or relative?

The relative case



Pro-poor growth, Relative definition

Through targeted strategic efforts, the growth in economy among the poor has a higher growth rate than the rest of the economy, thus changing the income distribution.

http://www.grida.no/graphicslib/detail/pro-poor-growth-absolute-and-relative-definition_10c0

Differing views...

But some commentators have argued that none of these two views are satisfactory *per se* and that, in effect, they should be observed jointly: to be labelled ‘pro-poor’, growth should reduce levels of poverty *and* be biased towards the poor compared to the non-poor (Osmani 2005)

Alone, none of the so-called ‘absolute’ and ‘relative’ perspectives are sufficient:

- this is obvious for the absolute perspective
- this becomes obvious for the relative perspective when growth is negative (in which case the absolute perspective is stronger!)

A unified view: Benchmarking poverty change

A more fruitful point of departure in the recent literature involves contrasting poverty change against an explicit benchmark (Kakwani & Son (2008), Essama-Nssah & Lambert (2009), Duclos (2009)):

Growth (or recession) is said to be pro-poor if poverty falls more than in a reference scenario

- Kakwani & Son (2008), Essama-Nssah & Lambert (2009) advocate a reference scenario of equi-proportionate growth to all incomes calibrated to the change in mean income (but note that other standards could be specified)
- Duclos (2009) discusses both equi-proportionate growth and equal-additions as baseline (note how strong can be the latter)

A unified view: Benchmarking poverty change (ctd.)

- The 'absolute perspective' corresponds to calibrating proportionate growth to 1 or equal additions to 0
- Beware that terminology is potentially confusing: The 'absolute perspective' is quite different from Duclos (2009)'s absolute, equal-additions benchmark!
  - Equal additions benchmark can be determined with reference to non-poor incomes (e.g., average income gains)
  - Equi-proportionate benchmark need not be set with reference to non-poor incomes
  - A benchmark combining the two classic perspectives is, e.g., an equi-proportionate growth of max $\left(1, \frac{\mu_1}{\mu 0}\right)$
- To me, key distinction is whether benchmark is 'internal' or 'external'

[outline]

Notions of pro-poor growth

The pro-poor growth measurement toolkit

The ‘Non-anonymous approach’

Growth incidence curves

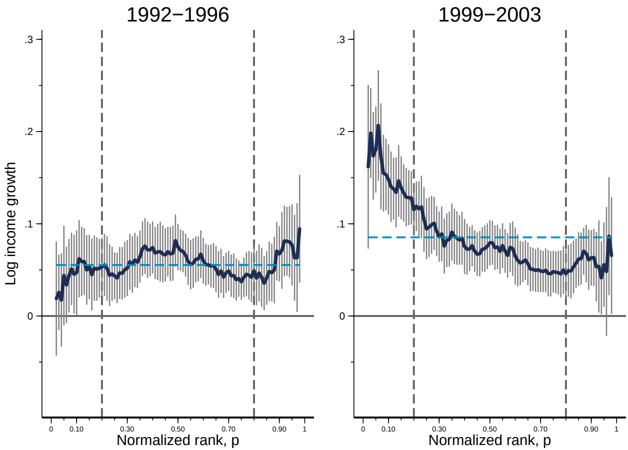
The growth incidence curve (GIC) traces the relative change of percentiles

$$g(p) = \frac{F_1^{-1}(p)}{F_0^{-1}(p)} - 1$$

against $p \in (0, 1)$ (Ravallion & Chen, 2003).

R&C suggest from the GIC the 'rate of pro-poor growth' $\frac{1}{H_0} \int_0^z g(p)dp$ as a summary index of pro-poor growth. It is the relative growth of income of the poor. It is also the change in the Watts poverty index divided by the initial headcount ratio.

Growth incidence curves (ctd.)



Growth incidence curves (ctd.)

$g(p) > 0$ for $p < H_0$ is equivalent to first-order poverty dominance: poverty is reduced for a broad class of measures – pro-poor growth in 'absolute sense'

(note that for a specific poverty index, dominance is not a necessary condition for pro-poor growth.)

$g(p) > \lambda$ for $p < H_0$, where $\lambda = \frac{\mu_1}{\mu_0} - 1$ is interpreted as pro-poor growth in a 'relative sense'.

Poverty growth curves

A closely related graph is the poverty growth curve (PGC) which traces the relative change of incomplete means up to p – it is simply the area under the GIC curve up to point p divided by p (Son, 2004)

$$c(p) = \int_0^p \left(\frac{F_1^{-1}(s)}{F_0^{-1}(s)} - 1 \right) ds$$

against $p \in (0, 1)$

Poverty growth curves (ctd.)

$c(p) > 0$ for $p < H_0$ is equivalent to second-order poverty dominance: poverty is reduced for a broad class of measures – pro-poor growth in 'absolute sense' (but again, for a specific poverty index, dominance is not a necessary condition for pro-poor growth.)

$c(p) > \lambda$ for $p < H_0$, where $\lambda = \frac{\mu_1}{\mu_0} - 1$ is interpreted as pro-poor growth in a relative sense

Essama-Nssah & Lambert (2008) measures

Interest in assessing 'pro-poorness' for a particular additive poverty measure of the type

$$P = \int_0^z \theta(y, z) f(y) dy$$

(with $\theta(y, z)$ continuous, decreasing and convex in y being individual poverty 'contributions')

Growth is declared 'pro-poor' if observed poverty reduction in P is larger than reduction that would have been observed if growth had been equi-proportionate.

this approach encompasses several earlier indices, e.g., Kakwani & Pernia (2000)

Essama-Nssah & Lambert (2008) measures (ctd.)

Building block: ϕ_P the growth elasticity of P (i.e., percentage reduction in P for a 1 percent increase in mean income)

$$\phi_P(q) = \frac{1}{P} \int_0^{F(z)} y(p)\, \theta'(y(p), z)\, q(y(p))\, dp$$

where $y(p)$ is the pth quantile and $q(y(p))$ is the GIC curve at p divided by the average growth rate (EN&L call it a 'growth pattern')

Essama-Nssah & Lambert (2008) measures (ctd.)

Counterfactual: what would have been this elasticity with a flat growth pattern (which corresponds to the case of equal proportionate growth, $q(y(p)) = 1$)

$$\phi_P(q_0) = \frac{1}{P} \int_0^{F(z)} y(p)\, \theta'(y(p), z)\, dp$$

Pro-poor growth indices: excess reduction of poverty from q compared to reference

$$\pi_P(q) = P(\phi_P(q_0) - \phi_P(q))$$

$$\kappa_P(q) = \frac{\phi_P(q)}{\phi_P(q_0)}$$

Essama-Nssah & Lambert (2008) measures (ctd.)

Decomposition by source

Growth patterns can be expressed as functions of patterns within income sources:

$$q(y) = \sum_{j=1}^{J} \alpha_j(y) q_j(y)$$

where $\alpha_j(y)$ is the share of income source j in total income at y and $q_j(y)$ is the relative growth of component j at total income y (NB: different from growth pattern of components j in isolation) these can be plugged in formulas above to identify contributions to pro-poor growth of income components

Dominance results (Duclos, 2009)

Duclos (Social Choice and Welfare, 2009) shows how classic first-order and second-order dominance results can be used to assess pro-poor growth robustly

In a nutshell, this involves assessing dominance using standard tools discussed earlier simple but after raising the second period poverty line by a reference fraction (proportionate approach – e.g., poverty line mutliplied by growth rate of mean income) or by adding a nominal amount (absolute approach, e.g., by adding average income gains to the poverty line)

[outline]

Recognizing group composition changes

One key feature of all approaches discussed thus far: group composition changes are ignored

We looked at change in poverty indices, at percentile growth, group incomes but there is mobility in the income distribution:

- people in poverty or at selected percentiles are not the same people over time
- people belong to different income groups at different period

Since different individuals are compared, such statistics can not be fully informative about who has gained from growth (and so whether, say, the people who were 'poor' at time t have gained more than those who were 'rich')

Relaxing the 'anonymity' principle

The key principle that is binding here is the 'anonymity principle' according to which re-ordering people and incomes should not affect any poverty (or inequality) assessment

In the context of pro-poor growth assessments, support for such a principle is less obvious.

Let us now relax it. (Or more precisely replace it by a weaker principle that reshuffling people and their *vector of incomes* (y_0, y_1) does not affect assessment.)

(Refs for this section: Jenkins & Van Kerm (2006,2011), Grimm (2007))

Income growth profiles vs. Growth incidence curves

First, let $\delta(x, y)$ measure the change in a person's income between base year income x and final year income y. For example,

- $\delta(x, y) = y - x$ (absolute income growth)
- $\delta(x, y) = \log y - \log x$ (proportionate income growth)

Then, rank individuals in increasing order of *initial period* income

Income growth profiles vs. Growth incidence curves

Growth incidence curve

$$\{\delta\left(x^{p}, y^{p}\right); p\}$$

(where x^p, y^p are pth quantiles)

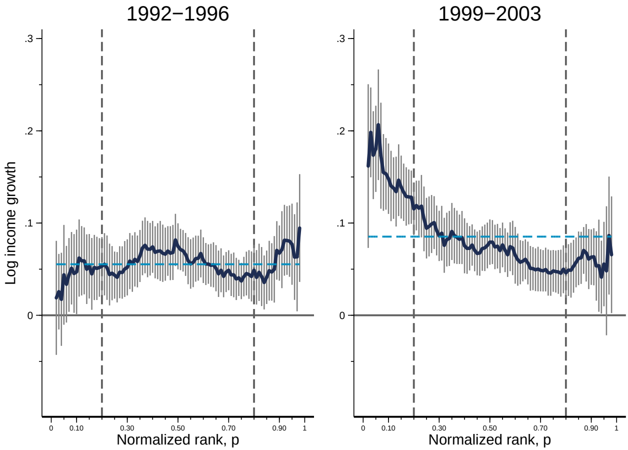
Income growth profile

$$\left\{\int \delta\left(x^{p}, s\right) dF_{t+\tau}(s|x^{p}); p\right\}$$

where H is joint distribution of incomes at t and $t+\tau$ and $F_{t+\tau}$ is conditional distribution of $t+\tau$ incomes given t income.

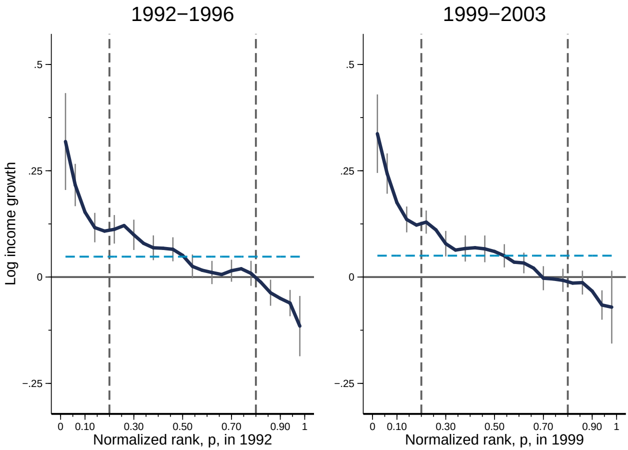
Income growth profiles vs. Growth incidence curves

A GIC curve:



Income growth profiles vs. Growth incidence curves

An income growth profile:



Income growth profiles vs. Growth incidence curves

Interpretation of the shape of both GIC and IGP similar. The curves relate income growth to ranks in the initial distribution:

- A flat line indicates equi-distributed (distributionally-neutral) growth
- A downward sloping curve indicates a "pro-poor" growth pattern
- An upward sloping curve indicates a "pro-rich" growth pattern

But GIC about income 'positions/groups' whereas IGP is about incomes of named individuals

Measurement error!

- IGP are much more sensitive to measurement error...
- Example of 'classical measurement error'
- Not much solutions
  - IV approach (but typically requires second measurements, e.g. other welfare measure or lagged info)
  - focus on accurately measured components only for comparison
  - improve collection as much as possible!

Gini change decomposition

(Jenkins & Van Kerm, OEP 2006)

Change in Gini coefficient over time is a function of the difference between quantiles:

$$\mathrm{GINI}(F_{t+\tau};\upsilon) - \mathrm{GINI}(F_t;\upsilon) = \int w(p;\upsilon)\left[\frac{x^p}{\mu_t} - \frac{y^p}{\mu_{t+\tau}}\right] dp$$

This can be related to pro-poor growth pattern:

$$\mathrm{GINI}(F_{t+\tau};\upsilon) - \mathrm{GINI}(F_t;\upsilon) = R(H;\upsilon) - P(H;\upsilon)$$

Gini change decomposition

(Jenkins & Van Kerm, OEP 2006)

Progressivity component:

$$P(H;\upsilon) = \int w\left(F_t(x);\upsilon\right)\left[\frac{y}{\mu_{t+\tau}} - \frac{x}{\mu_t}\right] dH(x,y)$$

$w(p;\upsilon) = \upsilon(1-p)^{\upsilon-1}$

$\Longrightarrow$ a measure of the 'pro-poorness' of growth

Reranking component:

$$R(H;\upsilon) = \int \left[w\left(F_t(x);\upsilon\right) - w\left(F_{t+\tau}(y);\upsilon\right)\right] \frac{y}{\mu_{t+\tau}} dH(x,y).$$

$\Longrightarrow$ picks up the difference between GIC and IMP approaches

$\Longrightarrow$ could be adapted to SST index decomposition in a straightforward manner

Decomposition of additive poverty indices

(see Grimm 2007)

The change in an additive poverty index is the average of the change in the individual contributions:

$$P_1 - P_0 = \frac{1}{N} \sum_{i=1}^{N} \theta(y_{i1}, z) - \theta(y_{i0}, z)$$

Partition population by poverty status in the two periods: never poor, always poor, exiters, entrants

Decomposition of additive poverty indices

(see Grimm 2007)

The change in poverty is equal to the contribution of the always poor plus the net effect of entrants and exiters

$$P_1 - P_0 = \frac{1}{N}\sum_{i=1}^{N}(\theta(y_{i1}, z) - \theta(y_{i0}, z))(y_{i0} < z \& y_{i1} < z) \quad (1)$$

$$+ \frac{1}{N}\sum_{i=1}^{N}(\theta(y_{i1}, z))(y_{i0} \geq z \& y_{i1} < z) \quad (2)$$

$$- \frac{1}{N}\sum_{i=1}^{N}(\theta(y_{i0}, z))(y_{i0} < z \& y_{i1} \geq z) \quad (3)$$

The gross change in poverty due to the initially poor is given by the first term (which can be negative or positive) and the third term (necessarily poverty-reducing).