Measuring Learning Inequality in Low-learning Situations: Metrics and Interpretation

Panel: Mind the gap: understanding education inequality in developing countries

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Background

- Interest in *Learning at the Bottom of the Pyramid* (LBOP)
- ASER, PAL, EGRA: not only for one-off status, but also impact
- Primary focus to date: changes in mean performance, not changes in (and drivers of) inequality
- Literature re: large international assessments shows growing interest in measuring inequality
- **Two main Qs**:
  - Do some early-learning measures and inequality measures work well together?
  - Do high-impact (large change in means) interventions also change inequality?

Hypotheses and “tests”

- **Gini Coefficient:** not just for economists!

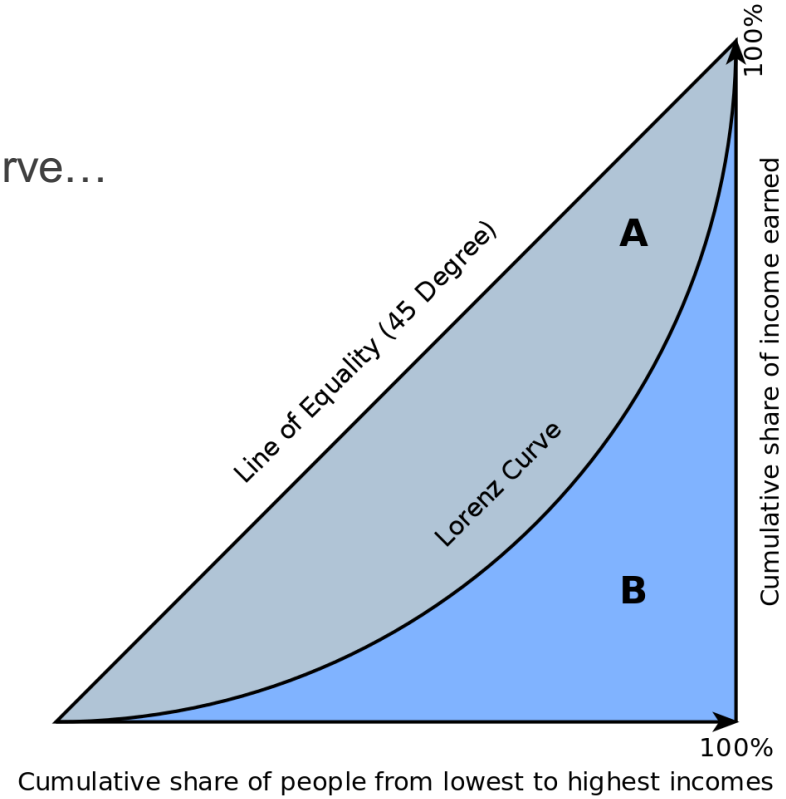
- …but what about other tools?
  - Ratios (*p90:p10*, *p75:p25*)
  - Coefficient of variation
  - % at {*some threshold*}

- Defining *useful*: story is **consistent but complementary**

- Insight into *changes* and *drivers of changes* in inequality in foundational learning from high-mean-impact interventions might be interesting and aid in interpreting results

Quick detour: the Gini coefficient & the Lorenz curve

- Gini coefficient = the ratio of A to B.
- The more “bowed out” the Lorenz curve…
- …the greater the Gini coefficient



About the Data

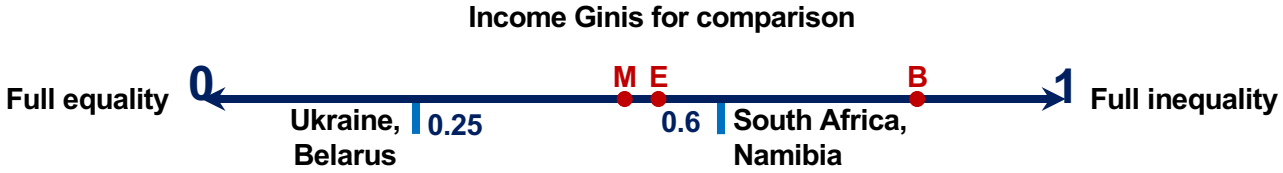
Country	Number of		Type of data (panel/ repeated cross-section/ snapshot)	Grades	Language(s)
	Students	Schools			
Democratic Republic of Congo	2,346	230	Unique round	3	Lingala, Tshiluba, Kiswahili
	7,081	290	Baseline + Endline	4, 6	French
Egypt	2,118 (56)		Baseline + Endline	2	Arabic
Kenya	12,769 (302)		Baseline + Midline + Endline	1, 2	English, Kiswahili
Malawi	5,120 (173)		Baseline + Unique rounds	1, 2, 3	Chichewa
Philippines	6,414 (308)		Baseline + Endline	1,2	Cebuano, Ilokano, Hiligaynon, Maguindanaoan
Uganda	12,146 (620)		Baseline + Endline	1-6	English, and 12 local languages like Luganda, Acoli, and Lugwere

Result #1: Some of these measures "work"

Round	mean	CV	ratio_p90p10	ratio_p75p25	Gini	pct_zero
Baseline	4.8	15.1	·	·	0.826	71.0
Midline	21.6	4.5	·	11.3	0.484	23.0
Endline	19.1	5.6	·	·	0.527	28.4

Observe:

- Ginis, coefficient of variation do not break down
- All measures trend in the same direction
- The *p90:p10*, *p75:p25* ratios often break down



Other cases, not just Kenya

Country	Language	Grade	Phase	Mean ORF	Gini	% at zero
DRC	French	6	Baseline	27.1	0.467	23.3%
			Endline	32.5 ↑	0.458 ↓	16.4% ↓
Uganda	Luganda	2	Baseline	6.2	0.788	65.4%
			Endline	10.4 ↑	0.672 ↓	48.5% ↓
Egypt	Arabic	2	Baseline	10.3	0.701	47.6%
			Endline	18.7 ↑	0.661 ↓	34.2% ↓
Philippines	Hiligaynon	2	Baseline	31.6	0.451	21.7%
			Endline	27.0 ↓	0.519 ↑	24.6% ↑

Same story:

- Ginis and % at zero go down as means go up
- …and vice versa (Philippines)
- Relatively larger change in means → relatively larger reduction in Gini (Uganda)

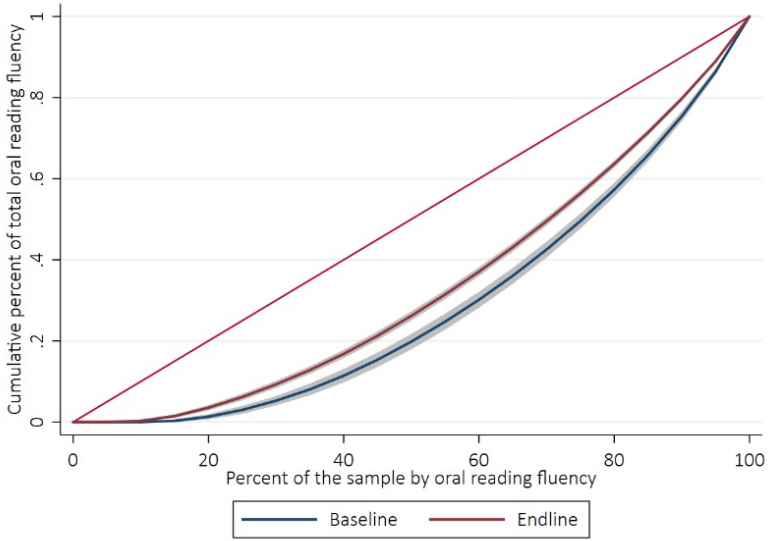
Characteristic of LI countries: lots of kids at zero

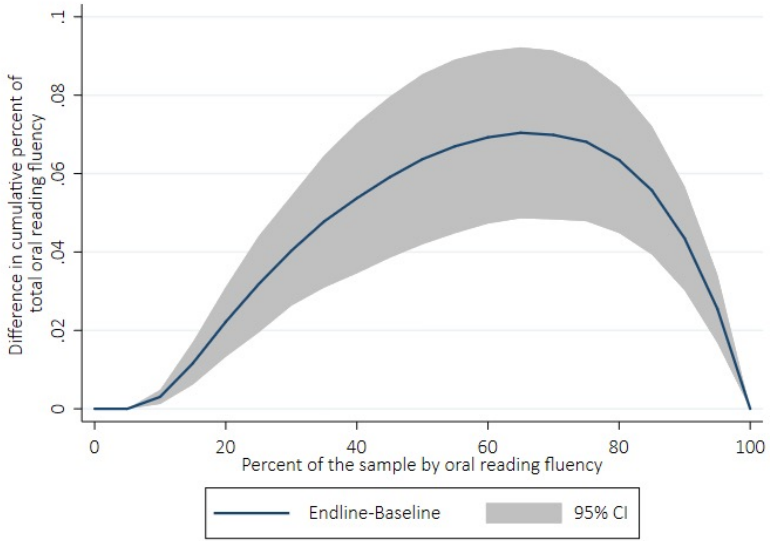
- e.g., at endline of an intervention, roughly 1 in 6 Gr. 6 children in the DRC still reading at zero cwpm (French)
- % reading at 0 akin to “learning poverty” (SDG4, World Bank)
- Appealing, common-sense measure
- Doesn’t tell the whole story on its own (but still useful)

Inequality reduction and “% at minimum level” are closely related

- Inequality was diminished by midline of the intervention.
- Observe the change in % at zero: it moves left, along with the Lorenz curve
- …but the curvature is also different in other ways!

Details on changes in inequality at all initial levels



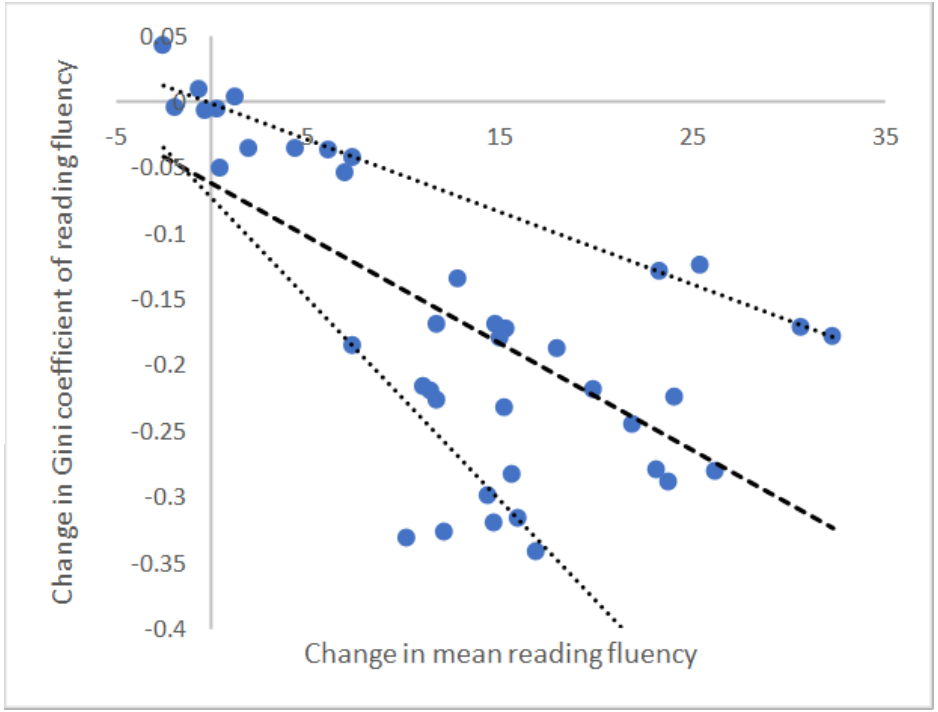


- Contrast plot: Change in Lorenz curves (endline – baseline) at each baseline percentile
- Observe:
  - Change is not uniform throughout
  - Biggest change at 65th percentile

Inequality reduction and progress in the averages are very related

- Larger improvements in averages ➡ better reduction in inequality

- The relationship gets “dispersed”: the greater the change in the mean, the less *predictable* the associated reduction in inequality



There is a *bottom of the pyramid* at the *bottom of the pyramid*

	SES Quartile	Kenya (PRIMR)					
		Grade 1			Grade 2		
		BL	EL	EL-BL	BL	EL	EL-BL
Gini	1	0.72	0.64	-0.07	0.51	0.45	-0.06
	2	0.55	0.50	-0.05	0.40	0.39	-0.01
	3	0.46	0.46	0.00	0.34	0.31	-0.03
	4	0.44	0.41	-0.02	0.32	0.28	-0.05
	All	0.53	0.50	-0.04	0.40	0.35	-0.05

Biggest inequality within the lowest SES group: also where things improved the most

…*bottom of the pyramid* at the *bottom of the pyramid*…?

Possible Pedagogical and Policy Implications

- The interventions underlying these data (PRIMR, *Tusome,* others) explicitly focused on basic skills
- No specific targeting of 'weaker performers' (communities, schools, individuals) within the intervention for additional support
- ...nonetheless, we see significant reductions in inequality
- Designing and administering highly-targeted interventions is complex and difficult – opportunity costs are high
- Might focusing on implementing a broad-based, thorough, basics-first intervention with high fidelity be as effective at reducing inequality as a program that explicitly targets narrower subpopulations based on poverty, rurality, gender, etc.?
- We are not sure, but we think these results are suggestive.

Contacts

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Learn more about RTI's work:

Thank You!

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