

Towards A Virtuous Spiral Between Poverty Reduction And Growth: Comparing Sub Saharan Africa With The Developing World

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Literature Review (1)

- Vast empirical literature on the link from growth to poverty reduction:
 - Regression framework: Dollar and Kraay (2002); Dollar, Kleineberg, Kraay (2016), many other.
 - Identity framework: Datt and Ravallion (1992); Kwakni, 1993; Bourguignon (2003); Fosu (2009, 2011, 2015).
 - Key finding: growth is central for poverty reduction.

Literature Review (2)

- Few on the reversal link from poverty reduction to growth:
 - Conceptual: Perry et al. (2006); Nissanke and Thorbecke (2007, 2010, etc.)
 - Empirical: Lopez and Servén (2009); Ravallion (2012); Arndt, McKay, and Tarp (2016); Thorbecke and Ouyang (2017); Ouyang, Shimeles, Thorbecke (2019).

- These studies suggested a more nuanced growth-poverty dynamic:
 - Growth is not always effective in reducing poverty.
 - Poverty matters for growth.

Research Questions and Empirical Equations

- (1) Does poverty --- including the poverty reduction rate and the initial level of poverty --- affect growth?

$$g(H_{it}) = b_1 + b_2g(\mu_{it}) + b_3g(\mu_{it}) \times \ln G_{it-\tau} + b_4g(\mu_{it}) \\ \times (Z/Y_{it-\tau}) + b_5g(G_{it}) + b_6g(G_{it}) \times \ln G_{it-\tau} + b_7g(G_{it}) \\ \times (Z/Y_{it-\tau}) + b_8 \ln G_{it-\tau} + b_9(Z/Y_{it-\tau})$$

- (2) Does faster growth bring about faster poverty reduction?

$$g(\mu_{it}) = \alpha + \beta \ln H_{it-\tau} + \gamma \ln G_{it-\tau} + \delta \ln \mu_{it-\tau} + \rho g(H_{it}) + \varepsilon_{it}$$

$$g(H_{it}) = \eta(1 - H_{it-\tau})g(\mu_{it}) + v_{it}$$

- (3) How is the growth-poverty dynamics in SSA different from that in the developing world as a whole?

Data (1)

- Some 1,600 unique country-year observations from World Bank surveys conducted during different sub-periods between 1981 and 2018
 - Panel data, but (highly) unbalanced
 - , which prevented us from taking advantage of panel regression procedures (tried FE and dynamic GMM, results not robust to small changes in empirical specification and even the code)
- Cross-sectional analysis sample for 129 less developed countries (LDCs) – including 44 SSA countries --- from 1981-2018
 - Each country has only one growth and poverty reduction spell (between the first and last survey year it was surveyed)
 - Average annual growth and poverty reduction rates for analysis

Data (2)

Table 1.1

The OLS Sample (N = 129), Summary Statistics: LDCs versus SSA.

Source: World Development Indicators	LDCs		SSA	
	N	Mean	N	Mean
Initial year	129	1994	44	1996
Last year	129	2015	44	2015
Initial poverty (\$3.2) headcount ratio (%)	129	45.73	44	70.33
Final poverty (\$3.2) headcount ratio (%)	129	30.49	44	59.71
Annual average poverty (\$3.2) reduction rate (%)	126	-3.81	44	-1.19
Initial poverty (\$1.9) headcount ratio (%)	129	29.05	44	52.37
Final poverty (\$1.9) headcount ratio (%)	129	16.49	44	36.90
Annual average poverty (\$1.9) reduction rate (%)	122	-5.14	44	-2.33
Initial mean (per month, in 2011 PPP terms)	129	202.81	44	113.99
Final mean (per month, in 2011 PPP terms)	129	310.24	44	145.87
Annual average growth in mean (%)	129	1.92	44	1.87
Initial Gini	129	41.61	44	46.76
Final Gini	129	39.70	44	43.93
Annual average change in Gini (%)	129	-0.32	44	-0.29
Initial per capita household consumption expenditure (per year in 2011 PPP terms)	106	3,241.04	38	1,700.62
Initial income share of the middle three quintiles (%)	128	45.45	44	42.60
Initial primary school enrollment (% gross)	124	95.32	42	83.82
Initial life expectancy at birth (years)	129	62.27	44	54.06
Initial relative price level of investment goods	120	0.66	44	0.51

Notes: Different countries have different initial and last years. Growth in mean is computed using monthly mean income or consumption expenditure data from the World Bank Povcalnet database.

- Note the average growth spell is 21 years for all 129 LDCs and 18 years for SSA countries; though country heterogeneity exists.

Data (3)

Table 1.2

The GMM Sample (N = 114), Summary Statistics: LDCs versus SSA.

Source: World Development Indicators	LDCs		SSA	
	N	Mean	N	Mean
Initial year	114	1993	37	1994
Middle year	114	1997	37	2000
Last year	114	2015	37	2015
Initial poverty (\$3.2) headcount ratio (%)	114	45.09	37	72.58
Middle year poverty (\$3.2) headcount ratio (%)	114	44.52	37	69.95
Final poverty (\$3.2) headcount ratio (%)	114	29.02	37	60.92
Annual average poverty (\$3.2) reduction rate (%)	110	-6.04	37	-1.11
Initial poverty (\$1.9) headcount ratio (%)	114	28.91	37	55.00
Middle year poverty (\$1.9) headcount ratio (%)	114	26.61	37	49.39
Final poverty (\$1.9) headcount ratio (%)	114	15.81	37	37.95
Annual average poverty (\$1.9) reduction rate (%)	105	-7.00	37	-2.11
Initial mean (per month, in 2011 PPP terms)	114	209.22	37	111.06
Middle year mean (per month, in 2011 PPP terms)	114	206.99	37	115.12
Final mean (per month, in 2011 PPP terms)	114	326.67	37	146.71
Annual average growth in mean (%)	113	2.29	37	1.81
Initial Gini	114	41.50	37	47.34
Middle year Gini	14	40.77	37	44.30
Final Gini	114	39.56	37	44.24
Annual average change in Gini (%)	113	-0.17	37	0.30
Initial per capita household consumption expenditure (per year in 2011 PPP terms)	99	3,343.81	31	1,681.00
Initial income share of the middle three quintiles (%)	113	45.45	37	42.25
Initial primary school enrollment (% gross)	111	94.94	37	82.55
Initial life expectancy at birth (years)	114	62.38	37	53.73
Initial relative price level of investment goods	109	0.69	37	0.51

Notes: Different countries have different initial, middle, and last years. Annual average change rates are for period between the middle year and the last year. Growth in mean is computed using monthly mean income or consumption expenditure data from the World Bank Povcalnet dataset.

Regression Procedures

- Simple Ordinary Least Square (OLS)
 - Initial values are from the first surveys
- Generalized Method of Moments (GMM)
 - Initial values from the first surveys are proxied by values from the middle surveys.
 - GMM allows us to control for potential endogeneity like a regular Instrumental Variable (IV) estimator, but improves its efficiency in the presence of heteroskedasticity of unknown form (Baum, Schaffer, & Stillman, 2003).
- Cross-sectional analysis does not allow for satisfactory causal identification. Suggestions for improvement?

Findings (1): Faster poverty reduction leads to faster growth, especially in SSA. High initial poverty retards growth.

Table 2.1

From Poverty Reduction to Growth, by region and poverty line, OLS.

	(1)	(2)	(3)	(4)
	LDC_z1	SSA_z1	LDC_z2	SSA_z2
Poverty reduction	-0.128*** (-4.72)	-0.488** (-3.47)	-0.128*** (-3.82)	-0.705** (-3.27)
Initial poverty	-0.011** (-3.16)	-0.009 (-1.87)	-0.011*** (-3.83)	-0.011 (-1.36)
Initial mean	-0.046*** (-6.38)	-0.045*** (-4.48)	-0.046*** (-7.88)	-0.046*** (-4.63)
Initial Gini	0.011 (0.74)	-0.018 (-0.93)	0.018 (1.32)	-0.011 (-0.52)
Initial share of income in middle 3 quintiles	-0.027 (-1.22)	-0.067* (-2.31)	-0.004 (-0.18)	-0.047 (-1.72)
Initial per capita private consumption expenditure	0.007* (2.09)	0.004 (1.15)	0.008* (2.61)	0.004 (1.32)
Initial life expectancy at birth	0.062** (3.38)	0.006 (0.19)	0.079*** (4.30)	0.035 (1.24)
Initial primary school enrollment	0.0003 (0.05)	0.010 (1.47)	-0.002 (-0.29)	0.003 (0.52)
Initial price level of investment goods	0.002 (1.01)	-0.003 (-0.68)	-0.001 (-0.29)	-0.001 (-0.25)
Constant	0.026 (0.19)	0.460 (1.99)	-0.152 (-1.16)	0.291 (1.41)
N	92	36	96	36
R ²	0.61	0.81	0.63	0.80
adj. R ²	0.56	0.75	0.59	0.73

Notes: z1 and z2 refer to, respectively, the international poverty line of \$1.90 and \$3.20 per person per day in 2011 PPP terms, which correspond to the \$1.25 and \$2 equivalents in 2005 PPP terms. This table reports coefficient estimates from Equation (1): $g(\mu_{it}) = \alpha + \beta \ln H_{it-\tau} + \gamma \ln G_{it-\tau} + \delta \ln \mu_{it-\tau} + \rho g(H_{it}) + \varepsilon_{it}$ with controls, using data from the OLS sample and following a simple OLS procedure. T-ratios are in brackets and corrected for heteroskedasticity. Significance level: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Findings (2): High initial poverty weakens the effectiveness of growth in reducing poverty.

Table 3.1

Initial Poverty Weakens Growth Effectiveness in Reducing Poverty, OLS.

	(1)	(3)	(2)	(4)
	LDCs_z1	LDCs_z2	SSA_z1	SSA_z2
Initial poverty-adjusted growth ($\hat{\eta}$)	-3.448***	-3.166***	-2.239***	-2.107***
	(-7.30)	(-4.33)	(-7.94)	(-7.77)
Constant	-0.0161*	-0.0139**	-0.0122**	-0.00685***
	(-2.12)	(-2.63)	(-3.51)	(-3.84)
N	122	126	44	44
R ²	0.4283	0.3805	0.5526	0.7017
adj. R ²	0.4236	0.3755	0.5420	0.6946

Notes: This table reports $\hat{\eta}$ from Equation (2): $g(H_{it}) = \eta(1 - H_{it-\tau})g(\mu_{it}) + v_{it}$ using the OLS sample and following a simple OLS procedure. T-ratios are in brackets and corrected for heteroskedasticity. Significance level: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 3.2

Initial Poverty Weakens Growth Effectiveness in Reducing Poverty, GMM.

	(1)	(3)	(2)	(4)
	LDCs_z1	LDCs_z2	SSA_z1	SSA_z2
Initial poverty-adjusted growth ($\hat{\eta}$)	-4.567***	-5.831**	-0.377	-0.284
	(-3.46)	(-2.66)	(-0.47)	(-0.58)
Constant	0.029	0.069	-0.013	-0.006
	(1.14)	(1.62)	(-1.00)	(-0.78)
N	103	108	37	37
R ²				
adj. R ²				

Notes: This table reports $\hat{\eta}$ from Equation (2): $g(H_{it}) = \eta(1 - H_{it-\tau})g(\mu_{it}) + v_{it}$ using the GMM sample and following a GMM procedure. Significance level: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Findings (3): Faster growth does bring about faster poverty reduction in LDCs as a whole, but not in SSA.

Table 4.1
From Growth to Poverty Reduction, by Region and Poverty Line, OLS.

	(1)	(2)	(3)	(4)
	LDC_z1	SSA_z1	LDC_z2	SSA_z2
Growth in mean (b_2)	-6.465 (-1.93)	1.243 (0.54)	-11.518* (-2.29)	-1.247 (-1.10)
Growth \times initial Gini (b_3)	1.346 (1.52)	-0.583 (-0.98)	2.655* (2.03)	0.087 (0.30)
Growth \times initial Z/Y (b_4)	1.376*** (4.41)	0.807*** (6.59)	0.757*** (4.82)	0.539*** (8.41)
Change in Gini (b_5)	13.890 (1.81)	-2.382 (-0.62)	24.288* (1.99)	-2.300 (-1.26)
Change in Gini \times initial Gini (b_6)	-3.220 (-1.59)	0.961 (0.93)	-6.107 (-1.93)	0.858 (1.69)
Change in Gini \times initial Z/Y (b_7)	-2.569*** (-3.98)	-1.755* (-2.28)	-1.755* (-2.26)	-0.912** (-3.00)
Initial Gini (b_8)	0.046* (2.42)	0.051* (2.25)	-0.017 (-0.55)	0.015 (1.24)
Initial income (b_9)	-0.007 (-0.79)	-0.004 (-0.37)	0.009 (1.46)	0.004 (1.18)
Constant (b_1)	-0.180* (-2.56)	-0.201* (-2.31)	0.062 (0.53)	-0.058 (-1.22)
N	122	44	126	44
R^2	0.807	0.831	0.679	0.878
adj. R^2	0.794	0.792	0.657	0.851

Notes: This table reports coefficient estimates from Equation (3): $g(H_{it}) = b_1 + b_2g(\mu_{it}) + b_3g(\mu_{it}) \times \ln G_{it-\tau} + b_4g(\mu_{it}) \times (Z/Y_{it-\tau}) + b_5g(G_{it}) + b_6g(G_{it}) \times \ln G_{it-\tau} + b_7g(G_{it}) \times (Z/Y_{it-\tau}) + b_8 \ln G_{it-\tau} + b_9(Z/Y_{it-\tau})$ using the OLS sample following a simple OLS procedure. T-ratios are in brackets and corrected for heteroskedasticity. Significance level: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

- GMM estimates are consistent and omitted for parsimony.

Findings (4): Effectiveness of growth in reducing poverty is only -1.14 in SSA, versus -2.04 in LDCs as a whole for poverty measured against the \$ 3.20 poverty line.

Table 4.3
Growth and Inequality Elasticity of Poverty Reduction.

	\$3.20	\$1.90	\$3.20	\$1.90
	All LDCs	All LDCs	SSA	SSA
<i>Based on OLS b's from Table 4.1</i>				
E_y	-2.04	-2.82	-1.14	-0.90
E_{Gini}	2.50	4.47	1.36	1.10
<i>Based on GMM b's from Table 4.2</i>				
E_y	-3.63	-3.81	-0.38	-0.84
E_{Gini}	6.38	6.07	1.15	2.47

Notes: This table reports elasticity estimates from Equation (4): $E_y = b_2 + b_3 \ln G_{it-\tau} + b_4(Z/Y_{it-\tau})$ and Equation (5): $E_{gini} = b_5 + b_6 \ln G_{it-\tau} + b_7(Z/Y_{it-\tau})$ using OLS and GMM estimates of b 's reported in Tables 4.1 and 4.2.

Elasticities can be computed from Equation (1) (p.4)

$$E_y = b_2 + b_3 \ln G_{it-\tau} + b_4(Z/Y_{it-\tau})$$

$$E_{gini} = b_5 + b_6 \ln G_{it-\tau} + b_7(Z/Y_{it-\tau})$$

Implications

- We investigate the links between poverty and growth using data from 129 developing countries, including 44 in Sub Saharan Africa, during 1981–2018.
- Faster poverty reduction leads to faster growth in the developing world as a whole; but especially in Sub-Saharan Africa.
- Initial poverty has no direct impact on growth in both regions. But it weakens the effectiveness of growth in reducing poverty; more in LDCs than in SSA.
- Faster growth brings about faster poverty reduction in the developing world as a whole; but not so much within SSA.
- For faster poverty reduction, LDCs especially SSA need pro-growth reduction strategies besides the conventional pro-poor growth strategies.