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Effect of income distribution on poverty reduction after the Millennium

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ABSTRACT

This study aims to investigate the effect of income distribution on poverty reduction and the effect of income distribution on growth elasticity of poverty reduction. It uses panel data of 70 countries during 2001-2010 provided by the World Bank. It applies panel data analysis both fixed effect and random effect models. It selects a better model by Hausman test. The findings reveal that, in general, better income distribution cannot reduce poverty in the world after the Millennium. Only in Southeast Asia that income distribution is significantly effective for the poverty alleviation. Moreover, better income distribution does not significantly affect the speed of poverty reduction which is measured by the growth elasticity of poverty reduction. The results of the study suggest that it is still hopeful for governments only in Southeast Asia that poverty can be reduced by better income distribution. Therefore, they should launch the policy that promotes the equality of income distribution especially job creations and income generation in rural communities of the countries to create the ultimate impacts on poverty reduction.

Keywords: Income distribution, poverty reduction, growth elasticity of poverty reduction, panel data analysis, millennium

JEL Classification: O15, I32, O11

1. Introduction

This paper adds evidence on the effects of income distribution on poverty reduction and growth elasticity of poverty reduction. It uses the data of 70 countries after the Millennium. It might be the first paper that analyses the data in this period.

The rationale of the poverty reduction due to the better income distribution arises from two concepts.

First, in two societies with the same mean income, the one with better income distribution has less poor people (Figure 1).

Second, in a society with better income distribution, an effort to reduce poverty is less (Figure 2).

Last, countries with better income distribution will reduce the poverty faster (Figure 3).

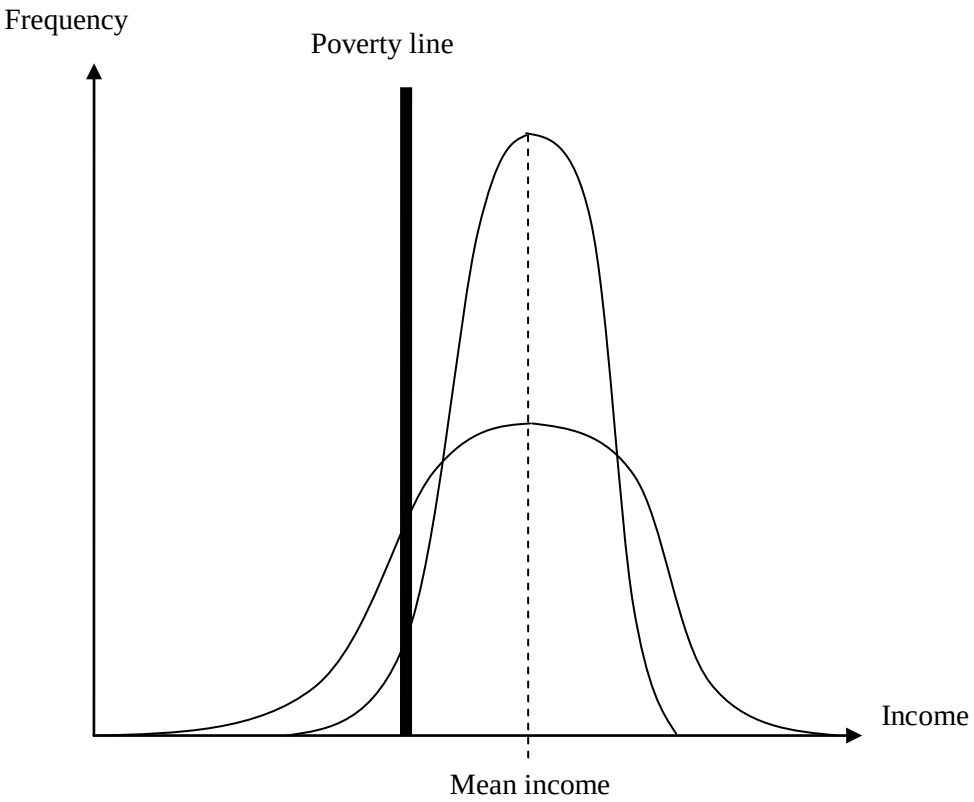

Figure 1. A society with better income distribution has less poor people.

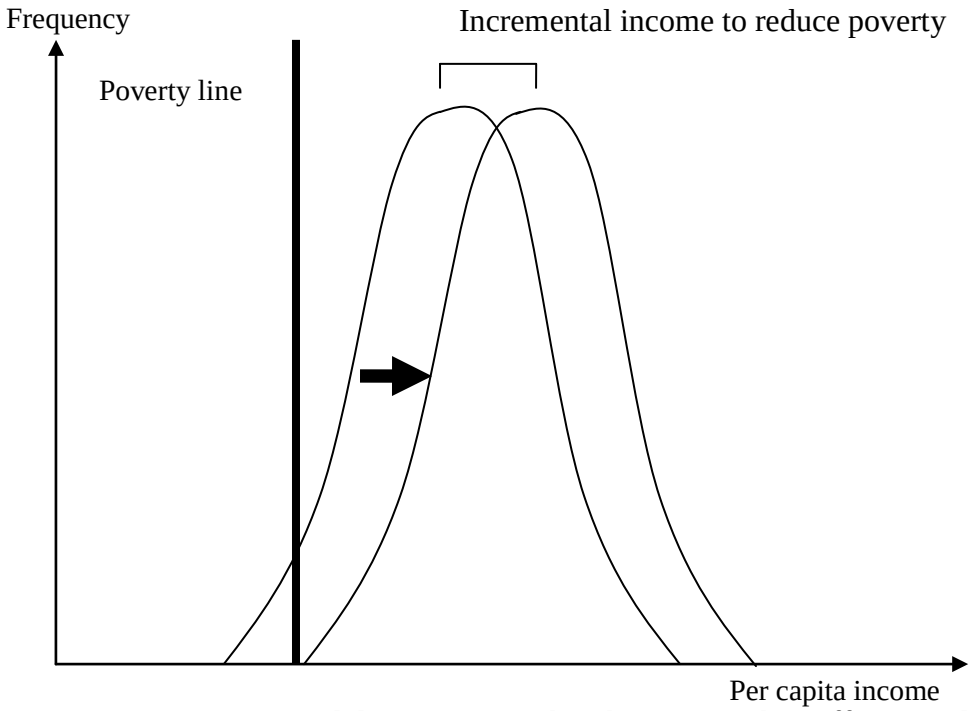

Figure 2. A society with better income distribution uses less effort to reduce

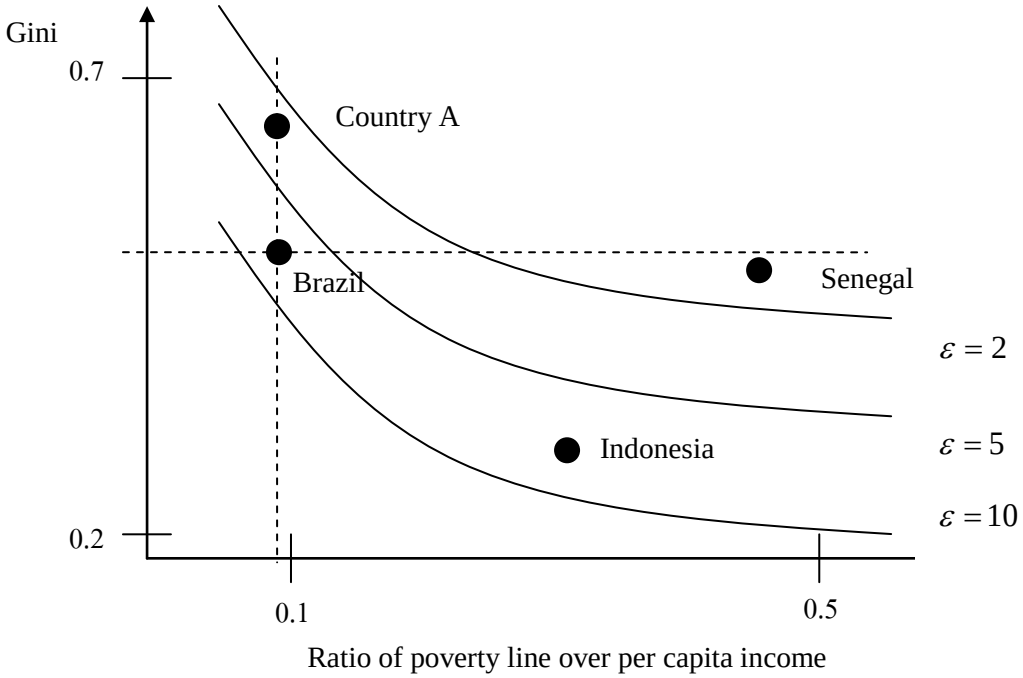

Figure 3. Countries with better income distribution will reduce the poverty faster

2. Data, methodology and results

The study uses panel data of 70 countries during 2001-2010 provided by the World Bank. It applies panel data analysis both fixed effect and random effect models. It selects a better model by Hausman test.

Model 1: Effects of income distribution on poverty growth

$$poverty\ growth = f(Gini, Per\ capita\ GDP, D_1Gini, D_2Gini, D_3Gini, D_4Gini)$$

where Poverty growth = Growth of Head Count Index
Gini = Gini coefficient
Per capita GDP = GDP divided by population
D_1 = Dummy variable for other Asian countries
D_2 = Dummy variable for South American countries
D_3 = Dummy variable for African countries
D_4 = Dummy variable for Southeast Asian countries

Expected signs of the coefficients are as follows:

1. Gini coefficient is expected to be positive to the poverty growth, i.e. the better income distribution the less poverty.
2. Per capita GDP is expected to be negative to the poverty growth, i.e. the richer country the less poverty.
3. D_1Gini , D_2Gini, D_3Gini, D_4Gini are expected to be positive to the poverty growth.

Model 2: Effects of income distribution on growth elasticity of poverty reduction

$$elasticity = f(Gini, Per\ capita\ GDP, D_1Gini, D_2Gini, D_3Gini, D_4Gini)$$

where elasticity = Growth elasticity of poverty reduction

$$\varepsilon = -\frac{\%\Delta Poverty}{\%\Delta Growth} = -\frac{\partial Poverty}{\partial Growth} \cdot \frac{Growth}{Poverty}$$

Poverty = Head count index
Growth = Percentage change of GDP
Gini = Gini coefficient
Per capita GDP = GDP divided by population
D_1 = Dummy variable for other Asian countries
D_2 = Dummy variable for South American countries
D_3 = Dummy variable for African countries
D_4 = Dummy variable for Southeast Asian countries

Expected signs of the coefficients are as follows:

1. Gini coefficient is expected to be negative to the growth elasticity of poverty reduction, i.e. the better income distribution the faster speed of poverty reduction.
2. Per capita GDP is expected to be positive, i.e. the richer country the faster speed of poverty reduction.
3. D_1Gini , D_2Gini, D_3Gini, D_4Gini are expected to be negative to the growth elasticity of poverty reduction

3. Results

The results separate into three sets. First, the study displays the regression on the effect of income distribution on poverty growth for the whole world using fixed effect model and random effect model with their Hausman test. Second, it shows the regression on the effect of income distribution on poverty growth for each region using both models and the Hausman test. Last, it illustrates the effect of income distribution on growth elasticity of poverty reduction at regional level.

Set 1

TABLE 1. Regression on the effect of income distribution on poverty growth for the whole world using fixed effect model

Dependent variable: poverty growth					
Independent variable	Coefficient	Standard error	t-stats	P>|t|	95% confident interval
Gini	.1022634	.1357313	0.75	0.452	-.1643433 .3688701
Per capita GDP	-.0002744	.0001674	-1.64	0.102	-.0006032 .0000545
Constant	-8.489536	5.65321	-1.50	0.134	-19.59371 2.614637
sigma_u	6.6946215				
sigma_e	7.2999823				
rho	.45682406				

Numbers of observation	630
R-squared	0.0280
F(2,558)	1.56
Prob > F	0.0019

Source: Estimation using Stata10

TABLE 2. Regression on the effect of income distribution on poverty growth for the whole world using random effect model

Dependent variable: poverty growth					
Independent variable	Coefficient	Standard error	t-stats	P>|t|	95% confident interval
Gini	.19662	.0743357	2.65	0.008	.0509246 .3423154
Per capita GDP	-.0001993	.0001317	-1.51	0.130	-.0004575 .0000589
Constant	-12.6501	3.198846	-3.95	0.000	-18.91972 -6.380476
sigma_u	6.1680995				
sigma_e	7.2999823				
rho	.41654755				
Numbers of observation					630
R-squared					0.0454
Wald chi2(2)					8.85
Prob > chi2					0.0120

Source: Estimation using Stata10

TABLE 3. Results of the Hausman test for the first set of regressions

Variables	Coefficient from fixed effect model	Coefficient from random effect model	Difference	Standard deviation
Gini	.1022634	.19662	-.0943566	.1135658
Per capita GDP	-.0002744	-.0001993	-.0000751	.0001033
Chi2(2)	1.31		Prob>chi2	0.5196

Source: Estimation using Stata10

Ho : Random effect model is more appropriate than fixed effect model

H_1 : Fixed effect model is more appropriate than random effect

Set 2

TABLE 4. Regression on the effect of income distribution on poverty growth for each region using fixed effect model

Dependent variable: poverty growth					
Independent variable	Coefficient	Standard error	t-stats	P>|t|	95% confident interval
Per capita GDP	-.0002309	.0001705	-1.35	0.176	-.0005659 .0001041
Gini other Asian countries	.0789175	.8588774	0.09	0.927	-1.60813 1.765965
Gini South American countries	.1307318	.0824397	1.59	0.113	-.0312001 .2926638
Gini African countries	-.1260751	.2477473	-0.51	0.611	-.6127121 .3605619
Gini Southest Asian countries	1.048348	.4080568	2.57	0.010	.2468234 1.849872
Constant	-15.08007	8.096784	-1.86	0.063	-30.98416 .824014
sigma_u	16.553614				
sigma_e	7.2617803				
rho	.83861499				
Numbers of observation					630
R-squared					0.0143
F(5,555)					2.41
Prob > F					0.0357

Source: Estimation using Stata10

TABLE 5. Regression on the effect of income distribution on poverty growth for each region using random effect model

Dependent variable: poverty growth					
Independent variable	Coefficient	Standard error	t-stats	P>|t|	95% confident interval
Per capita GDP	-.0001148	.0001368	-0.84	0.401	-.000383 .0001533
Gini other Asian countries	.1045744	.0660529	1.58	0.113	-.0248869 .2340358
Gini South American countries	.0320508	.0107426	2.98	0.003	.0109956 .0531059

Dependent variable: poverty growth					
Independent variable	Coefficient	Standard error	t-stats	P>|t|	95% confident interval
Gini African countries	.0962369	.0530064	1.82	0.069	-.0076537 .2001276
Gini Southest Asian countries	.1203029	.0760797	1.58	0.114	-.0288105 .2694163
Constant	-8.590319	1.7554	-4.89	0.000	-12.03084 -5.149799
sigma_u	6.2314176				
sigma_e	7.2617803				
rho	.42408106				

Numbers of observation	630
R-squared	0.0541
Wald chi2(5)	11.08
Prob > chi2	0.0498

Source: Estimation using Stata10

TABLE 6. Results of the Hausman test for the second set of regressions

Variables	Coefficient from fixed effect model	Coefficient from random effect model	Difference	Standard deviation
Per capita GDP	-.0002309	-.0001148	-.000116	.0001019
Gini other Asian countries	.0789175	.1045744	-.025657	.8563337
Gini South American countries	.1307318	.0320508	.0986811	.0817368
Gini African countries	-.1260751	.0962369	-.2223121	.2420104
Gini Southest Asian countries	1.048348	.1203029	.928045	.4009017
chi2(5)	9.74		Prob>chi2	0.0830

Source: Estimation using Stata10

Ho : Random effect model is more appropriate than fixed effect model

H_1 : Fixed effect model is more appropriate than random effect

Set 3

TABLE 7. Regression on the effect of income distribution on growth elasticity of poverty reduction for each region using fixed effect model

Dependent variable: Growth elasticity of poverty reduction					
Independent variable	Coefficient	Standard error	t-stats	P>|t|	95% confident interval
Per capita GDP	.0001766	.0001349	1.31	0.191	-.0000884 .0004416
Gini other Asian countries	.1470816	.6944853	0.21	0.832	-1.217081 1.511244
Gini South American countries	-.0646096	.0651529	-0.99	0.322	-.192588 .0633688
Gini African countries	.056429	.1957898	0.29	0.773	-.3281567 .4410147
Gini Southest Asian countries	.1576081	.3224797	0.49	0.625	-.475832 .7910482
Constant	1.109649	6.446919	0.17	0.863	-11.5539 13.7732
sigma_u	8.1483925				
sigma_e	5.7388363				
rho	.66843791				
Numbers of observation					626
R-squared					0.0007
F(5,551)					0.76
Prob > F					0.5820

Source: Estimation using Stata10

TABLE 8. Regression on the effect of income distribution on growth elasticity of poverty reduction for each region using random effect model

Dependent: Growth elasticity of poverty reduction					
Independent variable	Coefficient	Standard error	t-stats	P>|t|	95% confident interval
Per capita GDP	.0000924	.0000788	1.17	0.241	-.0000621 .0002468
Gini other Asian countries	-.0074999	.0279879	-0.27	0.789	-.0623553 .0473555
Gini South American countries	.0013654	.0045103	0.30	0.762	-.0074746 .0102053
Gini African countries	.0183913	.022852	0.80	0.421	-.0263979 .0631804

Dependent: Growth elasticity of poverty reduction					
Independent variable	Coefficient	Standard error	t-stats	P>|t|	95% confident interval
Gini Southest Asian countries	-.0088559	.0322519	-0.27	0.784	-.0720685 .0543568
Constant	-.2763463	.7925214	-0.35	0.727	-1.82966 1.276967
sigma_u	2.0030724				
sigma_e	5.7388363				
rho	.10859742				

Numbers of observation	630
R-squared	0.0059
Wald chi2(5)	2.82
Prob > chi2	0.7284

Source: Estimation using Stata10

TABLE 9. Results of the Hausman test for the third set of regressions

Variables	Coefficient from fixed effect model	Coefficient from random effect model	Difference	Standard deviation
Per capita GDP	.0001766	.0000924	.0000842	.0001095
Gini other Asian countries	.1470816	-.0074999	.1545816	.6939211
Gini South American countries	-.0646096	.0013654	-.065975	.0649966
Gini African countries	.056429	.0183913	.0380378	.1944516
Gini Southest Asian countries	.1576081	-.0088559	.166464	.3208629
chi2(5)	2.55		Prob>chi2	0.7691

Source: Estimation using Stata10

Ho: Random effect model is more appropriate than fixed effect model

H_1: Fixed effect model is more appropriate than random effect

4. Conclusions

In general, better income distribution cannot reduce poverty in the world after the Millennium. Only in Southeast Asia that income distribution is significantly effective for the poverty alleviation. Moreover, better income distribution does not significantly affect the speed of poverty reduction which is measured by the growth elasticity of poverty reduction.

REFERENCES

Bourguignon F. 2002. The growth elasticity of poverty reduction: explaining heterogeneity across countries and time periods, In T. Eicher and S. Turnovsky, Growth and Inequality, Boston: MIT Press.

Deininger K. and L. Squire (1998) New Ways of Looking at Old Issues: Inequality and Growth. Journal of Development Economics, 57 (2): 259-287.

Forbes K. 2000. A Reassessment of the Relationship between Inequality and Growth. American Economic Review, 90: 869-887.

Galor O. and J. Zeira (1993) Income distribution and macroeconomics, Review of Economic Studies, 60: 35-52.

Heston, A., Summers, R. & Aten, B. (2002) Penn World Table Version 6.1, Center for International Comparisons at the University of Pennsylvania (CICUP), October. (online) http://pwt.econ.upenn.edu/php_site/pwt_index.php

Klasen, S. 2006. Economic Growth and Poverty Reduction, Measurement issues in income and non-income dimensions. World Development 36(3): 420-445.

Klasen, S. and M. Misselhorn (2008) Determinants of the growth semi-elasticity of poverty reduction, Ibero-America Institute Working Paper (forthcoming).

Kraay A. 2004. When is growth pro-poor? Evidence from a panel of countries. Mimeo, Word Bank, Washington D.C. Journal of Development Economics, 80(1): 198-227.

Meier G.M. and J.E. Rauch (2005) Leading Issues in Economic Development. 8th edition (Chapter 8: Income Distribution, pp. 433-488), Oxford: Oxford University Press.

Ray D. 1998. Development Economics (Chapter 6: Economic Inequality, pp. 169-196 and Chapter 7: Inequality and Development, pp. 197-248), Princeton: Princeton University Press.