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El Koudouss El Mechry
Center for International Policy Studies
Dealy Hall, Room 541
Fordham University
441 East Fordham Road
Bronx, NY 10458
718-817-0835
meshriettolba@gmail.com

Evert Van der Sluis
Department of Economics
South Dakota State University
Brookings, SD 57007
605-688-4869
evert.vandersluis@sdstate.edu

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The Role of Foreign Aid and Foreign Direct Investment in Reducing Poverty

El Koudouss El Mechry,* and Evert Van der Sluis**
* Center for International Policy Studies, Fordham University; **Department of Economics, South Dakota State University, Brookings, SD 57007, 605-688-4869, evert.vandersluis@sdstate.edu

ABSTRACT

We examine the role of foreign aid and foreign direct investment (FDI) in reducing poverty in less developed countries (LDCs). Using panel data, our analyses suggest the effectiveness of foreign aid in reducing poverty depends on the measure of aid, the type of data analyzed, and the method of analysis employed. Overall, our findings suggest that FDI is largely ineffective in reducing poverty, and that U.S. agricultural aid has a small but significantly negative effect on reducing poverty in LDCs.

BACKGROUND

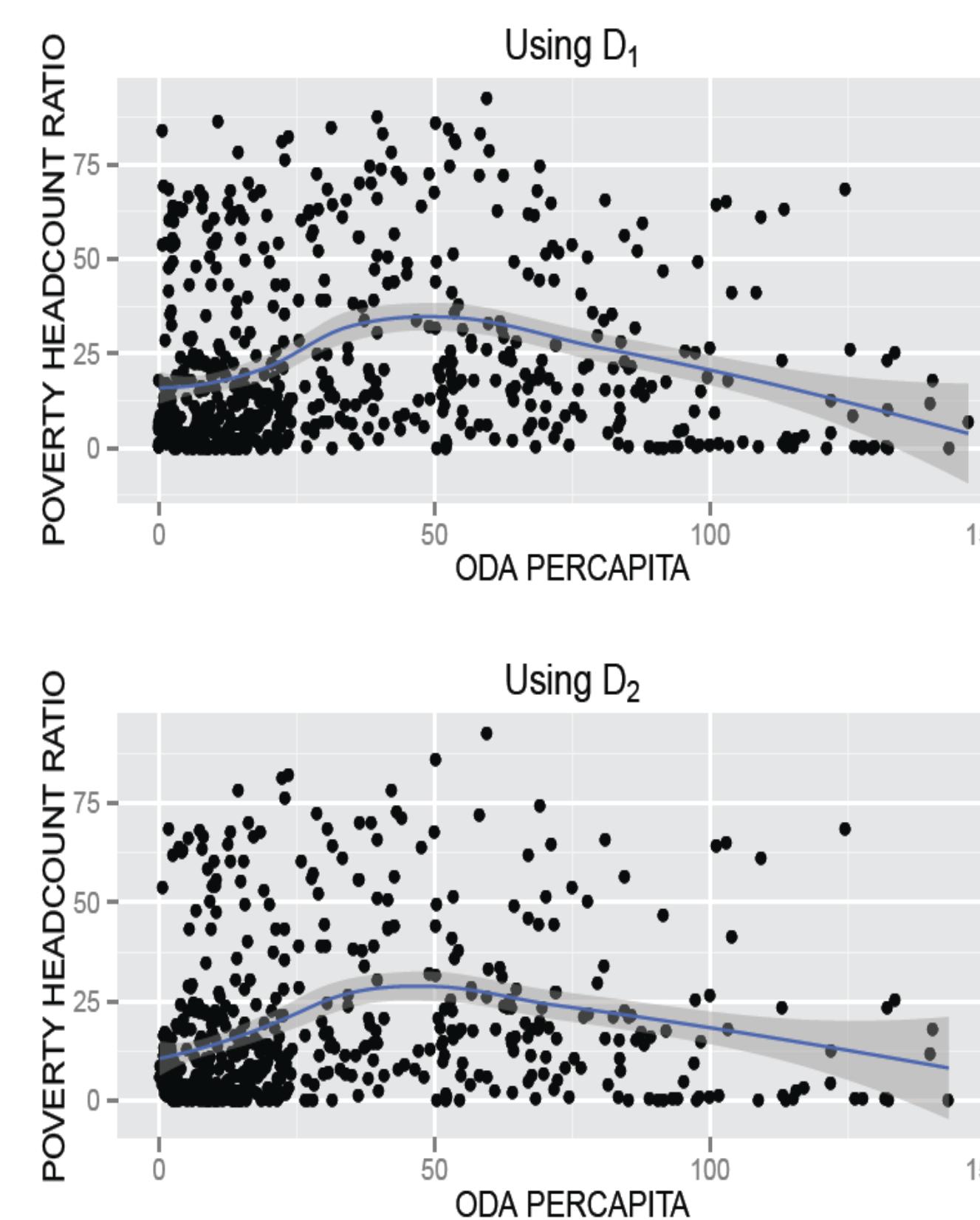
Globally, about 2.7 billion people (over 40% of the world's population) live on less than \$2 per day (World Bank, 2014). The vast majority of the poor lives in LDCs, suffers from poor health, malnutrition and illiteracy, and often lacks political representation. Eradicating absolute poverty is generally deemed necessary for achieving sustainable social and economic growth and development, so it is a key objective of many governments and non-governmental organizations (NGOs).

Many LDCs receive foreign aid from developed countries. In part to help reduce poverty, aid may be provided in the form of multilateral contributions funneled through international aid agencies, or as bilateral, humanitarian, and military aid. LDCs can also benefit from international capital flows to finance poverty alleviation policies through FDI, which may serve to fill the gap between LDCs' optimal rate of investment and their domestic savings.

We examine the contribution of official development assistance (ODA) and FDI in reducing poverty in LDCs. In particular, we explore the role of ODA and FDI in reducing malnutrition prevalence, mortality rates, life expectancy, school enrollment, access to primary school, and literacy rates. Because the vast majority of the poor are employed in agriculture, we also analyze the impact of ODA and FDI on agricultural productivity and crop yields.

DATA

Our main source of data is the World Development Indicators (WDI) database (World Bank, 2014). Agricultural aid data were taken from USAID (2014). We constructed two alternative datasets, each spanning the 1981-2013 period. The first dataset, denoted D1, includes all Low Income Countries (LICs), Lower Middle Income Countries (LMICs), and Upper Middle Income Countries (UMICs). The second one, D2, is similar, but excludes all countries with fewer than four observations of the poverty head count ratio measure, and also excludes China, India, the Russian Federation, as well as Egypt and Jordan, resulting in a sample of 73 countries representing all income levels, all continents, and all regions.



MODEL

The statistical model has alternative measures of foreign assistance and control variables.

$$\text{Poverty}_{i,t} = \beta_0 + \beta_1 \text{AID}_{i,t} + \beta_2 \text{FDI}_{i,t} + \beta_3 \text{P.GDP}_{i,t} + \beta_4 \text{ENROL}_{i,t} + \beta_5 \text{MORT}_{i,t} + \beta_6 \text{GINI}_{i,t} + \beta_7 \text{TRANSPARENCY}_{i,t} + \alpha_i + \mu_{i,t} \quad (1)$$

where subscripts i and t refer to country and time, respectively. Variables AID and FDI represent foreign assistance and foreign direct investment, respectively. P.GDP, ENROL, MORT, and GINI denote per capita GDP, primary school enrollment, the infant mortality rate, and the Gini index, respectively, and are included to control for income, education, health, and inequality. The TRANSPARENCY variable represents institutional quality. The sum of α_i , representing country-specific characteristics, and $\mu_{i,t}$, an idiosyncratic error term, corresponds to the error term in the classical model. In this model specification, we directly assess the relationship between poverty, aid, and FDI. This is in contrast to most studies on the role of foreign aid and FDI in reducing poverty, which employ similar regression specifications, but they use GDP growth as dependent variable, suggesting that AID and FDI increase growth and reduce poverty.

RESULTS

We first applied a pooled OLS regression to gain a preliminary understanding of the data. We recognize its limitations for panel data analysis, in that it fails to account for cross-sectional specific characteristics, may suffer from endogeneity issues, and produce biased and inconsistent results. The pooled OLS results indicate that aid is negatively related to poverty, but also suggest a significant U-shaped association between aid and poverty. (A U-shaped relation suggests that aid reduces poverty, but only up to some poverty threshold. Conversely, an inverted U-shaped relationship suggests aid reduces poverty beyond a minimum poverty level threshold.)

Subsequently, we estimated a first differences version of the statistical model, in efforts to eliminate country-specific characteristics and endogeneity effects.

$$\Delta \text{Poverty}_{i,t} = \beta_1 \Delta \text{AID}_{i,t} + \beta_2 \Delta \text{FDI}_{i,t} + \beta_3 \Delta \text{P.GDP}_{i,t} + \beta_4 \Delta \text{ENROL}_{i,t} + \beta_5 \Delta \text{MORT}_{i,t} + \beta_6 \Delta \text{GINI}_{i,t} + \beta_7 \Delta \text{TRANSPARENCY}_{i,t} + \mu_{i,t} \quad (2)$$

where $X_{i,t} = X_{i,t} - X_{i,t-1}$ for any variable X , and α_i and β_0 are eliminated. Results show a significant and negative relationship between aid and to poverty.

Results of the Breusch-Pagan Lagrange Multiplier (LM) test indicate the presence of panel effects, and those of the Hausman test suggest the presence of fixed (not random) effects. However, results of the fixed effect model indicate an insignificant relationship U-shaped between aid and poverty.

The Table to the right reports the results of running the fixed effects estimator on the model in Equation 2 using the D1 data set and the usual specifications. The results suggest that aid is significant and negatively related to poverty in specifications (1) and (2), but it has an insignificant U-shaped relationship with poverty in (3). FDI is insignificant in all there specifications, with a U-shaped relationship with poverty in (2) and (3), but inverted U-shaped in (1). Per capita income is negatively related to poverty, but it is insignificant. The relationship between enrollment and poverty is insignificant and inverted U-shaped in (1), but significant and U-shaped in (2) and (3). Infant mortality is insignificant and has the reverse sign in (3). Inequality and transparency have the expected signs, but only the former is significant. The model's fit is very poor.

	Dependent variable: POVERTY		
	(1)	(2)	(3)
ODAtoGov	-0.122*** (0.031)		
ODA.GNI		-0.641** (0.285)	
ODA.PERCAPITA			-0.062 (0.067)
ODA.PERCAPITA2			0.002 (0.002)
FDI	0.193 (0.539)	-0.491 (0.515)	-0.129 (0.596)
FDI2	-0.005 (0.021)	0.033 (0.028)	0.015 (0.030)
P.GDP	0.118 (0.095)	0.134 (0.159)	0.118 (0.191)
ENROL	-0.305 (0.590)	-0.797** (0.320)	-0.074* (0.369)
ENROL2	-0.003 (0.005)	0.002 (0.002)	0.004 (0.003)
MORT	0.014 (0.110)	0.016 (0.141)	-0.024 (0.142)
GINI	0.575 (0.243)	1.096*** (0.360)	0.877** (0.361)
TRANSPARENCY	-0.074 (3.084)	-2.116 (4.915)	-3.059 (5.882)
Observations	61	78	78
R ²	0.606	0.562	0.516
Adjusted R ²	0.179	0.187	0.165
F Statistic	3.074** (df = 9; 18)	3.713*** (df = 9; 26)	2.665** (df = 10; 25)

Note: *p<0.1; **p<0.05; ***p<0.01

RESULTS

Results of the fixed effects model applied to data set D2 differ slightly from of D1. The results indicate that aid is negatively related to poverty in specifications (1) and (2), but is only significant in (1). This relationship is U-shaped and insignificant in (3). FDI and enrollment remain unchanged, and per capita GDP has a significantly negative relationship with poverty in all specifications. Inequality again has the expected sign and is significant. As with the result of the D1 dataset, transparency has the reverse sign. The model's fit applied to D2 is slightly better than for D1.

To test for robustness of the results, we constructed two additional data sets from D1 and D2. In the first, countries were aggregated into six regions, while excluding high-income countries from each region. In the second data set, countries were aggregated over regions into four income categories. Results of the fixed effects model applied to data aggregated by income-category and by region suggest an inverted U-shaped relationship, while the same estimator applied to data aggregated by region using U.S. aid shows a U-shaped relationship between U.S. agricultural aid and poverty. The fit of the model applied to the two aggregated dataset is excellent, with adjusted R²'s of 0.83 and 0.88, respectively.

Finally, we used a U.S. aid to agriculture variable to test the effectiveness of aid to agriculture. However, data on both poverty and U.S. agricultural aid are only available for three regions: the Middle East and North Africa, Latin American Caribbean, and Sub-Saharan Africa. The Table to the right reports the results of applying the fixed effect estimator to model (2). The results show that U.S. agricultural aid (USAGAID) is significant and inversely related to poverty, but FDI is not significant and also has an inverted U-shaped relationship with poverty. Per capita GDP is significant and negatively related to poverty, enrollment has a U-shaped and significant relationship with poverty, infant mortality has the expected sign and is significant, and the variable representing political freedom is significant and negatively related to poverty. The fit of the model is good with an adjusted R² of 0.74.

Dependent variable:	POVERTY
USAGAID	-0.001*** (0.0003)
FDIPERCAPITA	0.010 (0.017)
I(FDIPERCAPITA^2)	-0.0001 (0.0001)
GDP.PER	0.812** (0.349)
ENROL	-1.213*** (0.205)
I(ENROL^2)	0.007*** (0.001)
MORTL	0.057** (0.023)
FREE	-0.727** (2.627)
Observations	96
R ²	0.884
Adjusted R ²	0.783
F Statistic	81.231*** (df = 8; 85)

Note: *p<0.1; **p<0.05; ***p<0.01

CONCLUSIONS

Consistent with findings in the literature, our research indicates that the role of foreign aid and FDI in reducing poverty in LDCs is mixed, complex, and difficult to assess. Clearly, poverty reduction requires far more than effective aid and FDI. Per capita GDP, education, health, and inequality are all variables that were significant in most specifications. Additional variables not included in our analysis may also determine the success of any poverty alleviation policy. Key contributions of our work are the U-shape and inverted U-shape forms of the role of aid and FDI in reducing poverty and the associated specific threshold levels.

REFERENCES

World Bank. (2014). World Development Indicators Online (WDI) database.