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DOES FOREIGN DIRECT INVESTMENT REDUCE POVERTY? EMPIRICAL EVIDENCE FROM TANZANIA

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Abstract

This paper investigates the direct impact of foreign direct investment (FDI) inflows on poverty reduction in Tanzania between 1980 and 2014. The paper attempts to answer one critical question: Does FDI reduce poverty in Tanzania? The study employs three poverty reduction proxies, namely, household consumption expenditure (Pov1), infant mortality rate (Pov2), and life expectancy (Pov3). The three poverty reduction proxies have been selected based on the need to capture poverty in its multidimensional nature. Using the autoregressive distributed lag (ARDL) bounds testing approach, the study finds that FDI has a short-run positive impact on poverty reduction when infant mortality rate is used as a proxy for poverty reduction. However, when infant mortality rate and life expectancy are used as poverty reduction proxies, FDI has no impact on poverty reduction. This applies irrespective of whether the analysis is conducted in the short run or in the long run. The study, therefore, concludes that the impact of FDI on poverty reduction is sensitive to the proxy used to measure the level of poverty reduction, and varies over time.

JEL Classification: F21; I32
Key words: Tanzania; Poverty Reduction; Foreign Direct Investment; Household Consumption Expenditure; Infant Mortality Rate; Life Expectancy.

1. Introduction

The relationship between foreign direct investment inflows (FDI) and poverty reduction has received increasing coverage due to the need to establish the nature of the relationship that exists between the two variables. Many developing countries have opened up their economies to foreign direct investment with the objective of fighting poverty, among other economic objectives. There is ongoing debate about the extent to which FDI has made a positive impact on poverty reduction. There is extensive empirical literature that has attempted to establish the nature of the relationship between FDI and poverty reduction realised through economic growth effects (see Zaman *et al.*, 2012; Shamim *et al.*, 2014; Ucal, 2014). The results from these studies are inconclusive. The few studies that have investigated the direct relationship between FDI and poverty reduction have also found inconclusive results. In addition, most of the studies that have examined the direct impact of FDI on poverty reduction have been mainly based on Asia and Latin America, affording Africa very little coverage.

Some of the studies that have investigated the direct relationship between FDI and poverty reduction have found a positive relationship between the two variables (see, for example, Baradwaj, 2014; Jalilian and Weiss, 2002; Gohou and Soumare, 2012; Fowowe and Shuaibu, 2014). Other studies, however, have found a negative relationship between FDI and poverty reduction (see Huang *et al*., 2010). Furthermore, there are studies that have found FDI to have an insignificant impact on poverty reduction (see Gohou and Soumare, 2012; Ogunniyi and Igberi, 2014; Akinmulegun, (2012).

Previous studies that have attempted to establish the direct relationship between FDI and poverty reduction have found varying results, depending on the poverty proxy employed, methodology used, and the time frame under consideration. Thus, the relationship between FDI and poverty reduction cannot be generalised across all study countries. Although the empirical findings from previous studies have been inconclusive, the importance of poverty reduction in Tanzania remains vital. It is against this background that this study attempts to investigate the direct impact of FDI on poverty reduction in Tanzania between 1980 and 2014.

This study differs from previous studies in that (i) it employs three poverty proxies – household consumption expenditure (Pov1), infant mortality rate (Pov2), and life expectancy (Pov3) – to investigate the impact of FDI on poverty reduction; (ii) it uses time series data, unlike other studies that have used cross sectional data, which does not sufficiently capture heterogeneity across countries; and (iii) it employs the autoregressive distributed-lag (ARDL) approach with its known advantages, such as absence of the requirement to perform pre-testing of variables for cointegration (Pesaran and Pesaran, 2009).

Tanzania has been selected for this study because it has received little coverage on the direct impact of FDI on poverty reduction (see Fowowe and Shuaibu, 2014). Tanzania is among the countries with a high population living below the poverty line of $1.90 per day in 2011 (World Bank, 2017). Furthermore, the country has opened up its economy to foreign direct investment (World Bank, 2017). Thus, Tanzania creates much interest, and this study would shed more light on the relationship between FDI and poverty reduction in this country.

The commencement of economic reforms in Tanzania from 1983 marked the introduction of a number of changes in the investment landscape (OECD, 2013). The reforms in the investment sector related to attracting FDI were two-pronged; first was the drive to create an environment conducive to investment. Some of the policies pursued as part of this drive were regional integration, industrial support, and promotion of exports (OECD, 2013). Second were policies with a direct impact on FDI, such as regulatory reforms, bilateral investment treaties (BITs), exchange control relaxation, and investment incentives, among other policy initiatives (OECD, 2013). The reforms related to investment were underlined by the need to increase private sector participation, creating an environment conducive to investment and providing regulations that supported investments. In response to the investment policies pursued, FDI inflows improved, although these were characterised by huge fluctuations over the years (World Bank, 2017).

On the poverty front, the government of Tanzania enshrined poverty reduction in the long-term vision, the National Development Vision 2025, and the Zanzibar National Development Vision 2020. To achieve the goals of the National Development Vision, the government adopted medium-term policy implemented through the National Strategy for Growth and Reduction of Poverty, or '*Mkukuta'* (NSGRP), in Tanzania mainland and Zanzibar Strategy for Growth and Reduction of Poverty (ZSGRP), or '*Mkuza'*, in the isles (Ministry of Finance and Economic Affairs, 2010; Revolutionary Government of Zanzibar, 2010). The NSGRP

and the ZSGRP are composed of 3 clusters: growth for reduction of income poverty, improved standards of living and increasing accountability in resource utilisation and the environment, and good governance and national unity (Ministry of Finance and Economic Affairs, 2010; Revolutionary Government of Zanzibar, 2010). In response to the poverty reduction policies adopted, poverty levels have fallen over the years, although they remain high (World Bank, 2017). There is also variation in the level of poverty by region, settlement type, and sex (National Bureau of Statistics, 2014; Office of the Chief Government Statistician, 2012)

The rest of the paper is divided as follows: Section 2 covers related literature; Section 3 outlines the estimation techniques; Section 4 presents the results and their analysis; while the fifth section concludes the study.

2. Review of Related Literature

There is extensive literature on the dynamic impact of FDI on poverty reduction achieved through economic growth, although the results from these studies are mixed. Only a few studies have investigated the direct impact of FDI on poverty reduction, and the results are still inconclusive. Three sets of findings have emerged from studies that have investigated the direct impact of FDI on poverty reduction.

First are empirical studies that have found FDI to have a positive impact on poverty reduction. Among these studies are Jalilian and Weiss (2002), Zaman *et al.* (2012), Gohou and Soumare, (2012), Fowowe and Shuaibu (2014), Shamim *et al*. (2014), Israel (2014); Ucal (2014), and Soumare (2015). Second are studies that have found a negative impact of FDI on poverty reduction (see, for example, Huang *et al*., 2010; Ali and Nishat, 2010). Third are studies that have found an insignificant relationship between FDI and poverty reduction (see Tsai and Huang, 2007; Gohou and Soumare, 2012; Akinmulegun, 2012; Ogunniyi and Igberi, 2014). Table 1 summarises studies that have investigated the impact of FDI on poverty reduction and their findings.

Table 1: Summary of Empirical Studies on the Impact of FDI on Poverty Reduction

Author (s)	Title	Region/Country	Impact
Jalilian and Weiss, 2002	Foreign direct investment and poverty in the ASEAN region	ASEAN	– Positive association between FDI and poverty reduction
Zaman *et al.*, 2012	The relationship between foreign direct investment and pro-poor growth policies in Pakistan	Pakistan	– Positive association between FDI and poverty reduction
Gohou and Soumare, 2012	Does foreign direct investment reduce poverty in Africa and are there any regional differences?	Africa	– Positive association between FDI and poverty reduction in Central and East Africa
Shamim *et al.*, 2014	Impact of foreign direct investment on poverty reduction in Pakistan	Pakistan	– Positive association between FDI and poverty reduction
Fowowe and Shuaibu, 2014	Is foreign direct investment good for the poor? New evidence from African countries	Africa	– Positive association between FDI and poverty reduction
Ucal, 2014	Panel data analysis of foreign direct investment and poverty from the perspective of developing countries	Developing Countries	– Positive association between FDI and poverty reduction

Israel, 2014	Impact of foreign direct investment on poverty reduction in Nigeria 1980-2009	Nigeria	– Positive association between FDI and poverty reduction
Soumare, 2015	Does foreign direct investment improve welfare in North Africa countries?	Northern Africa	– Positive association between FDI and poverty reduction
Huang *et al*., 2010	Inward and outward foreign direct investment and poverty: East Asia and Latin America	East Asia and Latin America	– Negative association between FDI and poverty reduction
Ali and Nishat, 2010	Do foreign inflows benefit Pakistan poor?	Pakistan	– Negative association between FDI and poverty reduction
Tsai and Huang, 2007	Openness, growth and poverty: the case of Taiwan	Taiwan	– Insignificant impact
Gohou and Soumare, 2012	Does foreign direct investment reduce poverty in Africa and are there any regional differences?	Africa	– Insignificant impact in Southern and Northern Africa
Akinmulegun, 2012	The impact of foreign direct investment on poverty reduction in Nigeria	Nigeria	– Insignificant impact

3. Estimation Techniques

ARDL Approach to Cointegration

The study employs the newly-developed ARDL bounds testing approach to cointegration because of a number of advantages. First, the ARDL involves the use of a single reduced form equation, unlike other methods that use a system of equations (see Duasa, 2007). Second, the ARDL does not require all variables to be integrated of the same order. Variables can be integrated of order [I (1)], order 0 - [I (0)] or fractionally integrated (Pesaran *et al*. 2001). To this end, the ARDL bounds testing approach was selected in this study.

Variables

There are three dependent variables in this study, namely, household consumption expenditure (Pov1), infant mortality rate (Pov2), and life expectancy (Pov3). The explanatory variables included in the study are FDI and other control variables. The control variables included in the study are human capital (HK), price level (CPI), trade openness (TOP), and infrastructure (FTL). Variable description is given in Table 2.

Table 2: Variable Description

Variable	Description
Pov1	Household final consumption expenditure per capita
Pov2	Infant mortality rate
Pov3	Life expectancy
FDI	Foreign direct investment inflows as a proportion of GDP
HK	Gross primary school enrolment
TOP	A summation of imports and exports as a proportion of GDP
CPI	Consumer price index
FTL	Infrastructure captured by fixed telephone lines

Models

Three models are used to investigate the impact of FDI on poverty reduction. Model 1 investigates the impact of FDI on poverty reduction using Pov1 (household consumption expenditure). Model 2 investigates the impact of FDI on poverty reduction using Pov2 (infant mortality rate) as a proxy for poverty reduction, while Model 3 captures the dynamic impact of FDI on poverty reduction using Pov3 (life expectancy) as a poverty reduction proxy. The models are specified in equations 1-3.

Model 1

$$Pov1 = \alpha_0 + \alpha_1 FDI + \alpha_2 TOP + \alpha_3 HK + \alpha_4 CPI + \alpha_5 FTL + \varepsilon \quad (1)$$

Model 2

$$Pov2 = \alpha_0 + \alpha_1 FDI + \alpha_2 TOP + \alpha_3 HK + \alpha_4 CPI + \alpha_5 FTL + \varepsilon \quad (2)$$

Model 3

$$Pov3 = \alpha_0 + \alpha_1 FDI + \alpha_2 TOP + \alpha_3 HK + \alpha_4 CPI + \alpha_5 FTL + \varepsilon \quad (3)$$

Where α_0 is a constant and $\alpha_1 - \alpha_5$ are coefficients and ε is the error term

ARDL model and the error correction specification are given in equation 4, 5, and 6 for Model 1, Model 2, and Model 3, respectively.

Model 1: ARDL Specification

$$\begin{aligned}\Delta Pov1_t = \alpha_0 &+ \sum_{i=1}^{n} \alpha_1 \Delta Pov1_{t-i} + \sum_{i=0}^{n} \alpha_2 \Delta FDI_{t-i} + + \sum_{i=0}^{n} \alpha_3 \Delta TOP_{t-i} + \sum_{i=0}^{n} \alpha_4 \Delta HK_{t-i} \\ &+ \sum_{i=0}^{n} \alpha_5 \Delta CPI_{t-i} + \sum_{i=0}^{n} \alpha_6 \Delta FTL_{t-i} + \vartheta_1 Pov1_{t-1} + \vartheta_2 FDI_{t-1} + \vartheta_3 HK_{t-1} \\ &+ \vartheta_4 TOP_{t-1} + \vartheta_5 CPI_{t-1} + \vartheta_6 FTL_{t-1} + \mu_t \quad (4a)\end{aligned}$$

Where $\alpha_1 - \alpha_6$ and $\vartheta_1 - \vartheta_6$ are regression coefficients, α_0 is a constant and, μ_t is white noise error term.

The error correction model for Model 1 is specified as follows:

$$\begin{aligned}\Delta Pov1_t = \alpha_0 &+ \sum_{i=1}^{n} \alpha_1 \Delta Pov1_{t-i} + \sum_{i=0}^{n} \alpha_2 \Delta FDI_{t-i} + \sum_{i=0}^{n} \alpha_3 \Delta TOP_{t-i} + \sum_{i=0}^{n} \alpha_4 \Delta HK_{t-i} \\ &+ \sum_{i=o}^{n} \alpha_5 \Delta CPI_{i-1} + \sum_{i=o}^{n} \alpha_6 \Delta FTL_{t-i} + \gamma_1 ECM_{t-1} + \mu_t \quad (4b)\end{aligned}$$

Where $\alpha_1 - \alpha_6$ and γ_1 are coefficients, α_0 is a constant ECM_{t-1} is lagged error term and μ_t is white noise error term.

Model 2: ARDL Specification

$$\Delta Pov2_t = \alpha_0 + \sum_{i=1}^{n} \alpha_1 \Delta Pov2_{t-i} + \sum_{i=0}^{n} \alpha_2 \Delta FDI_{t-i} + \sum_{i=0}^{n} \alpha_3 \Delta TOP_{t-i} + \sum_{i=0}^{n} \alpha_4 \Delta HK_{t-i} + \sum_{i=0}^{n} \alpha_5 \Delta CPI_{t-i} + \sum_{i=0}^{n} \alpha_6 \Delta FTL_{t-i} + \vartheta_1 Pov2_{t-1} + \vartheta_2 FDI_{t-1} + \vartheta_3 TOP_{t-1} + \vartheta_4 HK_{t-1} + \vartheta_5 CPI_{t-1} + \vartheta_6 FTL_{t-1} + \varepsilon_t \quad (5a)$$

Where $\alpha_1 - \alpha_6$ and $\vartheta_1 - \vartheta_6$ are coefficients, α_0 is a constant and ε_t is a white noise error term.

The error correction model for Model 2 is specified as follows:

$$\Delta Pov2_t = \alpha_0 + \sum_{i=1}^{n} \alpha_1 \Delta Pov2_{t-i} + \sum_{i=0}^{n} \alpha_2 \Delta FDI_{t-i} + \sum_{i=0}^{n} \alpha_3 \Delta TOP_{t-i} + \sum_{i=0}^{n} \alpha_4 HK_{t-i} + \sum_{i=o}^{n} \alpha_5 \Delta CPI_{i=0} + \sum_{i=o}^{n} \alpha_6 \Delta FTL_{t-i} + \gamma_2 ECM_{t-1} + \mu_t \quad (5b)$$

Where $\alpha_1 - \alpha_6$ and γ_2 are coefficients, α_0 is a constant ECM_{t-1} is lagged error term and μ_t is white noise error term.

Model 3: ARDL Specification

$$\Delta Pov3_t = \alpha_0 + \sum_{i=1}^{n} \alpha_1 \Delta Pov3_{t-i} + \sum_{i=0}^{n} \alpha_2 \Delta FDI_{t-i} + \sum_{i=0}^{n} \alpha_3 \Delta TOP_{t-i} + \sum_{i=0}^{n} \alpha_4 \Delta HK_{t-i} + \sum_{i=0}^{n} \alpha_5 \Delta CPI_{t-i} + \sum_{i=0}^{n} \alpha_6 \Delta FTL_{t-i} + \vartheta_1 Pov3_{t-1} + \vartheta_2 FDI_{t-1} + \vartheta_3 TOP_{t-1} + \vartheta_4 HK_{t-1} + \vartheta_5 CPI_{t-1} + \vartheta_6 FTL_{t-1} + \varepsilon_t \quad (6a)$$

Where $\alpha_1 - \alpha_6$ and $\vartheta_1 - \vartheta_6$ are coefficients, α_0 is a constant and ε_t is a white noise error term.

The error correction model for Model 3 is specified as follows:

$$\Delta Pov3_t = \alpha_0 + \sum_{i=1}^{n} \alpha_1 \Delta Pov3_{t-i} + \sum_{i=0}^{n} \alpha_2 \Delta FDI_{t-i} + \sum_{i=0}^{n} \alpha_3 \Delta TOP_{t-i} + \sum_{i=0}^{n} \alpha_4 HK_{t-i} + \sum_{i=o}^{n} \alpha_5 \Delta CPI_{i=0} + \sum_{i=o}^{n} \alpha_6 \Delta FTL_{t-i} + \gamma_3 ECM_{t-1} + \mu_t \quad (6b)$$

Where $\alpha_1 - \alpha_5$ and γ_3 are coefficients, α_0 is a constant ECM_{t-1} is lagged error term and μ_t is white noise error term.

Data Sources

Time series data from 1980 to 2014 was employed to investigate the direct impact of FDI on poverty reduction. The data was obtained from the World Bank Development Indicators and United Nations Conference on Development and Trade. Data analysis was done using Microfit 5.0.

4. Results

Unit Root Test
Pretesting of the variables for unit root was done to establish the order of integration, although it is not a prerequisite for the ARDL bounds testing approach employed in this study. Table 3 shows unit root test results using Dickey-Fuller Generalised Least Squares (DF-GLS), Phillips Perron (PP), and Perron unit root test PPU Root test.

The unit root tests results for Tanzania vary from one unit root test to the other; the results show that all variables are stationary in levels or in first difference, confirming the suitability of the ARDL-based analysis.

Bound F-statistic to Cointegration
The results of the bounds test and the critical values are presented in Table 4.

The F-statistics for Model 1-3 are 3.566, 7.959, and 9.517, respectively. The calculated F-statistics are compared to the Pesaran et al. (2001) critical values, also reported in Table 4. The calculated F-statistic is greater than the critical values in all the models, confirming cointegration in Model 1, Model 2, and Model 3.

Impact Analysis
The ARDL procedure is used in the estimation of the three models after confirming a long run relationship in Model 1-3. To proceed with the estimation, the optimal lag length is selected based on the criteria that provide the most parsimonious model. The optimal lag length selected is ARDL (2, 1, 0, 1, 1, 0) for Model 1; ARDL (2, 1, 4, 2, 2, 3) for Model 2; and ARDL (3, 1, 1, 1, 1, 0) for Model 3. The long-run and short-run coefficients for Model 1-3 are presented in Table 5.

Table 3: Unit Root Test Results

	ADF-GLS Test				PP Test				PPU(Root) Test			
Variable	**Stationarity of Variable in Levels**		**Stationarity of Variable in First Difference**		**Stationarity of Variable in Levels**		**Stationarity of Variable in First Difference**		**Stationarity of all Variables in Levels**		**Stationarity of all Variables in First Difference**	
	Without Trend	With Trend	Without Trend	With Trend	Without Trend	With Trend	Without Trend	With Trend	Without Trend	With Trend	Without Trend	With Trend
Pov1	-1.2793	-1.8948	-5.9083***	-6.1756***	-1.5927	-1.7032	-5.9083***	-6.1756***	-5.0613*	-5.5126*	-	-
Pov2	-2.5847**	-4.4376**	-	-	3.0267**	-8.4233***	-	-	-5.7978**	-5.4214**	-	-
Pov3	-6.5688***	-4.1466***	-	-	5.1840***	0.5905	-	-3.5913**	-7.0810***	-5.9210**	-	-
FDI	-2.4803**	-5.1055***	-	-	-4.1691***	-9.7404***	-	-	-1.9894	-2.9684	-6.3290***	-6.3292***
TOP	-2.0303**	-3.4088*	-	-	-2.0303**	-3.2476*	-	-	-5.3625**	-5.4513**	-	-
HK	-1.2793	-1.8948	-5.9083***	-6.1756***	-1.2839	-1.5640	-5.4598***	-5.3877***	-3.3300	-3.4671	-6.5116***	-6.6695***
CPI	-0.8439	-1.4430	-5.3893***	-5.5207***	4.9867***	-3.2532*	-	-	-1.5640	-2.9432	-5.7810**	-5.5341**
FTL	4.4861***	-3.0220*	-	-	-1.6913	-1.1531	-5.5944***	-5.7874***	-2.1364	-5.4167*	-7.1125***	-

Note:*, ** and *** denote stationarity at 10%, 5%, and 1% significance levels, respectively.

Table 4: Cointegration Results and Critical Values

Model	Independent Variables	Function		F –statistic		Cointegration Status	
1	Pov1	F(FDI, HK, TOP, INF, FTL)		3.566*		Cointegrated	
2	Pov2	F(FDI, HK, TOP, INF, FTL)		7.959***		Cointegrated	
3	Pov3	F(FDI, HK, TOP, INF, FTL)		9.517***		Cointegrated	
Asymptotic Critical values (unrestricted intercept and no trend)							
Pesaran *et al.*(2001:300) critical values(Table CI(iii) Case III		10%		5%		1%	
		I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
		2.26	3.35	2.62	3.79	3.41	4.68

Note: *, ** and *** denote statistical significance at 10%, 5%, and 1% levels, respectively.

Table 5: Long-Run and Short-Run Coefficients: Model 1, Model 2, and Model 3

Panel A: Long-Run Results						
Model	**Model 1 (Dependent Variable is Pov 1)**		**Model 2 (Dependent Variable is Pov 2)**		**Model 3 (Dependent Variable is Pov 3)**	
Regressor	**Coefficient**	**T-ratio**	**Coefficient**	**T-ratio**	**Coefficient**	**T-ratio**
C	5.5188***	7.3483	1.5573***	3.8092	-0.0343***	-8.7316
FDI	0.5825	0.4618	0.0016	0.9121	-0.3201	-0.2846
HK	-0.0177***	-3.5096	-0.0049*	-1.9799	0.3334***	6.2112
TOP	-0.0198*	-1.9374	0.3586	0.5938	0.7056	0.0942
CPI	0.0185***	9.2922	-0.0041**	-2.2578	0.4821***	3.9332
FTL	0.0176	-0.5248	-0.1049	-0.9262	0.0030***	5.4974
Panel B: Short -Run Results						
	Coefficient	**T-value**	**Coefficient**	**T-value**	**Coefficient**	**T-value**
ΔPov1	0.2335	1.3190	-	-	-	-
ΔPov2	-	-	0.7741**	2.8137	-	-
ΔPov3	-	-	-	-	0.9867***	5.0317
ΔFDI	-0.0246	-0.6994	0.1028*	2.0136	-0.4137	-0.2852
ΔHK	-0.1283*	-1.8089	-0.1797	-0.4802	0.2870***	3.0679
ΔHK(1)	-	-	0.4625	1.2493	-	-
ΔHK(2)	-	-	0.4054	0.9996	-	-
ΔHK(3)	-	-	-0.8474	-0.2922	-	-
ΔTOP	-0.5458*	-2.2396	0.5920*	1.8343	0.9121	0.0937
ΔTOP(1)	-	-	-0.6140	-0.1797	-	-
ΔCPI	0.3318*	1.9174	0.2241	0.7691	0.6231***	3.4565
ΔCPI(1)	-	-	0.7136	0.1686	-	-
ΔFTL	0.2438	0.1743	-0.0042	-1.4331	0.3937***	3.9446
ΔFTL(1)	-	-	0.0036	0.6659	-	-
ΔFTL(2)	-	-	0.0033	0.7261	-	-
ECM(-1)	-0.9602***	-4.0056	-0.0540***	-3.9048	-0.1293***	-8.9463

	Model 1	Model 2	Model 3
R-squared	0.5740	0.9856	0.9950
R-bar-squared	0.3711	0.9607	0.9933
F-statistic	4.0420	53.7937	675.118
Prob (F-statistic)	0.005	0.000	0.000
DW statistic	2.0154	1.7091	1.5280
SE of Regression	3.2505	0.0027	0.1495
Residual Sum of Squares	221.8834	0.8236	0.5362
Akaike Info. Criterion	-87.3887	135.0085	240.1057
Schwartz Bayesian Criterion	-95.4502	120.6686	233.3715

Notes: *, ** and *** denote stationarity at 10%, 5%, and 1% significance levels, respectively; Δ=first difference operator, ΔPov1=Pov1-Pov1 (-1); ΔPov2=Pov2-Pov2 (-1); ΔPov3=Pov3-Pov (-1); ΔFDI=FDI-FDI (-1); ΔHK=HK-HK (-1); ΔTOP=TOP-TOP (-1); ΔCPI=CPI-CPI (-1); ΔFTL=FTL-FTL (-1)

The long-run and short-run results presented in Table 5, Panel A and Panel B, for Model 1 show that FDI is insignificant in both the long run and in the short run. These results suggest that FDI does not play a significant role in reducing poverty in Tanzania, irrespective of whether it is in the long run or in the short run. These results are consistent with findings from other studies (see, for example, Gohou and Soumare, 2012; Ogunniyi and Igberi, 2014).

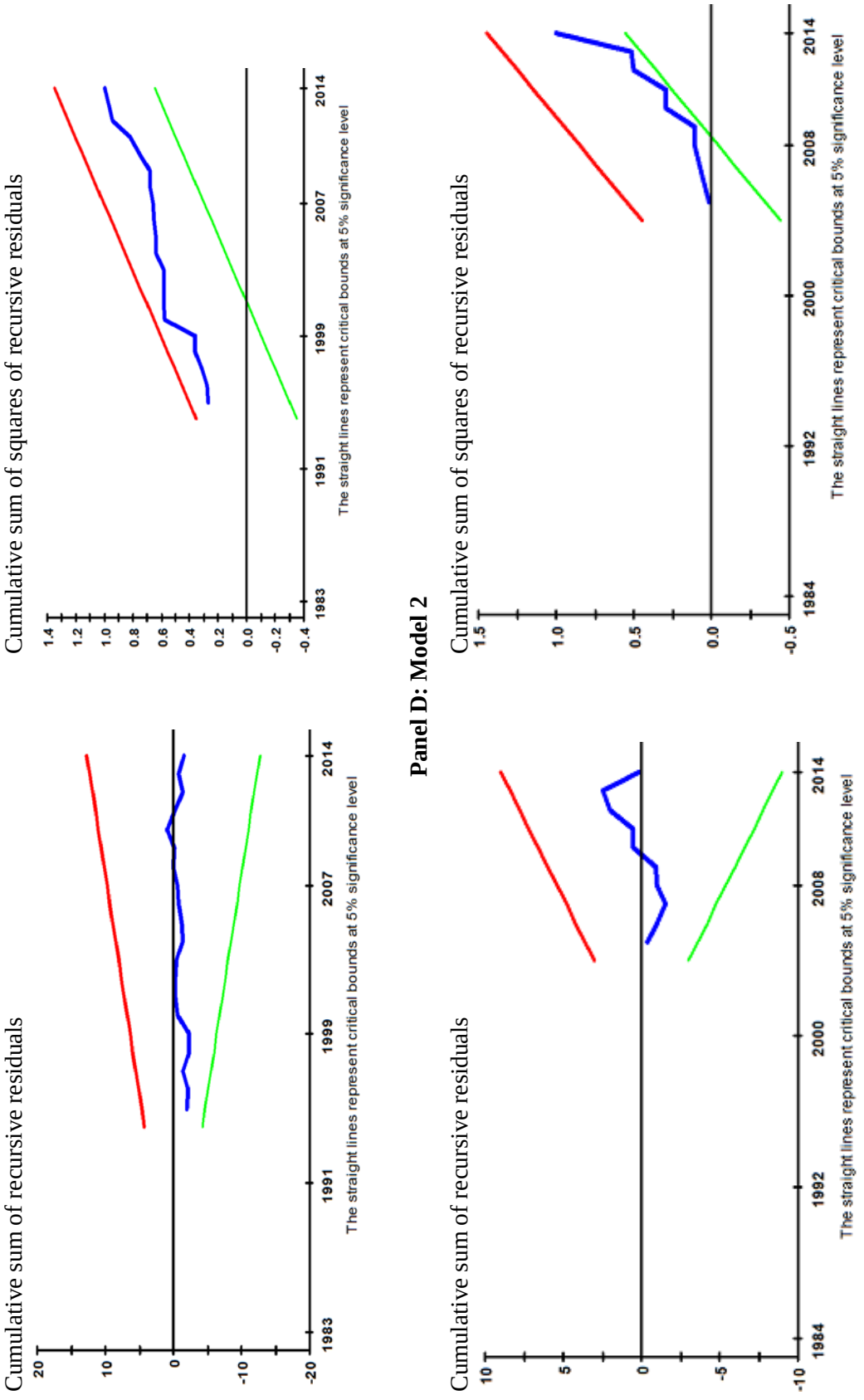
Other long-run and short-run results show that (i) past poverty reduction (ΔPov1) is insignificant in the short run; (ii) human capital (HK), captured by gross primary school enrolment rate, is negative and statistically significant in both the long run and the short run; (iii) trade openness (TOP) is negative and statistically significant in both the short run and the long run; (iv) price level (CPI) is insignificant in the long run, while it is positive and statistically significant in the short run; (v) infrastructure, captured by fixed telephone lines (FTL), is insignificant in the long run and in the short run; (vi) the coefficient on the lagged error correction, ECM (-1), is 0.96 and significant at 1%, implying that there is almost a complete adjustment to the equilibrium in one year if there is disequilibrium; and (vii) the explanatory power of the model is 57%.

Long-run and short-run results presented in Table 5, Panel A and Panel B, for Model 2 confirm that FDI is statistically insignificant in the long run. The results imply that FDI has no impact on poverty reduction in the long run. Although the results were not expected, a few other studies have found the same results (see, for example, Gohou and Soumare, 2012; Ogunniyi and Igberi, 2014). In the short run, FDI is positive and statistically significant. This is confirmed by the coefficient for ΔFDI, which is significant at the 10% level of significance. The results were expected, and they compare favourably with other studies that have investigated the relationship between FDI and poverty reduction. Studies that have found a positive impact of FDI on poverty reduction include Jalilian and Weiss (2002), Ucal (2014), Shamim *et al*. (2014), Fowowe and Shuaibu, (2014), Baradwaj (2014), and Uttama (2015), among others. Foreign direct investment can be used as a policy instrument in Tanzania but requires perfect timing, especially in the short run, in order to result in poverty reduction.

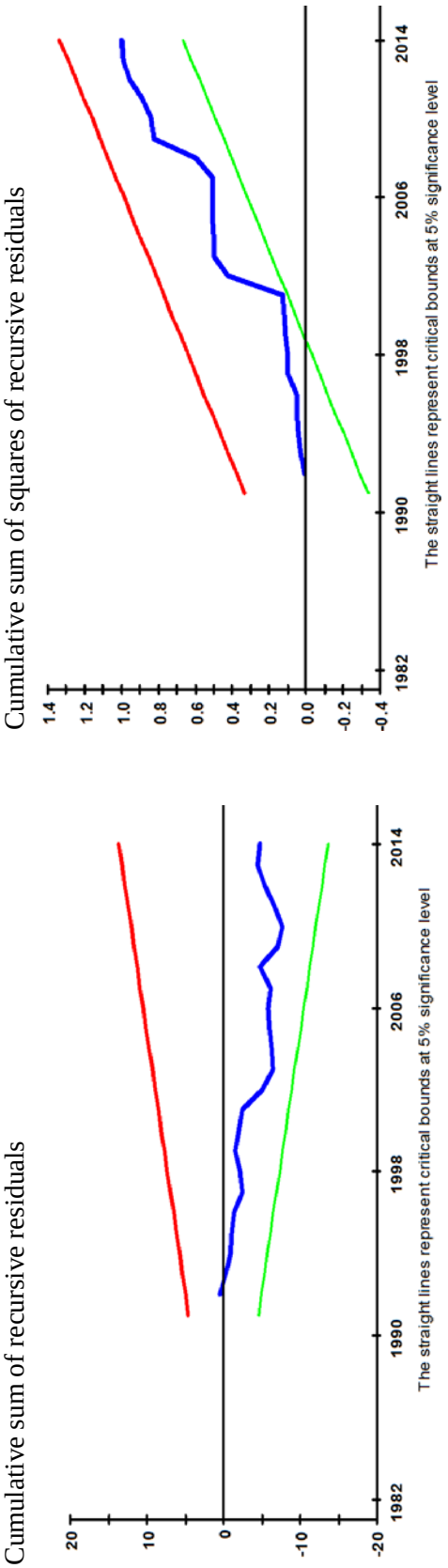
Other long-run and short-run results in Table 5, Panel A and Panel B, for Model 2 show that (i) past poverty reduction (ΔPov2) is positive and statistically significant in the short run; (ii) human capital (HK), measured by gross primary school enrolment rate, is negative and significant in the long run, while it is insignificant in the short run; (iii) trade openness (TOP) is insignificant in the long run, while a positive and significant relationship was confirmed in the short run; (iv) price level (CPI) is negative and statistically significant at 5% in the long run, while it is insignificant in the short run; (v) infrastructure (FTL) is insignificant in both the long run and the short run; (vi) the coefficient on the lagged error correction, ECM (-1), is 0.06 and statistically significant at 5%, implying that it takes over 16 years to get a full adjustment to the equilibrium when there is a disequilibrium in the economy; and (vii) the regression for the underlying ARDL Model 2 is a perfect fit, as indicated by an R-squared of 98%.

Empirical results in Table 5 for Model 3 reveal that FDI is insignificant in both the short run and the long run. The results, although not expected, compare favourably with findings from other studies on the same subject (see Gohou and Soumare, 2012; Ogunniyi and Igberi, 2014).

Figure 1: Plot of CUSUM and CUSUMSQ for Model 1-3



Panel E: Model 3



Note: Straight lines represent critical bounds at 5% level of significance.
The CUSUM and CUSUMQ plots show that parameters in the models are stable at 5% bounds.

Other long-run and short-run results reported in Table 5, Panel A and Panel B, show that (i) past poverty reduction (ΔPov2) is positive and statistically significant in the short run; (ii) there is a positive relationship between human capital (HK), measured by gross primary school enrolment rate, and poverty reduction – both in the short run and in the long run; (ii) trade openness has no impact on poverty reduction in the short run and in the long run; (iv) price level (CPI) has a positive impact on poverty reduction in the short run and in the long run; (v) infrastructure (FTL) is positive and statistically significant in the short run and in the long run; and (vi) the lagged error correction term, ECM (-1), is 0.13 and statistically significant at 1%, implying that when there is a disequilibrium, 13% of the disequilibrium is adjusted in the first year. Cumulative Sum of Recursive Residuals (CUSUM) and Cumulative Sum of Squares of Recursive Residuals (CUSUMSQ) plots are presented in Figure 1.

5. Conclusion

This paper has investigated the dynamic impact of FDI on poverty reduction in Tanzania between 1980 and 2014. Although there is extensive literature on the impact of FDI on poverty reduction, only a few studies have analysed the direct impact of FDI on poverty reduction. The bulk of the studies have investigated the indirect impact of FDI on poverty reduction through the economic growth link. Of the few studies that have investigated the direct impact of FDI on poverty reduction, the results are mixed. This study, therefore, attempted to close this lacuna by investigating the direct impact of FDI on poverty in Tanzania. The study also used three poverty reduction proxies, namely, household consumption expenditure (Pov1), infant mortality rate (Pov2), and life expectancy (Pov3). In addition, the study employed the ARDL bounds testing approach with its known advantages. The results of this study reveal that FDI has a short-run positive impact on poverty reduction when infant mortality rate is used as a proxy for poverty reduction. However, when infant mortality rate and life expectancy are used as poverty reduction proxies, FDI has no impact on poverty reduction. This applies irrespective of whether the analysis is conducted in the short run or in the long run. The study, therefore, concludes that the impact of FDI on poverty reduction is sensitive to the proxy used to measure the level of poverty reduction, and varies over time.

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