UNISA university of south africa

UNISA ECONOMIC RESEARCH WORKING PAPER SERIES

DYNAMIC IMPACT OF FDI INFLOWS ON POVERTY REDUCTION: EMPIRICAL EVIDENCE FROM SOUTH AFRICA

Mercy T. Magombeyi

Nicholas M. Odhiambo

Working Paper 3/2017

February 2017

Mercy T. Magombeyi
Department of Economics
University of South Africa
P. O. Box 392, UNISA
0003, Pretoria
South Africa
Email: tsile.musa@gmail.com

Nicholas M. Odhiambo
Department of Economics
University of South Africa
P. O. Box 392, UNISA
0003, Pretoria
South Africa
Email: odhianm@unisa.ac.za / nmbaya99@yahoo.com

DYNAMIC IMPACT OF FDI INFLOWS ON POVERTY REDUCTION: EMPIRICAL EVIDENCE FROM SOUTH AFRICA

Mercy T. Magombeyi [1] and Nicholas M. Odhiambo

Abstract

This paper investigates the direct impact of foreign direct investment inflows (FDI) on poverty reduction in South Africa from 1980 to 2014. Unlike the majority of the previous studies that relied on one poverty measure, this study employs three poverty reduction measures, namely, household consumption expenditure (Pov1), infant mortality rate (Pov2), and life expectancy (Pov3). The poverty proxies have been chosen based on the need to capture poverty in its multidimensional nature, which has not been fully explored in the literature. Using the recently developed autoregressive distributed lag approach (ARDL), the empirical findings of this study reveals that the impact of FDI on poverty reduction is sensitive to the poverty reduction proxy and the time under consideration, i.e., whether the analysis is conducted in the long run or in the short run. When infant mortality rate (Pov2) is used as a proxy for poverty reduction, FDI has a positive impact on poverty reduction in the long run and a negative impact on poverty reduction in the short run. However, when poverty reduction is proxied by household consumption expenditure and life expectancy, the study found no significant relationship between FDI and poverty reduction in South Africa – irrespective of whether the analysis is conducted in the short run or in the long run.

[1] Corresponding author: Mercy T. Magombeyi, Department of Economics, University of South Africa (UNISA). Email address: tsile.musa@gmail.com

Key Words: Poverty Reduction; Foreign Direct Investment; Household Consumption Expenditure; Infant Mortality Rate; Life Expectancy

JEL Classification: F21; I32.

1. Introduction

The relationship between poverty reduction and foreign direct investment inflows (FDI) has generated much debate in the recent past because of the need to find a solution to poverty. Even though there is rich theoretical literature on the benefits of FDI on poverty reduction, the benefits that are harnessed through this channel empirically are surrounded with much controversy. A number of studies have been done focusing on the impact of foreign direct investment through the economic growth channel (see, for example, Hsiao and Hsiao, 2006; Dollar *et al.*, 2013; Almfraji *et al*., 2014). Although these studies have attempted to establish the nature of the relationship between poverty and FDI, the results are far from being consistent. Even the few studies that have focused on the direct impact of FDI on poverty have brought to the fore nothing but inconclusive results.

Theoretical literature that supports the positive impact of FDI on poverty reduction is well documented, yet evidence from empirical studies still remains inconclusive. Some studies have found FDI to have a positive impact on poverty reduction (see, for example, Jalilian and Weiss, 2002; Zaman *et al.*, 2012; Gohou and Soumare, 2012; Fowowe and Shuaibu, 2014; Shamim *et al.*, 2014). There are also a few studies that have found FDI to have a negative impact on poverty reduction (Huang *et al*., 2010; Ali and Nishat, 2010). Apart from studies that have found a positive or negative impact of FDI on poverty reduction, there are yet other studies that have found FDI to have no significant impact on poverty reduction. Among these studies are, Tsai and Huang (2007), Gohou and Soumare (2012) and Akinmulegun (2012).

The results of the studies on the direct impact of FDI on poverty reduction vary depending on the study country/region, the proxy of poverty used, the methodology employed, and the study period under consideration – thereby validating the notion that the FDI-poverty reduction relationship cannot be generalised across all domains. Despite the inconclusive results currently prevailing, the importance of poverty reduction in an economy in general, and in South Africa in particular, cannot be overemphasised. It is, therefore, against this background that this study attempts to examine the impact of FDI on poverty reduction in South Africa from 1980 to 2014.

This study differs fundamentally from the previous studies in that, firstly, it employs the newly developed auto regressive distributed lag (ARDL) approach with its known robustness in small samples (see Odhiambo, 2008). Secondly, the study focuses on South Africa using time series data. In this regard, it is unlike other studies that have relied on cross sectional data, which is unable to sufficiently capture heterogeneity across countries (see Odhiambo, 2009). Thirdly, the study also employs three poverty proxies – Pov1 (household consumption expenditure, Pov2 (infant mortality rate), and Pov3 (life expectancy) – to investigate the nature of the relationship between FDI and poverty reduction in South Africa between 1980 and 2014.

South Africa has been selected for this study because it has received little coverage on the direct impact of FDI on poverty (see Fowowe and Shuaibu, 2014). Moreover, it is among the largest economies in Africa, as measured by GDP, and it receives a fair share of FDI inflows (World

Bank, 2016). After gaining independence in 1994, the South African government implemented policies that supported the integration of the South African economy into the global economy (Government Gazette, 1994; The National Planning Commission, 2011). The Reconstruction and Development Plan, and subsequent development plans, provided a framework for economic development. The policies the government rolled out aligned to investment can be categorised into two groups. The first of these focused on creating an investment environment conducive to attracting foreign investment. Some of the policies pursued include trade liberalisation, regionalisation, and industrial development. In the second group were policies that directly target FDI, such as exchange rate liberalisation, investment incentives, creation of industrial development zones and special economic zones, and Bilateral Investment Treaties, among other policy initiatives. These reforms were associated with a gradual increase in FDI flows into South Africa, although these were characterised by huge fluctuations (World Bank, 2014).

The poverty reduction policies the government inherited from 1980 to 1994 were unequal. After independence in 1994, the government made a sea of changes in an effort to restore equality in poverty reduction policies, among other policy initiatives (Government Gazette, 1994; The National Planning Commission, 2011). Government policies can be categorised into three groups. The first group focuses on the provision of relief to poor households through the social welfare window. The second group comprises policies that focus on economic empowerment of the poor. The programmes the government rolled out focused on increasing participation of the poor in economic activities, thereby providing a long term solution to poverty reduction. The third group comprises of government programmes that focus on the provision of services such as

education, health, and housing, among other services. In response to government policies, poverty levels in South Africa decreased, as measured by poverty headcount, from 6.93% in 1993 to 1.96% in 2011 (World Bank, 2014). Although there was a decrease in poverty at national level, sharp differences in poverty levels at provincial, sex, age, and settlement type were recorded (Statistics South Africa, 2014).

The rest of the paper is set out as follows: Section two reviews related literature. Section three outlines the estimation techniques. The fourth section presents the results and their analysis while the fifth section concludes the study.

2. Empirical Literature Review

The dynamic impact of FDI on poverty has received wide coverage in the literature, although the results are still inconclusive. The majority of the studies have explored the indirect effect of FDI on poverty, realised through the economic growth channel (see Warr, 2000; Hsiao and Hsiao, 2006; Dollar *et al.*, 2013; Feeny *et al.*, 2014). Empirical studies on the direct impact of FDI on poverty are still scant, and the results are also inconsistent. There are three findings from the studies that have investigated the direct impact of FDI on poverty. First are empirical studies that have found FDI to have a positive impact on poverty reduction. The majority of the studies employed gross domestic product and/or the Human Development Index as a proxy for poverty or welfare. Some of the studies that have found FDI to reduce poverty include Gohou and

Soumare (2012), Shamim *et al.* (2014), Fowowe and Shuaibu (2014), Ucal (2014), Israel (2014), and Soumare (2015).

Although there is overwhelming evidence in support of a positive impact of FDI on poverty reduction, some empirical studies have found a negative or no impact of FDI on poverty reduction. Studies that have found a negative impact of FDI on poverty reduction include Huang *et al*. (2010) and Ali and Nishat (2010). The results of these studies reveal that FDI inflows lead to an increase in poverty levels, contrary to theoretical postulations. Some of the studies that have found FDI to have no significant relationship with poverty include Tsai and Huang (2007), Akinmulegun (2012), and Gohou and Soumare (2012). Table 1 summarises studies that have investigated the impact of FDI on poverty 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. Empirical Model Specification and Estimation Methods

3.1 ARDL Approach to Cointegration

The ARDL bound testing approach was selected because of a number of advantages. First, the ARDL approach 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). It is against this background that the ARDL bounds approach was selected in this study.

Variables

The dependent variables are household consumption expenditure (Pov1), infant mortality rate (Pov2), and life expectancy (Pov3), while the explanatory variables include FDI and other control variables. The control variables included in the study are human capital, price level, trade openness, and infrastructure. 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

3.2 Model Specification

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

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

Model 2

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

Model 3

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

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

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

Model 1: ARDL Specification

$$\Delta Pov1_t = \alpha_0 + \alpha_1 t + \sum_{i=1}^{n} \alpha_1 \, \Delta Pov1_{t-i} + \sum_{i=0}^{n} \alpha_2 \, \Delta FDI_{t-i} + + \sum_{i=0}^{n} \alpha_3 \, \Delta TOP_{t-i} + \sum_{i=0}^{n} \alpha_4 \, \Delta HK_{t-i}$$

$$+ \sum_{i=0}^{n} \alpha_5 \, \Delta CPI_{t-i} + \sum_{i=0}^{n} \alpha_6 \, \Delta FTL_{t-i} + \vartheta_1 Pov1_{t-1} + \vartheta_2 FDI_{t-1} + \vartheta_3 HK_{t-1}$$

$$+ \vartheta_4 TOP_{t-1} + \vartheta_5 CPI_{t-1} + \vartheta_6 FTL_{t-1} + \mu_{1t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4a)$$

Where $\alpha_1 - \alpha_6$ and $\vartheta_1 - \vartheta_6$ are regression coefficients, α_0 is a constant and, μ_{1t} is white noise error term.

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

$$\Delta Pov1_t = \alpha_0 + \sum_{i=1}^{n} \alpha_1 \, \Delta Pov1_{t-i} + \sum_{i=0}^{n} \alpha_2 \, \Delta FDI_{t-i} + \sum_{i=0}^{n} \alpha_3 \, \Delta TOP_{t-i} + \sum_{i=0}^{n} \alpha_4 \, \Delta HK_{t-i}$$

$$+ \sum_{i=o}^{n} \alpha_5 \, \Delta CPI_{i-1} + \sum_{i=o}^{n} \alpha_6 \, \Delta FTL_{t-i} + \gamma_1 ECM_{t-1} + \mu_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4b)$$

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

$$\Delta Pov2_t = \alpha_0 + \sum_{i=1}^{n} \alpha_1 \, \Delta Pov2_{t-i} + \sum_{i=0}^{n} \alpha_2 \, \Delta FDI_{t-i} + \sum_{i=0}^{n} \alpha_3 \, \Delta TOP_{t-i} + \sum_{i=0}^{n} \alpha_4 \, \Delta HK_{t-i}$$

$$+ \sum_{i=0}^{n} \alpha_5 \, \Delta CPI_{t-i} + \sum_{i=0}^{n} \alpha_6 \, \Delta FTL_{t-i} + \vartheta_1 Pov2_{t-1} + \vartheta_2 FDI_{t-1} + \vartheta_3 TOP_{t-1}$$

$$+ \vartheta_4 HK_{t-1} + \vartheta_5 CPI_{t-1} + \vartheta_6 FTL_{t-1} + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (5a)$$

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:

$$\Delta Pov2_t = \alpha_0 + \sum_{i=1}^{n} \alpha_1 \, \Delta Pov2_{t-i} + \sum_{i=0}^{n} \alpha_2 \, \Delta FDI_{t-i} + \sum_{i=0}^{n} \alpha_3 \, \Delta TOP_{t-i} + \sum_{i=0}^{n} \alpha_4 HK_{t-i}$$

$$+ \sum_{i=o}^{n} \alpha_5 \, \Delta CPI_{i=0} + \sum_{i=o}^{n} \alpha_6 \, \Delta FTL_{t-i} + \gamma_2 ECM_{t-1} + \mu_t \ldots\ldots\ldots\ldots\ldots\ldots..(5b)$$

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

$$\Delta Pov3_t = \alpha_0 + \sum_{i=1}^{n} \alpha_1 \, \Delta Pov3_{t-i} + \sum_{i=0}^{n} \alpha_2 \, \Delta FDI_{t-i} + \sum_{i=0}^{n} \alpha_3 \, \Delta TOP_{t-i} + \sum_{i=0}^{n} \alpha_4 \, \Delta HK_{t-i}$$

$$+ \sum_{i=0}^{n} \alpha_5 \, \Delta CPI_{t-i} + \sum_{i=0}^{n} \alpha_6 \, \Delta FTL_{t-i} + \vartheta_1 Pov3_{t-1} + \vartheta_2 FDI_{t-1} + \vartheta_3 TOP_{t-1}$$

$$+ \vartheta_4 HK_{t-1} + \vartheta_5 CPI_{t-1} + \vartheta_6 FTL_{t-1} + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(6a)$$

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:

$$\Delta Pov3_t = \alpha_0 + \sum_{i=1}^{n} \alpha_1 \, \Delta Pov3_{t-i} + \sum_{i=0}^{n} \alpha_2 \, \Delta FDI_{t-i} + \sum_{i=0}^{n} \alpha_3 \, \Delta TOP_{t-i} + \sum_{i=0}^{n} \alpha_4 HK_{t-i}$$

$$+ \sum_{i=o}^{n} \alpha_5 \, \Delta CPI_{i=0} + \sum_{i=o}^{n} \alpha_6 \, \Delta FTL_{t-i} + \gamma_3 ECM_{t-1} + \mu_t \ldots\ldots\ldots\ldots\ldots\ldots..(6b)$$

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.*

3.3 Data Sources

The study employs time series data from 1980 to 2014 to investigate the direct impact of FDI on poverty reduction. The data was obtained from the World Bank development indicators. Data analysis was done using Microfit 5.0.

4. Empirical Analysis

4.1 Unit Root Test

The ARDL bound testing approach that is employed in this study does not require pre-testing of the unit root of variables included in the model. However, pretesting was done to determine if the variables are integrated with the highest order of one - I [(1)]. 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.

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	0.5324	-0.9765	-3.5219***	-4.6360***	3.7348***	-1.9806	–	-4.7252***	-2.9321	-4.3246	-6.3815***	-6.4193***
Pov2	-0.6196	-2.4142	-1.7115*	-3.4807**	-1.5984	-1.8477	-2.7283*	-6.0645***	-6.7140***	-6.5543***	–	–
Pov3	-3.7138***	-5.0544***	–	–	-3.2334***	-3.7126**	–	–	-6.4505***	-5.9918**	–	–
FDI	-4.1328***	-5.8740***	–	–	-4.2533***	-5.9719***	–	–	-5.2303**	-5.6444**	–	–
TOP	-1.5720	-2.2452	-5.3760***	-6.0413***	-1.8582	-2.7733	-5.9608***	-10.5612***	-4.2682	-4.2303	-6.8113***	-7.0676***
HK	-1.2314	-1.3145	-2.1669**	6.0337***	-1.6967	-1.4627	-5.8610***	-5.8897***	-6.3153***	-6.2470***	–	–
CPI	0.597	-0.6422	-1.7443*	-4.5392***	6.7037***	0.3108	–	-3.4934*	-2.8050	-4.4184	-5.8636**	-5.7274**
FTL	-1.0972	-0.7157	-3.7138***	-5.0544***	-3.1935**	-4.8049***	–	–	-0.3521	-3.1235	-6.2526***	-6.3004**

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

Although the results of the unit root tests for South Africa tend to vary from one unit root test to the other, overall, the results reveal that all variables are stationary in levels or in first difference. This confirms the suitability of ARDL based analysis.

4.2 Bound F-statistic to Cointegration

The results of the bounds test and the critical values are presented in Table 4.

Table 4: Cointegration Results and Critical Values

Model	Independent Variables	Function		F -statistic		Cointegration Status	
1	Pov1	F(FDI, HK, TOP, INF, FTL)		3.8837**		Cointegrated	
2	Pov2	F(FDI, HK, TOP, INF, FTL)		7.9722**		Cointegrated	
3	Pov3	F(FDI, HK, TOP, INF, FTL)		4.7594***		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

The F-statistics for Model 1-3 are 3.8837, 7.9722 and 4.7594. The calculated F-statistics are compared to the Pesaran *et al*. (2001) critical values, also reported in Table 4. In all the models, the calculated F-statistic is greater than the critical values. Therefore, cointegration is confirmed in Model 1, Model 2, and Model 3.

4.3 Impact Analysis

After confirming the long-run relationship in Model 1-3, the ARDL procedure is used in the estimation of the three models. To proceed with the estimation, the optimal lag length is selected based on Bayesian Information Criteria (BIC), which produced more parsimonious results than the Akaike Information Criteria (AIC) based models. The optimal lag length selected for Model 1 is ARDL (4, 0, 3, 1, 0, 2); for Model 2 it is ARDL (3, 3, 2, 2, 3, 2); and for Model 3 it is ARDL (2, 1, 0, 1, 3, 4). The long-run and short-run coefficients for Model 1-3 are presented in Table 5.

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

Panel A: Long-Run Coefficients (Dependent Variables)						
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	6.9811	1.6131	7.2445***	3.6277
FDI	0.5825	0.4618	0.0042**	2.2344	-0.76963	-0.1045
HK	-0.0177***	-3.5096	0.0126	0.6561	-0.0238*	-2.1019
TOP	-0.0198*	-1.9374	-0.0192	-0.3571	-0.0037	-1.4113
CPI	0.0185***	9.2922	-0.0214**	-2.8385	0.0154*	1.8581
FTL	0.0176	-0.5248	-0.0394	-0.4870	-0.3390*	-2.0248
Panel B: Short-Run Results						
	Coefficient	**T-value**	**Coefficient**	**T-value**	**Coefficient**	**T-value**
ΔPov1	0.7199***	3.3348	-	-	-	-
ΔPov1(1)	0.2090	0.8316	-	-	-	-
ΔPov1(2)	0.3864*	1.8578	-	-	-	-
ΔPov2	-	-	0.7196***	4.1845	-	-
ΔPov2(1)	-	-	0.3129	1.6562	-	-
ΔPov3	-	-	-	-	0.9734***	4.9333
ΔFDI	0.4155	0.4362	-0.1974	-0.2926	-0.4813	-1.1529
ΔFDI(1)	-	-	-0.5293***	-3.3356	-	-
ΔFDI(2)	-	-	-0.2301**	-2.3087	-	-
ΔHK	-0.0031	-1.0922	0.3662	0.2640	-0.0024**	-2.1484

ΔHK(1)	0.0069*	2.1468	-0.0017	-0.9984	-	-
ΔHK(2)	0.8982	0.3105	-	-		
ΔTOP	0.0016	0.3112	-0.6858	-0.0190	-0.7967**	-3.2845
ΔTOP(1)	-	-	-0.0042	-1.2494	-	-
ΔCPI	0.0132***	3.6192	0.0153	1.2685	0.0082	0.8191
ΔCPI(1)	-	-	-0.0584***	-5.0993	-0.0210*	-1.8168
ΔCPI(2)	-	-	-0.0204	-1.1873	-0.0076	-1.0462
ΔFTL	0.0514	1.4034	0.2039	1.0542	-0.0346**	-2.4362
ΔFTL(1)	0.0577	1.3709	-0.0356*	-1.7697	-0.0020	-0.0763
ΔFTL(2)	-	-	-	-	0.0151	0.6436
ΔFTL(3)	-	-	-	-	0.0147	0.4872
ECM(-1)	-0.7133***	-3.0406	-0.1357***	3.5329	0.1015***	-4.7229
	Model 1		**Model 2**		**Model 3**	
R-squared	0.7237		0.9827		0.9961	
R-bar-squared	0.4474		0.9511		0.9971	
F-statistic	3.2742		41.5431		300.790	
Prob (F-statistic)	0.012		0.000		0.000	
DW statistic	1.8988		2.0254		1.7890	
SE of Regression	0.2748		0.0331		0.0300	
Residual Sum of Squares	0.0748		0.0120		0.0126	
Akaike Info. Criterion	31.6425		59.7815		59.9985	
Schwartz Bayesian Criterion	20.1706		44.3913		47.8096	

Notes: *, ** and *** denotes 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 regression results for Model 1 presented in Table 7.3, Panel A and Panel B, show that FDI has an insignificant impact on poverty reduction, in both the short run and the long run, when poverty is proxied by household consumption expenditure. This implies that an increase in FDI does not have any significant effect on poverty levels in South Africa. Although the results were not expected, they are not uncommon. Some other studies (see, for example, Tsai and Huang, 2007; Akinmulegun, 2012) also found FDI to have no significant impact on poverty reduction. However, poverty reduction in one and two past periods ΔPov1 and ΔPov1 (2) was found to be statistically significant with a positive sign. The findings from this study suggest that past poverty reduction efforts play an important role in current poverty reduction.

Other long-run and short run results presented in Table 5, Panel A and Panel B, show that (i) human capital (HK) is negative and statistically significant in the long run and, in the short run, human capital is insignificant in one past period (ΔHK (1)), while a positive and statistically significant relationship is registered in the two past periods (ΔHK (2)); (ii) trade openness (TOP) is negative and statistically significant in the long run, while in the short run, trade openness is insignificant; (iii) a positive relationship exists between price level and poverty reduction in the long run and the short run; (iv) infrastructure (FTL) is insignificant in both the long run and the short run; (v) the error correction coefficient ECM (-1) is 0.71 and statistically significant at 1%, implying that the rate of adjustment to the equilibrium is 71% in one period if there is a shock to the economy; and (vi) the regression results are a perfect fit as indicated by an R-squared of 72%.

Results for Model 2 presented in Table 5, Panel A and Panel B, confirm that FDI is positive and statistically significant in the long run. The results imply that FDI helps to reduce poverty in South Africa in the long run. When South Africa increases FDI inflows, more positive benefits are derived by the poor. The opposite is true if there are limited FDI inflows in the long run; the benefits from FDI are also limited. The results are consistent with findings from other studies (see Zaman *et al.*, 2012; Fowowe and Shuaibu, 2014; Ucal, 2014; Soumare, 2015). However, in the short run, FDI was found be negative and statistically significant. The results imply that FDI makes the poor worse off in the short run. In other words, there exists a lag between receiving FDI and accruing positive benefits to the poor. These results are not unique to South Africa; other studies also confirm a negative impact of FDI on poverty reduction (see, among others, Huang *et al*., 2010; Ali and Nishat, 2010). Further, infant mortality rate (ΔPov2) is positive and statistically significant at 1%. Thus, past poverty reduction has a positive spill over effect on current poverty reduction.

Long run and short run results presented in Table 5, Panel A and Panel B for Model 2, reveal that (i) human capital (HK) is insignificant in the long run and in the short run; (ii) trade openness (TOP) is insignificant in the long run and in the short run; (iii) price level (CPI) is negative and statistically significant in both the long run and the short run; (iv) infrastructure (FTL) is insignificant in the long run (FTL) and, in the short run, one time lagged infrastructure (ΔFTL (1)) is negative and statistically significant at 10%; (v) the lagged error correction (ECM (-1) coefficient is 0.14 and statistically significant at 1%, implying that it takes seven years and one full month to get a full adjustment to the equilibrium in South Africa when there is

disequilibrium in the economy; and (vi) the regression for the underlying ARDL Model 2 is a perfect fit as indicated by an R-squared of 98%.

Empirical results presented in Table 5, Panel A and Panel B for Model 3, show that the coefficient for FDI in the long run and ΔFDI in the short run are statistically insignificant. Thus, FDI has no impact on poverty reduction in South Africa in the short run or in the long run when life expectancy is used as a poverty reduction proxy. These results were not expected although they are not unique to South Africa. There are other empirical studies that have also found a statistically insignificant impact of FDI on poverty reduction (see, for example, Tsai and Huang, 2007; Gohou and Soumare, 2012; Akinmulegun, 2012). Further, the coefficient for life expectancy in the short run (ΔPov3) is positive and statistically significant at 1%. The results imply that past poverty reduction plays a positive role in current poverty reduction.

Other long run and short run results presented in Table 5, Panel A and Panel B for Model 3, show that (i) human capital (HK) is negative and statistically significant in both the long run and the short run; (ii) trade openness (TOP) is insignificant in the long run, and a negative significant impact was confirmed in the short run; (iii) price level (CPI) has a positive impact on poverty reduction in the long run, according to the findings of this study, while in the short run, price level (CPI) worsens poverty reduction; (iv) infrastructure (FTL) is negative and statistically significant in the short run and in the long run; (v) the lagged error correction term ECM (-1) is 0.10 and significant at 1% with a negative sign, implying that it takes about 10 years to have a

full adjustment when there is disequilibrium in the economy; (vi) and the regression for the underlying ARDL Model 3 is a perfect fit as indicated by an R-squared of 99%.

Diagnostic tests were performed on Model 1-3 for serial correlation, functional form, normality and heteroscedasticity. Model 1 passed all the tests, while Model 2 and 3 passed the serial correlation, normality, and heteroscedasticity tests but failed functional form. The results for the diagnostic tests are presented in Table 6.

Table 6: Diagnostic Test: Model 1-3

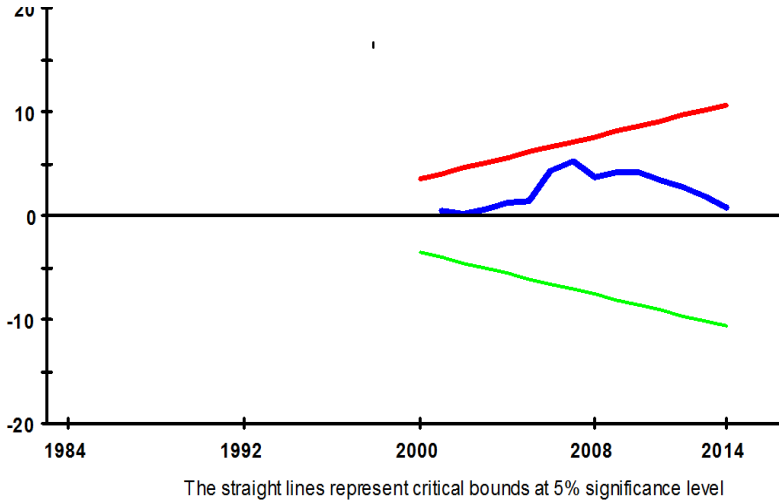
LM Test Statistic	**Results**		
	Model 1	**Model 2**	**Model 3**
Serial Correlation (CHSQ 1)	0.0938 [0.759]	0.0736 [0.786]	0.129 [0.720]
Functional Form (CHSQ 1)	0.0212 [0.884]	10.887 [0.001]	11.614 [0.001]
Normality (CHSQ 2)	0.2654 [0.876]	0.2222 [0.895]	2.142 [0.343]
Heteroscedasticity (CHSQ 1)	0.1418 [0.706]	2.0013 [0.157]	0.581 [0.446]

The plot for Cumulative Sum of Recursive Residuals (CUSUM) and Cumulative Sum of Squares of Recursive Residuals (CUSUMSQ) are given in Figure 1. Panel C, Panel D and Panel E show CUSUM and CUSUMSQ plots for Model 1-3, respectively.

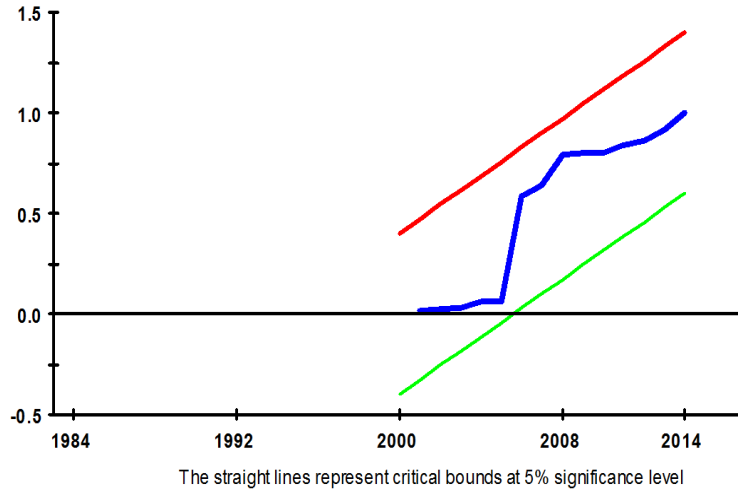
Figure 1: Plot of CUSUM and CUSUMSQ for Model 1-3

Panel C: Model 1

Cumulative sum of recursive residuals



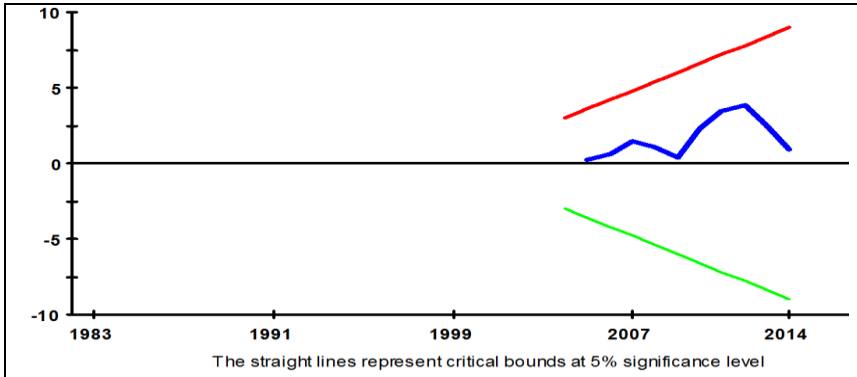
Cumulative sum of squares of recursive residuals

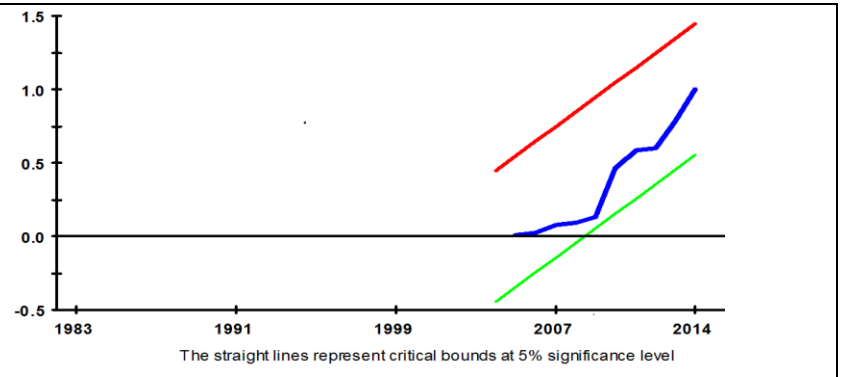


Panel D: Model 2

Cumulative sum of recursive residuals

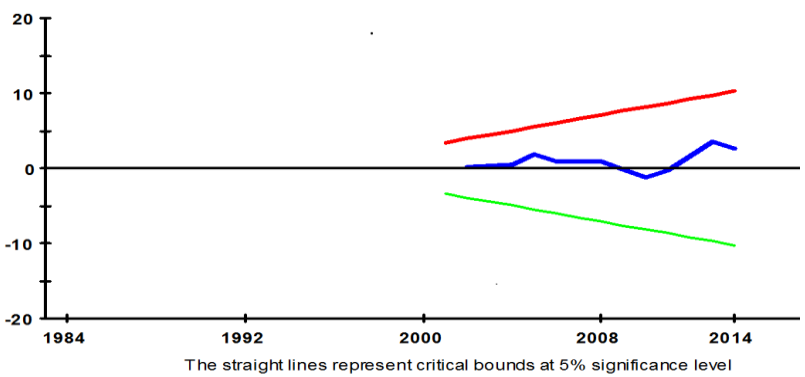
Cumulative sum of squares of recursive residuals



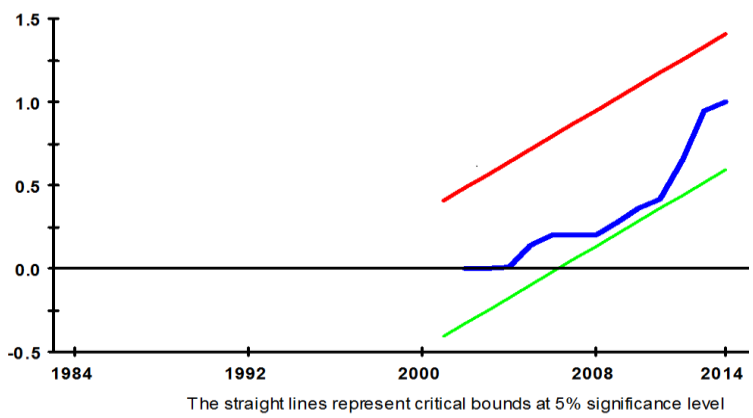


Panel E: Model 3

Cumulative sum of recursive residuals



Cumulative sum of squares of recursive residuals



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.

5. Conclusion

This paper has investigated the dynamic impact of FDI on poverty reduction in South Africa between 1980 and 2014. Although the literature on the impact of FDI on poverty reduction is pervasive, only a few studies have investigated the direct impact of FDI on poverty reduction. The majority of the studies have investigated the indirect impact of FDI on poverty, realised through economic growth. Among the few studies that have investigated the direct impact of FDI on poverty, the results are inconclusive. This study attempted to close the gap by investigating the direct impact of FDI on poverty in South Africa. Furthermore, the study also employed the ARDL bounds testing approach with its known advantages. The study has also used three poverty proxies to investigate the impact of FDI on poverty reduction, minimising reliance on one poverty reduction proxy. The results of this study reveal that when infant mortality rate (Pov2) is used as a proxy for poverty reduction, FDI has a positive impact on poverty reduction in the long run and a negative impact on poverty in the short run. However, when household consumption expenditure and life expectancy are used as proxies, an insignificant relationship between FDI and poverty reduction was confirmed. 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 poverty reduction proxy used and the time dimension under consideration.

References

Akinmulegun, SO. 2012. Foreign direct investment and standard of living in Nigeria. *Journal of Applied Finance and Banking* 2(3), 295-309.

Ali, M., Nishat, M. and Anwar, T. 2010. Do foreign inflows benefit Pakistan poor? *The Pakistan Development Review* 48(4), 715-738.

Almfraji, MA., Almsafir, MK. and Yao, L. 2014. Economic growth and foreign direct investment inflows: The case for Qatar. *Social and Behavioral Science*, 109, 1040-1045.

Borensztein, E. De Gregorio, J. and Lee, J-W. 1998. How does foreign direct investment affect economic growth? *Journal of International Economics* 45,115-135.

Dollar, D. Kleineberg, T. and Kraay, A. 2013. Growth Still Is Good For The Poor. Policy Research Paper 6568.World Bank. Washington. DC.

Duasa, J. 2007. Determinants of Malaysian trade balance: An ARDL bounds testing approach. *Journal of Economic Cooperation* 28(3), 21-40.

Feeny, S., Lamsiraroj, S. and McGillivray, M. 2014. Growth and foreign direct investment in the Pacific Island countries. *Economic Modelling* 37, 332-339.

Fowowe, B and Shuaibu, MI. 2014. Is foreign direct investment good for the poor? New evidence from African Countries. *Eco Change Restruct* 47, 321-339.

Gohou, G and Soumare, I.2012. Does foreign direct investment reduce poverty in Africa and are there regional differences. *World Development* 40(1), 75-95.

Government Gazette, 1994. White Paper on Reconstruction and Development No 16085. Online. Available from <http://www.info.gov.za. [Accessed 23 September 2016].

Hsiao, ST and Hsiao, MW. 2006. Foreign direct investment and GDP in east and South East Asia-Panel data versus series causality analysis. *Journal of Asian Economics* 17(6), 1082-1106.

Huang C., Teng, k and Tsai, P. 2010. Inward and outward foreign direct investment and poverty reduction: East Asia versus Latin America. *Review of World Economics* 146 (4), 763-779.

Israel, AO. 2014. Impact of foreign direct investment on poverty reduction in Nigeria. *Journal of Economics and Sustainable Development*. 5(20), 34-45.

Jalilian, H and Weiss, J. 2002. Foreign direct investment and poverty in the ASEAN region. *ASEAN Economic Bulletin* 19(3), 231-253.

Klein, M., Aaron, C and Hadjimichael, B. 2001. Foreign Direct Investment and Poverty Reduction. Policy Research Working Paper 2613. World Bank.

Mohr, P and Associates, 2015. Economics for South African Students. 5th Edition. Van Schaik Publishers. Pretoria. South Africa.

Odhiambo, NM, 2009. Energy consumption and economic growth nexus in Tanzania: An ARDL bounds testing approach. *Energy Policy* 37, 617-622.

Odhiambo, NM. 2008. Financial depth, savings and economic growth in Kenya: A dynamic causal linkage. *Economic Modelling* 25, 704-713.

Pesaran, MH., Shin, Y and Smith, RJ. 2001. Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics* 16(3), 289-326.

Shamim, A., Azeem, P and Naqvi, MA. 2014. Impact of foreign direct investment on poverty reduction in Pakistan, *International Journal of Academic Research in Business and Social Sciences* 4(10), 465-490.

Soumare, I. 2015. Does Foreign Direct Investment Improve Welfare in North Africa? Africa Development Bank.

Statistics South Africa, 2014. Poverty Trends in South Africa: An Examination of Absolute Poverty between 2006 and 2011. [Online]. Available from <htttp://www.beta2.statssa.gov.za/publication/report>. [Accessed 13 June 2015].

The National Planning Commission, 2011. National Development Plan: Vision for 2030. Online. Available from <http://www.gov.za/sites/.[Accessed June 2015].

Tsai, P. and Huang, C. 2007. Openness, growth and poverty: The case of Taiwan. *World Development* 35(11), 1858-1871.

Ucal, MS. 2014. Panel data analysis of foreign direct investment and poverty from the perspective of developing countries. *Social and Behavioral Science* 109, 1101-1105.

Warr, P. G. 2000. Poverty incidence and economic growth in south East Asia. *Journal of Asian Economics* 11, 431-441.

World Bank, 2014. World Development Indicators. [Online]. Available from <http:// www.data.worldbank.org> [Accessed 1 December 2014].

World Bank, 2016. World Development Indicators. [Online]. Available from <http:// www.data.worldbank.org> [Accessed 22 December 2016].

Zaman, K., Khan, MM., and Ahmad, M. 2012. The relationship between foreign direct investment and pro-poor growth policies in Pakistan: The new interface. *Economic Modelling* 29, 1220-1227.