## FINANCIAL DEVELOPMENT-POVERTY REDUCTION NEXUS IN BRICS: A PANEL DATA ANALYSIS APPROACH Kunofiwa TSAURAI<sup>1</sup>

#### Abstract

This paper's objectives were two, namely: (1) investigating the impact of financial development on poverty alleviation (proxied by life expectancy) and (2) exploring whether the complementarity between financial development and foreign direct investment (FDI) enhanced poverty reduction in BRICS (Brazil, Russia, India, China, South Africa) countries. The study used panel data analysis estimation techniques, namely pooled ordinary least squares (OLS), fixed effects and fully modified ordinary least squares (FMOLS) with data ranging from 1994 to 2013. The existing theoretical literature shows that financial development can have either a positive or negative impact on poverty alleviation. On the other hand, existing empirical literature produced results which are quite divergent, conflicting and diverse, namely: (1) financial development has a positive effect on poverty reduction, (2) financial development has a negative influence on poverty alleviation, (3) financial development and poverty reduction affected each other and (4) there is a negligible influence of financial development on poverty reduction. Although results show that the impact of financial development and FDI on poverty reduction is mixed, it is quite evident in majority of cases that the complementarity between financial development and FDI enhanced poverty reduction. The policy implication is that BRICS countries should implement policies designed at improving both financial development and FDI inflows in order to be able to reduce poverty.

Keywords: Financial Development; Poverty; BRICS; Panel Data

## 1. Introduction

#### 1.1 Background of the study, problem statement and research gap

Reducing the poverty headcount rate the world over is one of the millennium development goals set in 2015 by the United Nations (Rewilak. 2017:169). One of the ways through which poverty reduction goal was meant to be achieved is through enhancing financial sector development in line with majority theoretical and empirical literature prescriptions.

The theoretical literature arguments which supports the financial development led poverty reduction or poverty increase are quite compelling. Whilst Rajan and Zingales (1998), Stiglitz (1998) and World Bank (2001) supports the financial development led poverty reduction hypothesis, authors such as Boukhatem (2016) and Abdin (2016) are of the view that financial development perpetuates poverty among the poor people. It is on this basis that the author argues that the financial development-poverty reduction nexus is not only far from being conclusive but also not yet a settled matter in development finance. Even the empirical research on financial development-poverty reduction nexus could only manage to produce mixed, divergent and conflicting findings which fall into five categories as follows. (1) financial development positively affects poverty reduction, (2) financial development has a negative impact on poverty reduction, (3) a bi-directional relationship

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exist between financial development and poverty reduction, (4) there is a negligible relationship between financial development and poverty reduction and (5) the relationship between financial development and poverty reduction is non-linear.

Talking about non-linear relationship between these two variables, Dhrifi (2013) noted that financial development enhanced poverty reduction efforts if the savings, institutional quality and access to credit and insurance services is high in the economy. This finding is in a way consistent with Swan (1956) whose study likened FDI to an increase in foreign savings being transferred into the host economy for positive economic growth and development agenda. It is against this backdrop that the current study investigated the complementarity between financial development and FDI (a form of savings) on poverty alleviation in BRICS.

## 1.2 Contribution of the paper

Although there are few authors who acknowledged the existence of a non-linear relationship between financial development and poverty reduction such as Dhrifi (2013), no study that this author is aware of has so far investigated the complementarity between financial development and FDI on poverty reduction. The author is also not aware of the existence of a comprehensive study on the impact of financial development on poverty alleviation in BRICS countries. Existing empirical studies on BRICS focused on the influence of financial development on economic growth and not on testing the relevancy of the financial development–led poverty reduction hypothesis.

## **1.3 Organization of the paper**

Section 2 is the literature review, section 3 discusses the financial development and life expectancy (poverty) trends in BRICS nations whilst section 4 is the pre-estimation diagnostics. Section 5 is research methodology. Section 6 summarizes the study.

## 2. Literature review

According to Rajan and Zingales (1998), a developed financial sector is better able to reduce poverty as big financial institutional players can easily absorb the costs involved in the provision of small loans or credits to the poor people. The view resonates with Stiglitz (1998) and was supported by a World Bank (2001) report which insinuated that developed financial markets allows the poor to have more access to financial products or small loans which can improve the standards of their day to day livelihoods. On the other hand, Boukhatem (2016) argued that financial development cannot positively influence poverty reduction before reaching a certain minimum threshold level. The same study by Boukhatem (2016) implied that financial development further entrenches the poor people into deep poverty because they do not have the required collateral security to be able to access financial services or loans. A study done by Abdin (2016) noted that financial instability which is associated with financial development had a retarding effect on poverty reduction efforts in Bangladesh.

Several empirical studies on the impact of financial development on poverty have been done. A summary of such studies are presented in Table 1.

poverty allevi	ation		in minucine of minanetal development on
Author	Countries of	Period and	Results
	study	Methodology	
Rewilak	Developing	The data is	Financial development was found to have
(2017)	countries	averaged from	reduced the proportion of people living in
()		2004 to 2015	poverty.
		Cross sectional	
		data analysis	
Donou-	Developing	2002-2011	Banks were found to have reduced poverty
Adonsou	countries	Fixed effects	when poverty gap and headcount ratio were
and		two stage	used as measures of poverty. Contrary to
Sylwester		least squares	theoretical expectations, the study found out
(2016)		_	that microfinance institutions had no
			influence on poverty.
Jalilian and	Developing	1960-1995	They observed that financial development
Kirkpatrick	countries	Panel data	enhanced economic development thereby
(2005)		analysis	reducing poverty levels in the countries
			studied.
Rashid and	Developing	1985-2008	Absolute poverty was reduced by financial
Intartaglia	countries	Two step	development. On the other hand, their study
(2017)		generalised	found out that financial development had no
		methods of	influence on relative poverty.
		moments	
		(GMM)	
Zahonogo	Sub-Saharan	1980-2012	Found out that the relationship between
(2017)	Africa	System	financial development and poverty
		GMM	alleviation follows a U-shape and is not non-
Б	A.C.:	1001 2005	$\frac{1}{1}$
Fowowe and	African	1981-2005	Financial development had an insignificant
Abidoye	countries	Ordinary least	influence on poverty reduction in African
(2013)		squares (OLS)	countries.
		GMM	
Kirknatrick	Developing	Not applicable	The study observed that financial market
et al (2000)	countries	It was a	imperfections should be addressed in order to
et ul (2000)	countries	Literature	enable the financial sector to alleviate
		review based	poverty.
		study.	
Dhrifi (2013)	89 developed	1990-2011	Financial development was found to have had
	and	Panel data	a significant positive impact on poverty
	developing	analysis	reduction if the following conditions exist:
	countries	-	(1) high levels of institutional quality, (2)
			more savings, (3) more access to credit
			facilities and insurance.
Ho and Iyke	China	1985-2014	A feedback relationship between financial
(2017)		Toda-	development and poverty was detected in the
		Yamamoto	case of China.
		causality test	

Abdin (2016)	Bangladesh	1974-2013 Multiple Regression analysis	Financial development was found to have had a significant positive impact on poverty alleviation through its ability to promote savings mobilization, access to credit
Sehrawat and Giri (2017)	India	1970-2015 Autoregressive Distributive Lag (ARDL)	<ul><li>services and economic growth.</li><li>Financial development and economic growth had a significant positive influence on poverty reduction in India.</li></ul>
Danduane (2014)	Nigeria	1970-2011 ARDL and Toda- Yamamoto causality test	Financial development was found to have had no impact on poverty reduction in Nigeria.
Odhiambo (2010)	Kenya	1968-2006 Error Correction Model (ECM)	Among other findings, the study observed that a uni-directional causality relationship running from financial development to poverty reduction existed in Kenya.
Keho (2016)	Sub-Saharan African countries	1970-2013 Granger causality tests	The study noted that there is no direct influence of financial development on poverty reduction.
Uddin et al (2014)	Bangladesh	1975-2011 ARDL	Financial development had a significant positive effect on poverty alleviation. The same study noted that the impact of financial development on poverty reduction was non- linear in the case of Bangladesh.
Dewi et al (2018)	Indonesia	1980-2015 ARDL	A uni-directional causality relationship running towards poverty reduction from financial development was observed in the case of Indonesia.
Bayar (2017)	Emerging markets	1993-2012 Panel data analysis	Stock market and banking sector development were both found to have had a significant positive influence on poverty alleviation in emerging markets.
Aye (2013)	Nigeria	1960-2011 Vector Error Correction Model (VECM) and Vector Autoregressive (VAR)	Financial development was found to have had an indirect positive influence on poverty reduction through economic growth in the shore run only. In the long run, the study revealed that no relationship between financial development, economic growth and poverty reduction was detected.
Rono et al (2015)	Kenya	1980-2013 ARDL	The credit offered by non-bank financial institutions significantly reduced the number of people living below the poverty datum line.

Source: Author compilation



#### 3. Financial development and life expectancy trends in BRICS

Figure 1 shows the financial development trends for BRICS nations during the period from 1994 to 2013.

Source: Author compilation using data from World Development Indicators Database

Domestic credit by financial sector (% of GDP) in Brazil went down by 19.32 percentage points, from 84.57% in 1994 to 65.25% in 1998. Thereafter, Brazil's domestic credit by financial sector (% of GDP) went up by 9.93 percentage points during the period from 2002 to 2006, experienced a 10.48 percentage points positive growth from 2006 to 2010 before further going up by 6.94 percentage points during the period from 2010 to 2010. India experienced a similar trend in its domestic credit by financial sector (% of GDP) during the 20-year period ranging from 1994 to 2013. As for Russia, domestic credit by financial sector (% of GDP) increased from 31.71% in 1994 to 44.93% in 1998, declined by 18.04 percentage points during the subsequent four-year period before experiencing another decline of 5.35 percentage points, from 26.88% in 2002 to 21.53% in 2006. During the four-year period from 2006 to 2010, domestic credit by financial sector (% of GDP) increased by 16.19 percentage points before experiencing another 10.98 percentage points increase, from 37.72% in 2010 to 48.70% in 2013.

Domestic credit by financial sector (% of GDP) in China went up from 88.95% in 1994 to 112.47% in 1998, further increased by 30.19 percentage points (from 112.47% in 1998 to 142.66% in 2002) before declining by 10.01 percentage points during the subsequent fouryear period ranging from 2002 to 2006. China's domestic credit by financial sector (% of GDP) increased by 10.98 percentage points (from 132.66% in 2006 to 143.63% in 2010) during the subsequent four-year period before experiencing a positive growth of 14.02 percentage points during the period ranging from 2010 to 2013 to end the period at 157.65%. South Africa's domestic credit by financial sector (% of GDP) increased from 131.67% in 1994 to 135.61% in 1998, went up by 19.64 percentage points (from 135.61% in 1998 to 155.25% in 2002) during the subsequent four-year period before further increasing by 37.25 percentage points during the period from 2002 to 2006. Furthermore, the domestic credit by financial sector (% of GDP) for South Africa declined from 192.50% in 2006 to 185.47% in 2010 before experiencing a further decrease of 3.27 percentage points (185.47% in 2010 to 182.21% in 2013) during a three-year period from 2010 to 2013.

Figure 2 shows the total life expectancy at births (years) trends for BRICS nations for the period ranging from 1994 to 2013.



Source: Author compilation using data from World Development Indicators Database

For Russia, life expectancy increased from 64.47 years in 1994 to 67.03 years in 1998, declined from 67.03 years in 1998 to 65.13 years in 2002 before going up by 2.45% during the subsequent four-year period ranging from 2002 to 2006. Russia's life expectancy went up from 66.73 years in 2006 to 68.84 years in 2010 before experiencing another positive growth of 2.52% (from 68.84 years in 2010 to 70.58 years in 2013) during the period from 2010 to 2013. As for South Africa, life expectancy experienced a downward trend during the period ranging from 1994 to 2002 (from 61.76 years in 1994 to 58.55 years in 1998, from 58.55 years in 1998 to 54.30 years in 2002, from 54.30 years in 2002 to 52.61 years in 2006). Life expectancy for South Africa then increased by 6.22% during the subsequent four-year period (2006 to 2010) before experiencing another positive growth of 7.05% (55.89% in 2010 to 59.83% in 2013) during the period from 2010 to 2013. The life expectancy for Brazil, India and China consistently followed an upward trajectory during the twenty-year period ranging from 1994 to 2013 (see Figure 2).

# 4. Pre-estimation diagnostics

Correlation analysis, descriptive statistics and mean and overall mean trends analysis were the pre-estimation diagnostics that were performed in order to understand the nature and character of the data before analysing it.

Table 2: Correlation analysis								
	LIFEEXP	FIN	FDI	GDP	OPEN	INFL	SAV	
LIFEEXP	1.00							
FIN	-0.2714***	1.00						
FDI	0.5243***	0.1317	1.00					
GDP	0.1560	0.0728	0.1632	1.00				
OPEN	-0.2902***	0.2830***	0.0473	0.0443	1.00			
INFL	0.0031	-0.0621	-0.1600	-0.0318	-0.1372	1.00		
SAV	0.5408***	0.0067	0.4474***	-0.1975**	0.3569***	-0.0532	1.00	

Source: Author's compilation from E-Views

Note: \*\*\*, \*\* and \* denote 1%, 5% and 10% levels of significance, respectively.

Where LIFEEXP, FIN, FDI, GDP, OPEN, INFL and SAV stands for life expectancy, financial development, foreign direct investment, economic growth, trade openness, inflation and savings respectively. Three different sets of correlation findings were established (see Table 2). A significant negative correlation between (1) financial development and trade openness and (2) trade openness and life expectancy were observed. GDP and inflation were positively but non-significantly correlated with life expectancy. A significant positive correlation between (1) FDI and life expectancy and (2) savings and life expectancy was also detected in Table 2. The multi-collinearity problem between and among the variables used is non-existent in line with Stead (1996).

The presence of extreme values is evident in the economic growth (GDP) and inflation data sets because the standard deviation for the variables is more than 100 (see Table 3). The probability of the Jarque-Bera criteria for GDP, inflation and savings is 0, which is proof that the data for these three variables does not follow a normal distribution, consistent with Tsaurai (2017:182-183).

Table 3: Descriptive statistics									
	MORTALITY	LIFEEXP	FIN	FDI	GDP	OPEN	INFL	SAV	
Mean	33.52	66.34	91.41	2.29	4 085	43.00	34.87	28.36	
Median	33.3000	67.0200	76.995	2.2100	3 159.16	46.760	6.8000	24.920	
Maximum	79.9000	75.7700	192.66	6.0100	14 487	72.870	2 075.89	51.460	
Minimum	7.4000	52.5700	20.810	0.1700	353.29	15.64	0.2600	15.090	
Std. Dev.	18.3311	6.3720	50.352	1.4655	3 531.11	14.910	209.45	10.168	
Skewness	0.5476	-0.5308	0.4019	0.4337	1.2009	-0.2195	9.4191	0.7597	
Kurtosis	2.5538	2.4045	1.9348	2.2885	3.8093	1.8644	92.0373	2.4959	
Jarque-Bera	5.8279	6.1735	7.4195	5.2441	26.7665	6.1762	34 510	10.68	
Probability	0.0543	0.0457	0.0245	0.0727	0.0000	0.0456	0.0000	0.0048	

Source: Author's compilation from E-Views

Table 4: Mean financial development and poverty trends in BRICS (1994-2013)									
	LIFEEXP	FIN	FDI	GDP	OPEN	INFL	SAV		
Brazil	71.28	78.41	2.65	6 345	23.25	113.24	18.86		
Russia	66.84	30.87	2.09	6 065	55.08	42.39	31.05		
India	63.95	58.20	1.27	776.98	36.15	7.56	27.48		
China	73.14	126.25	3.90	2 363	46.11	4.79	44.94		
South Africa	56.47	163.34	1.54	4 874	54.43	6.36	19.48		
Overall mean	66.34	91.41	2.29	4 085	43.00	34.87	28.36		

Source: Author's compilation

Brazil, Russia, India and China had a mean life expectancy which was above the overall mean life expectancy of 66.34 years whilst South Africa is an outlier because its mean life expectancy was a bit far much below the overall mean life expectancy. China and South Africa are characterised by mean financial development which is far much higher than the overall mean financial development of 91.41% of GDP. It is evident that Russia, India, China and South Africa are outliers because their mean financial development is far away (either below or above) from the overall mean financial development of 91.41%. In terms of FDI, there is no outlier because all the mean FDI figures are around the overall mean FDI of 2.29% of GDP.

Brazil, Russia and India had their mean GD per capita above the overall mean GDP per capita of 4 085. The remaining countries (China and South Africa) had their mean GDP per capita below the overall mean GDP per capita value. Brazil, Russia, India and China are outliers because the deviation between their mean GDP per capita values and the overall mean GDP per capita is too high. With regards to inflation, Brazil, India, China and South Africa are outliers because their mean inflation figures are quite far away from the overall mean inflation figure of 34.87%.

The mean savings ratios for Russia, India and China are above the overall mean savings ratio of 28.36% of GDP during the period ranging from 1994 to 2013. The mean savings ratios for the remaining countries (Brazil and South Africa) were lower than the overall mean savings ratio (see Table 4). It appears that China is the only outlier given that its mean savings ratio (44.94% of GDP) is the furthest away from the overall mean savings ratio of 28.36% of GDP.

# 5. Research methodology

The general econometric model for estimating the impact of financial development on poverty is represented by equation 1.

 $POVERTY_{i,t} = \beta_0 + \beta_1 FIN_{i,t} + \beta_2 X_{i,t} + \mu_{i,t} + \varepsilon_{it}$ [1]

Where POVERTY is proxied by life expectancy in years and X stands for the control variables.  $\beta_0$ ,  $\beta_1$  and  $\beta_2$  represents the intercept, co-efficient of financial development and co-efficients of the control variables respectively. Error term is denoted by  $\mathcal{E}it$  whilst the time invariant and unobserved country specific effect is represented by  $\mu_{i,i}$ .

In order to address the second objective (determining the influence of the complementarity between financial development and FDI on poverty), the study used the following econometric model.

$$POVERTY_{i,t} = \beta_0 + \beta_1 FIN_{i,t} + \beta_2 FDI_{i,t} + \beta_3 (FIN_{i,t} \cdot FDI_{i,t}) + \beta_4 GDP_{i,t} + \beta_5 OPEN_{i,t} + \beta_6 INFL_{i,t} + \beta_7 SAV_{i,t} + \mu_i + \varepsilon_{it}$$
[2]

 $\beta_3$  is the co-efficient of the interaction term  $FIN_{i,t}$ .  $FDI_{i,t}$ . If the co-efficient  $\beta_3$  is

positive and significant, it means the complementarity between financial development and FDI increased the life expectancy in years (reduced poverty). The equations were estimated using three panel data analysis methods, namely the fixed effects, pooled OLS and the FMOLS. Economic growth (GDP), trade openness (OPEN), inflation (INFL) and savings (SAV) are control variables which were used in the study, following similar empirical studies (Walsh and Yu. 2010; Soumare and Tchana. 2015). GDP per capita, total imports and exports (% of GDP), inflation consumer prices (annual %) and gross domestic savings (% of GDP) were used as measures of economic growth, trade openness, inflation and savings respectively. The choice of the control variables and their proxies used depended mainly on empirical research work on a similar topic and ultimately on the availability of the data.

The current study used secondary annual data ranging from 1994 to 2013. The data was extracted from international reputable sources such as World Development Indicators, International Monetary Fund and African Development Bank databases. Consistent with Aye and Edoja (2017), the current study transformed all the data sets into natural logarithms before analysing it in order to address the negative impact of extreme or abnormal values on the quality of the results. The data analysis involved three stages, namely panel root testing, panel co-integration tests and actual data analysis.

Table 5 shows that all the variables are integrated of order 1 hence satisfying the stationarity requirements consistent with Tsaurai (2018a: 60).

Table 5: Panel root tests – Individual intercept									
Level									
	LLC	IPS	ADF	PP					
LIFEXP	-1.2434	-0.1126	12.0740	5.4071					
FIN	-0.3432	0.5453	6.3341	4.0132					
FDI	-2.2683**	-2.4383***	23.0641**	34.8510***					
GDP	1.7602	3.1468	1.2415	0.8108					
OPEN	-0.7388	-0.0009	8.2980	7.3869					
INFL	-1.7983**	-2.9504***	27.0881***	75.9374***					
SAV	-1.0749	-1.4282*	19.2980**	10.9059					
First difference									
LIFEXP	-4.2132**	-3.6466***	37.0333***	127.987***					
FIN	-2.8743***	-4.1430***	35.3855***	201.314***					
FDI	-1.5115*	-3.8958***	33.5924***	317.139***					
GDP	-2.0747**	-1.9880**	18.6653**	28.3737***					
OPEN	-2.6803***	-3.3814***	29.4752***	59.2394***					
INFL	-5.4855***	-5.3502***	45.7968***	172.478***					
SAV	-2.6993***	-3.9860***	34.8737***	58.4502***					

Source: Author's compilation from E-Views

Note: LLC, IPS, ADF and PP stands for Levin, Lin and Chu; Im, Pesaran and Shin; ADF Fisher Chi Square and PP Fisher Chi Square tests respectively. \*, \*\* and \*\*\* denote 10%, 5% and 1% levels of significance, respectively.

The results presented in Table 6 provide evidence that there are at most 6 co-integrating vectors among the variables being studied, a finding which confirms the existence of a long run relationship among the variables being studied.

Table 6: Johansen Fisher Panel Co-integration test									
Hypothesised No.	Fisher Statistic	Probability	Fisher Statistic	Probability					
of CE(s)	(from trace test)		(from max-						
			eigen test)						
None	6.931	0.7319	6.931	0.7319					
At most 1	6.931	0.7319	6.931	0.7319					
At most 2	2.773	0.9863	58.03	0.0000					
At most 3	92.10	0.0000	92.10	0.0000					
At most 4	160.1	0.0000	117.2	0.0000					
At most 5	81.07	0.0000	67.97	0.0000					
At most 6	32.73	0.0003	32.73	0.0003					

Source: Author's compilation from E-Views

For the data analysis using the fixed effects, pooled OLS and the FMOLS, the only distinguishing feature in the models 1 to 7 is the proxy of financial development used. For example, domestic credit by financial sector, domestic private credit, stock market capitalisation, stock market turnover, stock market value traded, outstanding domestic private debt securities and outstanding domestic public debt securities were used in models 1, 2, 3, 4, 5, 6 and 7 respectively.

Table 7: Fixed effects –Life expectancy is the dependency variable									
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7		
FIN	0.04	-0.01	-0.003	-0.02***	-0.01**	0.02**	0.01**		
FDI	0.02	0.03	0.01	-0.002	0.02	0.003	-0.002		
FIN.FDI	-0.004	-0.01	-0.002	0.002	-0.003	-0.003	0.001		
GDP	0.02**	0.03***	0.03***	0.03***	0.04***	0.01	0.02***		
OPEN	0.01	0.03	0.03	0.01	0.02	0.01	0.02		
INFL	-0.003	-0.003	-0.005	-0.01*	-0.01*	-0.004	-0.004		
SAV	0.04	0.02	0.03	0.04	0.06	0.03	0.04		
Adjusted	0.91	0.91	0.91	0.91	0.91	0.91	0.91		
R-squared									
F-statistic	89.10	88.15	87.94	97.70	94.44	93.16	91.50		
Prob (F-	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
statistic)									

\*\*\*, \*\* and \* denote 1%, 5% and 10% levels of significance, respectively.

Source: Author's compilation from E-Views

Using fixed effects approach (see Table 7), financial development had a positive but nonsignificant impact on life expectancy under model 1. On the other hand, financial development had a significant positive influence on life expectancy under models 6 and 7, where both private and public sector bond development was used as a proxy of financial development. In summary, domestic credit by financial sector, private and public bond sector development enhanced life expectancy in the BRICS countries during the period under study. The results are consistent with World Bank (2001), Stiglitz (1998) and Rajan and Zingales (1998) whose studies concluded that a developed financial sector is better able to contribute towards poverty alleviation due to its ability to provide small loans and other financial services to the poor people. In models 2 and 3, financial development had a non-significant negative effect on life expectancy whilst financial development had a significant negative impact on life expectancy in models 4 and 5. The result means that domestic private credit, stock market capitalisation, stock market turnover and stock market value traded had a deleterious effect on life expectancy in BRICS nations during the period under study. The finding resonates with Abdin (2016) whose study noted that financial instability that comes with increased financial development further entrenches the poor into more poverty.

FDI had a non-significant positive effect on life expectancy in models 1, 2, 3, 5 and 6 in line with Magombeyi and Odhiambo (2018) whose study observed that FDI increased life expectancy in Botswana. The finding also resonates with Tsaurai (2018b) whose study noted that FDI reduced the proportion of unemployment in BRICS nations. FDI was found to have had a non-significant negative influence on life expectancy in models 4 and 7 (see Table 7) in line with Lazreg and Zouari (2018) whose study revealed that FDI increased poverty levels in North African nations.

Although the interaction between financial development and FDI had a non-significant negative influence on life expectancy in models 1, 2, 3, 5 and 6, it is evident that the complementarity between financial development and FDI reduced the size of the negative effect of financial development on life expectancy. On the other hand, the combination between financial development and FDI was found to have had a non-significant positive influence on life expectancy in models 4 and 7. The finding follows Dhrifi (2013) whose study argued that financial development enhanced poverty reduction efforts if the savings (FDI and or domestic savings), institutional quality and access to credit and insurance services is high in the economy.

Table 9: Pooled OLS –Life expectancy is the dependency variable									
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7		
FIN	-0.03**	-0.03***	-0.02***	-0.03***	-0.02***	0.001	0.01		
FDI	-0.03	0.06*	0.05***	0.05*	0.05***	0.02*	-0.001		
FIN.FDI	0.01	-0.007	-0.01	-0.003	-0.01	0.005	0.01***		
GDP	0.04***	0.04***	0.04***	0.03***	0.04***	0.03***	0.03***		
OPEN	-0.16***	-0.16***	-0.14***	-0.20***	-0.17***	-0.17***	-0.16***		
INFL	-0.002	-0.01	-0.004	0.0003	-0.01	0.01	0.01		
SAV	0.22***	0.24***	0.19***	0.28***	0.24***	0.23***	0.25***		
Adjusted R-	0.74	0.78	0.77	0.75	0.79	0.73	0.76		
squared									
F-statistic	42.27	51.48	48.53	44.26	52.65	39.85	44.92		
Prob (F-	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
statistic)									

\*\*\*, \*\* and \* denote 1%, 5% and 10% levels of significance, respectively. Source: Author's compilation from E-Views

Under pooled OLS framework (see Table 9), financial development was found to have had a significant negative influence on life expectancy in models 1 to 5. On the other hand, financial development had a non-significant positive effect on life expectancy in models 6 and 7. In line with majority theoretical predictions (Romer. 1986; Kumar and Pradhan. 2002; Swan. 1956; Nath. 2005; Solow. 1956), FDI had a significant positive influence on life expectancy in models 2, 3, 4, 5 and 6. On the contrary, FDI had a non-significant negative effect on life expectancy in models 1 and 7, in line with the dependency theory propagated by Amin (1974). It is evident that the interaction between financial development and FDI improved life expectancy under models 1, 6 and 7. Furthermore,

although the interaction term is negative but non-significant in models 2, 3, 4 and 5, the size and sign of the interaction terms in those models show that the complementarity between financial development and FDI improved the life expectancy period in BRICS nations. The same comment applies to models 2, 3, 4 and 5 under the FMOLS approach (see Table 10).

Table 10: Fully Modified Ordinary Least Squares (FMOLS) –Life expectancy is the dependency variable									
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7		
FIN	0.04	-0.004	-0.01	-0.02**	-0.02**	0.02	0.01		
FDI	0.01	0.008	0.001	0.01	0.03	0.001	-0.004		
FIN.FDI	-0.004	-0.003	-0.001	-0.001	-0.01	-0.002	0.001		
GDP	0.02	0.03**	0.03***	0.03***	0.04***	0.01	0.02**		
OPEN	0.01	0.02	0.02	-0.01	-0.005	-0.01	0.002		
INFL	-0.002	-0.002	-0.01	-0.01	-0.01	-0.004	-0.005		
SAV	0.08	0.06	0.08	0.10*	0.13**	0.08	0.10*		
R-squared	0.93	0.92	0.92	0.93	0.92	0.93	0.93		
Adjusted R-squared	0.92	0.91	0.91	0.92	0.91	0.92	0.92		

\*\*\*, \*\* and \* denote 1%, 5% and 10% levels of significance, respectively.

Source: Author's compilation from E-Views

Under the FMOLS approach, life expectancy was positively but non-significantly affected by financial development in models 1, 6 and 7 whilst financial development had a nonsignificant negative impact on life expectancy in models 2 and 3. The significant negative impact of financial development on life expectancy was observed in models 4 and 5 (see Table 10). FDI had a non-significant positive effect on life expectancy in models 1 to 6 whilst model 7 saw life expectancy being negatively but non-significantly influenced by FDI. Contrary to theoretical predictions, the complementarity between financial development and FDI had a negative but non-significant effect on life expectancy under FMOLS in models 1 and 6.

#### 6. Conclusion

This paper's objectives were two, namely: (1) investigating the impact of financial development on poverty alleviation (proxied by life expectancy) and (2) exploring whether the complementarity between financial development and FDI enhanced poverty reduction in BRICS countries. The study used panel data analysis estimation techniques (pooled OLS, fixed effects and FMOLS) with data ranging from 1994 to 2013. The existing theoretical literature shows that financial development can have either a positive or negative impact on poverty alleviation. On the other hand, existing empirical literature produced results which are quite divergent, conflicting and diverse, namely: (1) financial development has a positive effect on poverty reduction, (2) financial development has a negative influence on poverty alleviation, (3) financial development and poverty reduction affected each other and (4) there is a negligible influence of financial development on poverty reduction. Although results show that the impact of financial development and FDI on poverty reduction is mixed, it is quite evident in majority of cases that the complementarity between financial development and FDI enhanced poverty reduction. The policy implication is that BRICS countries should implement policies designed at improving both financial development and FDI inflows in order to be able to reduce poverty.

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