Macrothink Institute™

International Journal of Regional Development
ISSN 2373-9851
2016, Vol. 3, No. 1

The Relationship between FDI and Financial Market Development: The Case of the Sub-Saharan African Region

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Received: November 20, 2015 Accepted: December 15, 2015 Published: January 23, 2016

doi:10.5296/ijrd.v3i1.8592 URL: http://dx.doi.org/10.5296/ijrd.v3i1.8592

Abstract

The purpose of this paper is to investigate the long-run relationship between foreign direct investment and financial market development in the sub-Saharan African region. Due to the lack of adequate and reliable financial market data for all countries, the data of eight sub-Saharan countries that have full and reliable data sources are used. Our study covers data ranging from 1991 to 2013.

For simplicity, the financial market development indicators are divided into two categories: banking and stock market development indicators. We apply the Granger causality test to examine the causal relationship between the two variables. Then, the two-step panel regression model (2SLS) is run to ensure consistency in the findings. Based on the results of both the Granger causality test and 2SLS panel regression, the relationship between foreign direct investment (FDI) and financial market development is found to be inclusive.

Keywords: Foreign direct investment (FDI), financial market development (FMD), Granger causality test, 2SLS regression model

1. Introduction

It is not uncommon to find economic literature that documents both foreign direct investments and financial market development as contributing to a country's economic growth. The focus has been in unveiling the role of foreign direct investment and financial market development, unilaterally or in combination, to growth. As the financial market across various economies became complex and dynamic and the need for foreign direct investments increased globally, scholars and stakeholders have increased their efforts to investigate the impact of foreign investment on financial markets, and vice-versa. While there are a reasonable number of studies on both foreign direct investments and financial markets, the focus of much of the studies has been on developed economies. The findings indicate the relationship between foreign direct investments and financial markets is positive and significant.

Desai et al (2006) and Henry (2000) examine the impact of foreign direct investments on a host country's financial market, and finds that foreign investment impacts financial market development by increasing the availability of funds in the market and bringing financial market integration. Another study by Alfaro et al (2004) also indicates the existence of a positive and significant correlation between FDI and financial markets. The focus of most research papers has been on developed countries where their financial market is fully developed. Therefore, the findings of these studies may not fully reflect the actual performance of FDI and financial markets in developing countries and emerging markets, as financial markets of developing countries are not fully developed. There have been a number of issues related to the availability and reliability of data for many countries.

The nature and quality of data affects the outcome of a research paper. Arize et al (2003) clearly indicates the lack of sufficient and reliable data for developing and emerging markets. Despite these problems, we find few studies in the financial literature which explain the relationship between foreign direct investments and financial market development in developing countries. Adam and Tweneboah (2009) examine the effects of FDI on the Ghana stock market and find a long-term relationship between the variables. Another study by Al Nasser and Soydemir (2010) on the financial market of fourteen Latin American countries shows a unidirectional relationship between FDI and banking sector development indicators, and a bi-directional relationship between FDI and stock market development indicators.

The findings of this research paper indicate the relationship between foreign direct investments and financial market development is inclusive. While there is a long-term relationship between foreign direct investment inflows and credit, there is no significant long-term relationship between foreign direct investment inflows and private sector liability within 1% to 10% confidence intervals. Both credit and liability are bank sector development indicators. Taking stock market development indicators, stock market capitalization as a percentage of GDP is the only variable from the stock market development indicators which is found to have a long-term relationship with foreign direct investment inflows at a 5%

confidence level. All other variables of the financial market development indicators are found insignificant in affecting the flow of foreign direct investments into the region In general, the findings of this research paper suggest that the relationship between foreign direct investment inflows and financial market development is inclusive.

This research paper contains the following sections: Section II addresses related literature reviews; Section III addresses the data and methodology used (unit root tests and Granger causality tests are incorporated in this section);Section IV shows regression models and their respective results; and finally, the conclusion and recommendations are summarized in Section IV.

2. Review of the Literature

In many pieces of literature, the relationship between Foreign Direct Investment and Financial Market Development has widely been discussed in terms of their contribution to economic growth. What is not widely explained is the direct relationship which may exist between the variables. There are quite a few pieces of financial literature which investigate the causal relationship between these variables. For example, Desai et al (2006) and Henry (2000) investigate the impact of FDI flows on the host country's financial market and banking sector development. They find that foreign direct investment net inflow increases the availability of funds in the market and thereby ensures financial market integration and banking sector development. In the same study, Desai et al (2006) indicates that a well-furnished stock market in the host country attracts FDI, as the market increases liquidity and reduces the cost of capital in the financial market.

In other studies, Kholdy and Sohrabian (2008) and Rajan and Zingales (2003) use political economy analysis to investigate the impact of foreign direct investment on a domestic market which is relatively dominated by a few monolithic elites. They find that foreign direct investment weakens the power of elites in the market by forcing adoption of the norms and regulations of the domestic market, which in turn contributes to the development of financial markets.

Rigorous studies have been undertaken to understand the inter-linkage impact of foreign direct investment and financial market development on growth. In an attempt to understand this impact, Hermes and Lensink (2003) investigate the effects of foreign direct investment in reducing the cost of innovation in the host country. The study reveals the cost of innovation declines with the increase of foreign direct investment inflows, as there will be technology spillover from foreign firms to local firms. The study, however, finds that foreign direct investment ensures the spillover of technology transfer when the host country's financial market is well developed to attract foreign investments. The paper indicates that the impact of foreign direct investment on growth remains positive only in a well-developed financial market. Similarly, Alfaro et al (2004) finds a positive relationship between foreign direct investment and growth using banking sector and stock market indicators.

In another study, Omran and Bolbol (2003) investigate the impact of foreign direct investment on growth using Pooled OLS on seventeen Arab countries, and find that the

effects of foreign direct investment on growth depends on the development of financial markets. In a similar study, Bailliu (2000) indicates the positive contribution of capital flows to growth with a well-developed financial market. Other researchers also find similar results regardless of different techniques and methods used to investigate the impact (e.g., Choong et al., 2004; Choong et al., 2005; Durham, 2004; Azman-Saini et al., 2010; Choong, 2012, Alfaro et al 2010). In contrast, several other studies find no significant correlation between foreign direct investment and financial market development that can affect economic growth (e.g. Durham, 2004; Carkovic & Levine, 2005).

On the other hand, the development of the financial sector determines the amount of available credit in the market, which in turn influences the economic growth of the host country. The financial sector development is decisive in determining the extent of credit foreign firms can borrow from the local financial institutions. This in turn can have an effect on the level of technology spillover to local firms. This indicates a well-developed financial market can expedite the diffusion of technology into the host country (Hermes & Lensink, 2003). Another study conducted by Demetriades and Andrianova (2004) also shows that the existence of a well-developed financial sector is a precondition for the host country to attract new investments and innovations. Another important factor which contributes to the development of financial market and foreign direct investment is the level of a host country's financial market liberalization.

A more restricted capital control discourages foreign investment and leaves the host country's financial market less competitive. In this case, Henry (2000) indicates that financial market liberalization increases the extent of foreign direct investment inflows and private investment. In collaboration with other positively contributing factors, market liberalization can lower the cost of capital which is considered crucial for an investor to make about foreign investment decisions. In another study, Desai et al. (2006) explains the effects of the cost of capital (due to capital control) on foreign investment. The theory behind this investigation is that capital control can push lending interest rates high, which increases the cost of capital, and may discourage local affiliates of multinational investors from getting loans to finance their portion of investment. Foreign investors also become reluctant to invest in a country where there are no motivated local partners. In general, the existence of a well- developed financial market reduces the cost of capital and encourages foreign direct investment flows. In contrast, the lack of a well-developed financial market discourages domestic as well as foreign direct investment.

The financial markets of most developing countries are not as well developed as that of developed countries. There is a possibility that there may be a bias on the outcome attributed to the use of insufficient or unreliable data. There are quite a limited number of studies available related to FDI and financial market development on Africa. As Arize et al (2003) indicates, there have not been enough studies available on developing countries and emerging economies due to lack of persistent and reliable data. Despite these roadblocks, there are quite a few studies available regarding financial literature, particularly on FDI and financial markets of the continent. For example, Adam and Tweneboah (2009) examine the effects of FDI on the Ghana stock market and find a long-term relationship between the two indicated variables.

Another study by Al Nasser and Soydemir (2010) on the financial market of fourteen Latin American countries shows a unidirectional relationship between foreign direct investment and banking sector development indicators, and bidirectional relationship between foreign direct investment and stock market development indicators.

We believe that the relationship between FDI and financial markets has not been thoroughly investigated. The number of studies that have tried examining the long-run relationship between the stated variables is limited in number as well as in scope, especially studies that are related to developing countries, including Africa. Therefore, this research paper is aimed to contribute to the existing literature by adding some more insights on FDI and financial markets.

3. Data and Long-Run Causality Analysis

3.1 Data and Variable Definition

This section describes the nature of the data used in the empirical analysis and the various variables employed in the analysis. It investigates the impact of foreign direct investment on domestic financial market development and vice-versa. A number of sub-Saharan African countries are considered in the investigation.

Since the financial markets of developing countries are not as well developed as that of developed nations, only countries that have the data recorded are included in the study. Thus, the sample data is composed from eight (Note 1) Sub-Saharan African countries including Botswana, Egypt, Kenya, Ghana, Mauritius, Namibia, Nigeria, and South Africa. The sample covers yearly data from 1990 to 2013, and they are all retrieved from the World Bank Database CD-ROM (2015).

Two commonly used indicators of foreign direct investment, hereafter FDI, are considered in the analysis. These are the ratio of FDI to GDP, hereafter FDIGDP, and the ratio of FDI to gross fixed capital formation, hereafter FDIGCF. However, FDIGDP is preferred in the analysis as there is no complete and stable data for FDIGCF.

The financial market development indicators, hereafter FMD, are categorized into two major categories, stock market development indicators and banking sector development indicators. Additionally, each major category contains its own sub-category. The stock market development indicators, hereafter SMD, include (i) the ratio of stock market capitalization to GDP, hereafter STKMACAGDP, (ii) the ratio of stock value traded as a percentage of GDP, hereafter STKTRAVALGDP, and (iii) stock value traded turnover ratio (%), hereafter STKTRAVATOR.

The banking sector development indicators, hereafter BSD, consist of (i) the amount of credit given to public and private sectors as a percentage of GDP, hereafter CRGDP, and (ii) the amount of liquid liability of public and private sectors as a percentage of broad money, hereafter LBM.

Four control variables (which are micro-economic variables) are incorporated in its regression equation. These variables are real exchange rates, hereafter EXRATE, gross

domestic product (PPP), hereafter $\log(GDP)_{t-1}$, broad money as a percentage of GDP (also called money supply; refers to the availability of money in an economy,) hereafter BMGDP, and market openness, hereafter OPENNESS (represented by the ratio of exports plus imports over GDP).

3.2 Descriptive Statistics and Unit Root Test

This paper uses simple descriptive statistics, including a scatter plot and correlation matrix to explain the relationship between FDI and FMD variables.

To investigate the stationarity of the FDI and FMD variables, the research paper uses Levin, Lin and Chu (2002), Im', Perasan and Shin (2003), and the well-known augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests in the heterogeneous panel data. Summaries of the descriptive statistics, correlation matrix and unit root tests are presented below.

Table 1. Descriptive statistics

	FDI and Financial Market Development (FMD) Indicators					
	FDIGDP	CRGDP	LBM	STKMACAGDP	STKTRAVAGDP	STKTRAVATOR
Mean	2.4749	43.0953	13.1529	20.9971	9.8243	11.8317
Median	1.5770	30.8632	12.1444	20.3237	1.0129	5.1906
Maximum	13.4551	160.1249	79.1749	39.1946	142.1908	64.2613
Minimum	-6.8976	3.6573	-16.1125	5.4670	0.0266	0.5538
Std. Dev.	2.7070	37.5100	10.7095	6.6589	24.7671	15.2881
Skewness	1.1881	1.5100	2.7334	0.2108	3.3811	1.9619
Kurtosis	5.2076	4.4323	17.3003	3.2950	14.6017	5.7289
Observations	192	192	192	192	192	192

Table 1 contains a summary of the descriptive statistics. It shows the average of each variable included in the sample and the standard deviation of the variables from their corresponding mean. The averages of stock market capitalization and foreign direct investment to GDP is 20.99% and 2.47% respectively. The standard deviation of these variables is 6.65 and 2.71in that order, and indicates differences in the level of stock market capitalization and foreign direct investment across countries in the sub-Saharan region. The average value of stocks traded and the ratio of stock turnover, both as a percentage of GDP, is 9.82% and 9.82% respectively. The standard deviation of the latter two variables is 24.76 and 15.28 respectively, which indicates differences in the value of stocks traded and turnovers across countries.

As to BSD, credits to public and private sectors are averaged at 43.09% (with standard deviation 37.51), and liquid liability of public and private sectors are averaged at 13.15% (with standard deviation 10.71). Comparing all development indicators, the deviation in FDI is smaller across the countries.

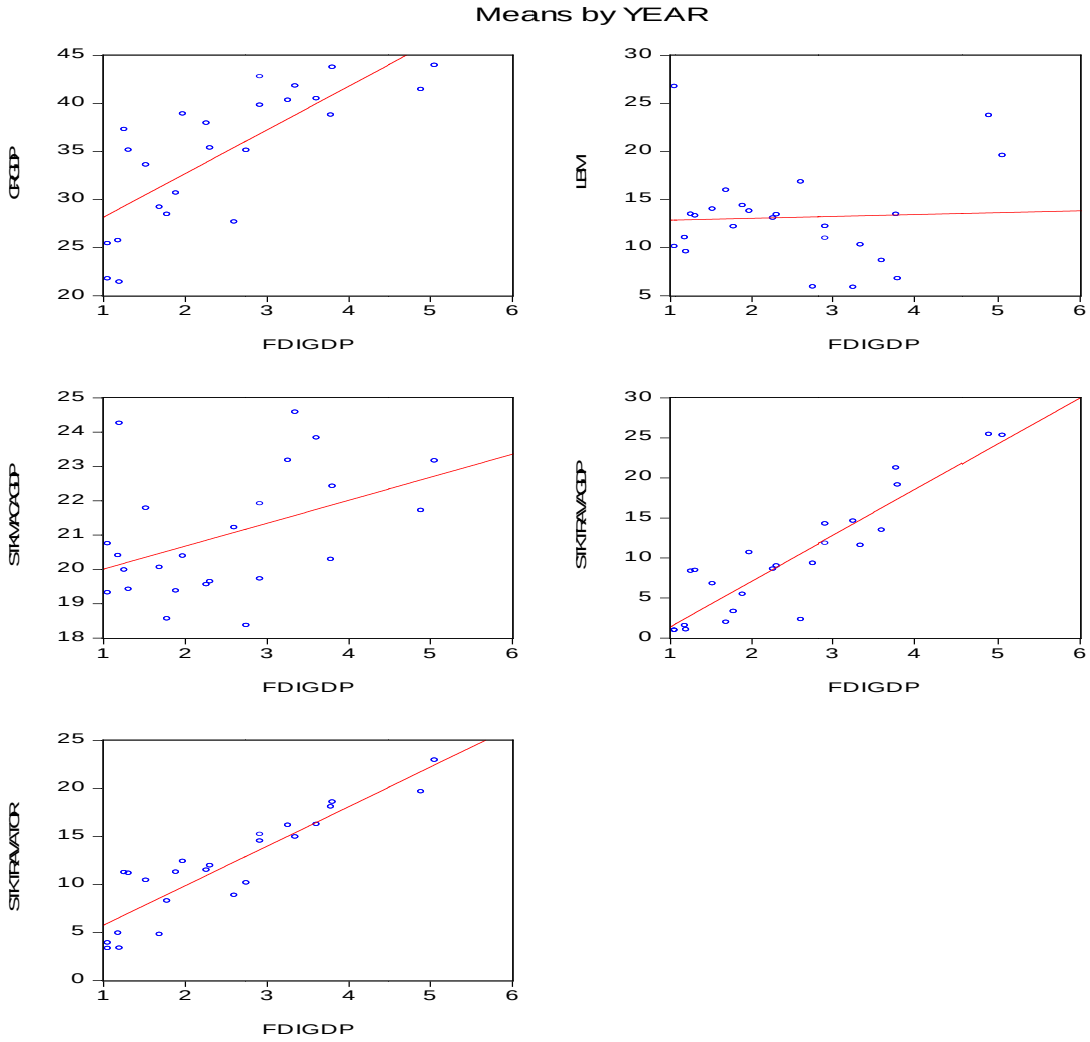

Figure 1. Scatter Plots of FDI and FMD indicators

Figure 1 shows the scatter plot of FDI and FMD variables, based on the average of each variable for each country. The figures indicate there is a linear relationship between FDI and FMD variables. We observe a linear relationship between FDIGDP and stock market development indicators (STKMACAGDP, STKTRAVAGDP, and STKTRAVATOR.) The relationship between FDIGDP and the banking sector development indicator (CRGDP) is also linear.

Table 2. Correlation matrix

	FDI and Financial Market Development Indicators						
	FDIGDP	BMGDP	CRGDP	LBM	STKMACAGDP	STKTRAVAGDP	STKTRAVATOR
FDIGDP	1						
CRGDP	0.1581	0.1889	1				
LBM	0.2393	0.0621	0.3747	1			
STKMACAGDP	0.1989	0.0020	0.1614	-0.0619	1		
STKTRAVAGDP	0.1161	0.0538	0.4212	0.0333	0.0549	1	
STKTRAVATOR	0.1646	0.1114	0.3548	0.0866	0.0764	0.8765	1

Table 2 shows the correlation between FDI and FMD indicators. There is a positive correlation between FDIGDP and FMD indicators. The correlations between FDI and all FMD variables do not exceed 67% and the highest correlations are between STKTRAVAGDP and CRGDP (42%) and STKTRAVATOT and CRGDP (35%).

Table 3. Panel unit root test

FDI and Financial Market Development Variables (FMD)												
Method	FDIGDP		CRGDP		LBM		STKMACAGDP		STKTRAVAGDP		STKTRAVATOR	
Level	Stat.	Prob.	Stat.	Prob.	Stat.	Prob.	Stat.	Prob.	Stat.	Prob.	Stat.	Prob.
Levin, Lin & Chu t*	-4.283	0.000	0.642	0.74	-4.693	0.00	-4.114	0.00	-3.041	0.00	-2.778	0.00
Im, Pesaran and Shin W-stat	-4.673	0.000	-0.202	0.42	-5.778	0.00	-4.392	0.00	-3.891	0.00	-4.568	0.00
ADF - Fisher Chi-square	51.106	0.000	18.142	0.31	59.382	0.00	48.455	0.00	41.999	0.00	51.093	0.00
PP - Fisher Chi-square	53.546	0.000	13.883	0.60	106.44	0.00	49.458	0.00	26.793	0.04	52.305	0.00
First Difference												
Levin, Lin & Chu t*	-7.605	0.000	-9.889	0.00	-13.31	0.00	-12.56	0.00	-8.476	0.00	-15.63	0.00
Im, Pesaran and Shin W-stat	-11.28	0.000	-9.366	0.00	-14.48	0.00	-12.50	0.00	-9.156	0.00	-13.26	0.00
ADF - Fisher Chi-square	124.95	0.000	103.03	0.00	165.17	0.00	139.93	0.00	102.94	0.00	153.32	0.00
PP - Fisher Chi-square	722.55	0.000	108.58	0.00	589.76	0.00	230.92	0.00	200.66	0.00	405.71	0.00

Table 3 shows the unit root summary of FDI and FMD variables. In this case, all the reported unit root tests indicate FDIGDP, STKMACAGDP, STKTRAVAGDP, and STKTRAVATOR are stationary at level. The unit root test results for LBM and CRGDP show that the variables are stationary at first difference. The unit root test for the control variables indicate that GDP, BMGDP, and EXRATE are stationary at first difference, whereas Market OPENNESS is stationary at level.

3.3 Granger Causality Analysis between FDI and FMD

The existence of co-integration between FDI and FMD variables is examined using the panel co-integration test before the Granger causality test is performed. As co-integration between the variables is indicated, we implement the Granger (1969) causality test to examine the relationship between FDI and FMD variables.

Granger assumes that past value of the first variable (index) explains the second variable (index) while past value of the second variable (index) does not explain the first variable (index.) The Granger causality test is performed using the Error Correction Model (ECM), but is subject to certain errors as the specification of the model depends on pre-test unit roots and co-integration equations.

Alternatively, Toda and Yamamato (1995) propose the Level VAR procedure, a VAR model which considers the level order of the variables which will be estimated. This model also helps detect the long-term relationship of variables which are under investigation. In our causality test analysis, we consider our specification to be a bivariate VAR model with individual and time effects included. The models can be represented by:

$$FDI_{it} = \delta_{1t} + \alpha_1 FDI_{i(t-1)} + \alpha_2 FDI_{i(t-2)} + \beta_1 FMD_{i(t-1)} + \beta_2 FMD_{i(t-2)} + \eta_{1i} + v_{1it} \quad (1)$$

$$FMD_{it} = \delta_{2t} + \gamma_1 FMD_{i(t-1)} + \gamma_2 FMD_{i(t-2)} + \lambda_1 FDI_{i(t-1)} + \lambda_2 FDI_{i(t-2)} + \eta_{2i} + v_{2it} \quad (2)$$

Note: δ_{1t} and δ_{2t}represent the time effect, and $\eta_{1i}$and η_{2i}represent the individual effect. The null hypothesis of Granger causality assumes that FDI does not Granger-cause FMD, conditional on time and individual effects and restricts $\lambda_1 = \lambda_2 = 0$. The other hypothesis of causality assumes FMD does not Granger-cause FDI, conditional on time and individual effects and restricts $\beta 1 = \beta 2 = 0$.

Before running the causality test, we determine the appropriate lag length using the Akaike Information Criteria (AIC) and Schwarz Criterion. In this case, both tests confirm a maximum lag length of two. The common practice in VAR models is to check the stationary properties of variables before running the model. However, the conversion of data into first difference comes with the risk of losing the long-term properties of the variables which are under investigation (Sims, 1980; stock and Watson, 2001). Therefore, all variables at level are used when estimating the long-term relationship between the variables. In this case, the "Level VAR" estimation technique proposed by Toda and Yamamato (1995) is followed. The Granger causal relationship between FDI and FMD variables is presented below.

Table 4. VAR granger causality test

	FDI and Banking Sector Development (BSD) Indicators				
Variable	FDIGDP	BMGDP	CRGDP	LBM	**CAUSES**
FDIGDP		**0.0351****	0.3480	0.8939	**1**
CRGDP	**0.034****	**0.085***		0.2244	**2**
LBM	0.5807	**0.0001*****	**0.0194****		**2**
CAUSES	**2**	**3**	**1**	**1**	
df		**2**	**2**	**2**	
Chi-sq		**6.7999**	**6.7611**	**1.0869**	
		FDI and Stock Market Development (SMD) Indicator			
Variable	FDIGDP	GFCGDP	STKTRVAGDP	STKTRVATOR	**CAUSES**
FDIGDP		**0.0001*****	0.3403	0.2831	**1**
STKMACAGDP	**0.0001*****		0.9264	0.5279	**1**
STKTRAVAGDP	0.6875	0.8830		**0.0257****	**1**
STKTRAVATOR	0.4052	0.5258	**0.0003*****		**1**
CAUSES	**1**	**1**	**1**	**1**	
Df.		**2**	**2**	**2**	
Chi-sq		**55.7482**	**0.7493**	**1.8067**	

Notes. Parentheses show Standard errors; Significant values, ***=P<0.01, **=P<0.05, *=P<0.1.

Table 4 shows the Granger causality test between FDI and FMD variables. While CRGDP Granger-causes FDIGDP at 3.4% confidence level, it is Granger-caused by another BSD variable, LBM at 1% confidence level. Apart from BSD variables, SMD variables also cause FDIGDP at different levels. For example, STKMACAGDP Granger causes FDIGDP at 1% confidence level. Another SMD variable, STKTRAVATOR and STKTRAVATOR also Granger-cause each other at 2.57% and 1% confidence levels respectively. Finally, FDIGDP causes STKMACAGDP at 1% confidence level. The overall results of the Granger causality test indicate that CRGDP from BSD and another variable (STKMACAGDP) from SMD Granger-cause FDIGDP at confidence intervals from 1% to 10%. The output of the VAR Granger causality test is presented below.

4. Two-Step Panel Regression Model (2SLS) Specification

The results of the Granger causality test show that the long-term relationship between FDI and FMD variables is inclusive. This mixed scenario invites further investigation of the relationship between the two sets of variables using a regression model. The regression model(s) considers the effects of cross-section and time simultaneously. To further minimize the effects of the endogenous problem between FDI and FMD variables, and to better predict the relationship between them, a regression model for the cross-section of eight sub-Saharan countries is developed. The model takes the form of simultaneous equation and is presented as follows:

$$FDI_{it} = a_0 + a_1 FMD_{it} + a_2 LOG\,(GDP_{it-1}) + a_3 EXR_{it} + a_4 BMGDP_{it} + a_5 OPENNESS_{it} + \varepsilon_{it} \quad (3)$$

$$FMD_{it} = b_0 + b_1 FDI_{it} + b_2 LOG\,(GDP_{it-1}) + b_3 EXR_{it} + b_4 BMGDP_{it} + b_5 OPENNESS_{it} + \nu_{it}. \quad (4)$$

All explanatory variables are chosen based on the existing literature on the determinants of FDI and FMD indicators (e.g. Al Nasser and Soydemir, 2010; Alfaro et al, 2004; Asiedu and Lien, 2011; Hermes and Lensink, 2003; Kholdy and Sohrabian, 2008). The simultaneous equation stated above helps solve the endogenous problem which may occur between FDI and FMD variables. The 2SLS panel regression results are presented below.

4.1 Relationship between FDI and FMD Variables

Table 5A shows the regression results of the 2SLS panel regression of equation (3) and (4) for FDI and FMD indicators. This table shows CRGDP (from the banking sector development indicators) and STKMACAGDP (from the stock market development indicators) positively and significantly affect FDIGDP at 5% confidence level. All other FMD variables including STKTRAVAGDP, STKTRAVATOR, and LBM are found statistically insignificant to impact FDIGDP at a given range of confidence levels, 1% to 10%. This regression result confirms the bidirectional causal relationship found between FDIGDP and FMD variables (CRGDP and STKMACAGDP).

Table 5A. Two-stage least square panel regression results for financial market development indicators (FMD)

Dependent variable: FDIGDP		
Variable	**Std. Error**	**P-Value**
FDIGDP(-1)	(0.0835)	**0.0000*** **
CRGDP	(0.0125)	**0.0338** **
LBM	(0.0075)	0.3172
STKMACAGDP	(0.0250)	**0.0245** **
STKTRAVAGDP	(0.0114)	0.8398
STKTRAVATOR	(0.0202)	0.8019
Log(GDP)t-1	(0.0006)	**0.0001*** **
BMGDP	(0.0336)	**0.0740***
OPENNESS	(0.0115)	0.6936
EXRATE	(0.0150)	0.4561
R-squared	**0.509736**	
Adjusted R-squared	0.459528	
Durbin-Watson stat	2.109409	
No. of observations	184	

Notes. Parentheses show Standard errors; Significant values, ***=P<0.01, **=P<0.05, *=P<0.1.

4.2 Relationship between FDI and BSD Indicators

Table 5B presents the results of 2SLS panel regression for FDI and Banking Sector Development (BSD) indicators. It shows while CRGDP impacts FDIGDP positively and significantly at approximately 5% confidence level, LBM fails to significantly affect FDIGDP at a given range of confidence intervals between 1%and 10%. The findings of the

Granger causality test and the regression outcome indicate CRGDP significantly impacts the flow of FDI into the region.

Table 5B. Two-stage least square panel regression results for banking sector development indicators

Dependent Variable: FDIGDP

Variable	Std. Error	P-Value
FDIGDP(-1)	(0.0854)	**0.0000*** **
CRGDP	(0.0125)	**0.0514** **
LBM	(0.0080)	0.3887
Log(GDP)t-1	(0.0006)	**0.0000*** **
BMGDP	(0.0353)	**0.0957***
OPENNESS	(0.0107)	0.8085
EXRATE	(0.0132)	0.5161
R-squared	**0.5053**	
Adjusted R-squared	0.46432	
Durbin-Watson stat	2.14623	
No. of observations	184	

Notes. Parentheses show Standard errors; Significant values, ***=P<0.01, **=P<0.05, *=P<0.1.

4.3 Relationship between FDI and SMD Indicators

Table 5C summarizes the results of 2SLS panel regression for FDI and Stock Market Development (SMD) indicators. The table shows STKMACAGDP is the only variable which affects FDIGDP positively and significantly at 7.27% confidence level. Other SMD variables such as STKTRAVAGDP and STKTRAVATOR are found statistically insignificant to impact FDIGDP at confidence intervals between 1% and 10%. This result is consistent with the outcome of the Granger causality test result (see the Granger causality test result, Table 3A).

Table 5C. Two-stage least square panel regression results for stock market development indicators

Dependent Variable: FDIGDP

Variable	Std. Error	P-Value
FDIGDP(-1)	(0.0821)	**0.0000*** **
STKMACAGDP	(0.0275)	**0.0727***
STKTRAVAGDP	(0.0103)	0.601
STKTRAVATOR	(0.0170)	0.9629
Log(GDP)t-1	(0.0006)	**0.0002*** **
OPENNESS	(0.0118)	0.9464
EXRATE	(0.0128)	0.3762
R-squared	**0.49708**	
Adjusted R-squared	0.45541	
Durbin-Watson stat	2.07745	
No. of observations	184	

Notes. Parentheses show Standard errors; Significant values, ***=P<0.01, **=P<0.05, *=P<0.1.

4.4 Summary of the Effects of FDI on FMD and Macroeconomic Variables (MEI)

Table 5D presents the effects of FDI on financial market development (FMD) and macroeconomic variables (MEI). This table shows FDIGDP significantly affects STKMACAGDP and BMGDP at 0.14% and 5.8% confidence levels respectively. In contrast, FDIGDP fails to impact CRGDP, STKTAVAGDP, STKTRAVATOR and LBM at confidence intervals between 1% and 10%. This result confirms the causality test result presented on table 3A and 3B.

Table 5D. Two-stage least square panel regression results for FMD andMacroeconomic variables (MEI)

Dependent variables: STKMACAGDP, BMGDP

INDICATOR	STKMACAGDP	BMGDP
FDIGDP	**0.0014*** **	**0.058** **
	(0.0583)	(0.0334)
BMGDP	**0.0014*** **	
	(0.0346)	
CRGDP	0.4714	
	(0.0316)	
LBM	0.442	
	(0.0154)	
STKMACAGDP		**0.011*** **
		(0.0291)
STKTRAVAGDP		0.7678
		(0.0169)
STKTRAVATOR		0.1413
		(0.0170)
Log(GDP)t-1	0.4387	**0.0041*** **
	(0.0015)	(0.000031)
OPENNESS	**0.0261** **	**0.0109*** **
	(2.2450)	
EXRATE	**0.0799***	0.1939
	(-1.7619)	(0.0006)
R-squared	**0.85269**	**0.8354**
Adjusted R-squared	0.8395	0.8196
Durbin-Watson stat	2.1082	2.0724
No. of observations	184	184

Notes. Parentheses show Standard errors; Significant values, ***=P<0.01, **=P<0.05, *=P<0.1.

4.5 Summary of the Effects of Macroeconomic Variables (MEI) on FDI and FMD Variables

The above tables, Table 5A, 5B, 5C, and 5D incorporate the effects of Control Variables (CV) on FDI and FMD variables. In all cases, GDP (which implies the size of the economy measured by log $(GDP)_{t-1}$) and Broad Money (which indicates the availability of money in an economy) reveal a positive and significant impact on the flow of FDI to the region. In contrast, other control variables, including exchange rates and market openness, are not found to have a significance influence on FDI flows within 1% to 10% confidence intervals. Literature documents paradox results on the effects of the exchange rate uncertainty on market openness and FDI inflows. A significant number of empirical studies find a positive correlation between exchange rates and FDI (e.g. Froot and Stein, 1991; Swenson, 1994;

Klein and Rosengren, 1994), while several other studies find no significance correlation between exchange rates and FDI (e.g. Lipsey, 2001; Benassy-Quere, 2001; Byrne & Davis, 2003; Huber & Pain, 1999). Similarly, the results of several studies on market openness (Openness) and FDI inflows indicate inconclusive results. While several studies find a positive correlation between trade (which is a proxy for market openness) and FDI inflows, others find no correlation, or insignificant correlation between the two variables.

5. Conclusion

The purpose of this paper is to investigate the relationship between foreign direct investment and financial market development in the sub-Saharan African countries. Depending on the availability of financial data, eight sub-Saharan African countries are included in the study. For the purpose of clarity and simplicity, financial market development indicators are divided into two sub-groups, namely stock market development indicators and banking sector development indicators. The study covers 1991 to 2013 and the financial data is retrieved from the World Bank Database CD-ROM (2015).

In the analysis, a combination of several methodologies including descriptive statistics and correlation matrix, VAR and Granger Causality test, and 2SLS panel regression model are employed. The use of the VAR system, Granger causality test, and 2SLS regression model addresses the issue of an endogenous problem that may occur between FDI and FMD variables.

The relationship between FDI and FMD variables are found to be inclusive. Specifically, the relationship between FDI and Credit (a banking sector development indicator) is found to be statistically significant from both the Granger causality test and 2SLS regression model results. In contrast, both the Granger causality test and 2SLS regression results show the relationship between FDI and Private Sector Liquid Liability (another banking sector development indicator) is not statistically significant. In regard to the stock market and FDI relationship, there is only one stock market development variable (Stock Market capitalization) which is positively and significantly correlated with FDI. All other financial market development indicators (FMD) such as stock market turnover ratio (STKTRAVATOR) and stock value traded (STKTRAVAGDP) are found statistically insignificant to affect the flow of FDI to the region.

Regarding the control variables (macro-economic variables), we find log (GDP)t-1, and broad money (BMGDP) significantly affect the flow of FDI into the region. However, both exchange rates and trade openness are found not statistically significant to affect the inflow of FDI into the region, but they both affect stock market capitalization (STKTRAVATOR) and broad money (BRGDP) significantly. The overall findings of this paper, from both causality test and 2SLS regression model results, show the relationship between FDI and FMD in the sub-Saharan African region is inclusive.

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Note

Note 1. The list of Sub-Saharan African countries include Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo Brazzaville, Congo Democratic Republic, Côte d'Ivoire, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gabon, The Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Reunion, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, Sudan, Swaziland, Tanzania, Togo, Uganda, Western Sahara, Zambia, and Zimbabwe.

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