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The long-run and short-run effects of foreign direct investment on financial development in African countries

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Abstract

This paper contributes to the understanding of the other neglected effects of foreign direct investment by analysing how foreign direct investment affects financial development in the short-run and long-run for a panel of 49 African countries over the period 1990-2016. The empirical evidence is based on Pooled Mean Group (PMG) approach. With three panels differentiated by income level, the following findings are established: first, while there is a positive and significant long-run relationship between foreign direct investment and financial development in Africa, in the short-run the effect of foreign direct investment on financial development is negative. Second, the effect of foreign direct investment is positive and significant in the long-run in the three sub-samples. However, in the short-run, the effect of foreign direct investment is negative and significant in lower-income countries and non-significant in lower-middle-income and upper-middle-income countries. Overall we find a strong evidence supporting the view that foreign direct investment promotes financial development in African countries in the long-run.

Keywords: Foreign direct investment, financial development, Pooled Mean Group, Africa

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1. Introduction

During the last decades, there was a drastic increase in foreign direct investment (FDI) received all over the world and the value of the worldwide stock of FDI more than quadrupled within ten years to reach a volume of more than US\$15 trillion in 2007 (Stiebale and Reize, 2011). In Africa, inward FDI has increased from US\$41 million over the period 1980-1985 to US\$ 1,064 million over the period 2005-2009, which represents an average growth rate of 99% over the entire period (Gui-Diby, 2014). Foreign direct investment has become an important and first source of external capital that complements domestic capital, particularly for African countries, whose economic development requires huge capital (Seetanah, 2009; Agosin and Machado, 2005).

The ever-increasing volume of foreign direct investment (FDI) inflows has led researchers to examine the development impact of foreign direct investment along various dimensions namely: inequality (Wu and Hsu, 2012), poverty reduction (Gohou and Soumaré, 2012), total factor productivity (Herzer, 2017), employment creation (Jude and Silaghi, 2016), technology transfer (Kim, 2008), competitiveness (Zhang, 2014), entrepreneurship (Munemo, 2018) and most importantly economic growth (Malikane and Chitambara, 2017; Zghidi et al., 2016). Surprisingly, the question of whether foreign direct investment promote financial development has received little attention, particularly for African countries.

The issue of financial development is important for African countries as it has been shown that financial development spurs economic growth (Ibrahim and Alagidede, 2017; Kouki, 2013) and reduces poverty (Abosedra et al., 2016). Additionally, financial development is important since some scholars argue that countries with well-developed financial sector seem to attract more foreign direct investment (Desbordes and Wei, 2017) and thus gained more economic growth (Alfaro et al., 2004). However, few studies have examined the direct link between FDI inflows and financial development particularly in developing world as Africa.

Thus, literature gaps on the relationship between FDI and financial development are numerous, despite the established link between FDI and growth. First, there is a lack of empirical systematic studies that examine categories of countries that attract the highest values of FDI (advanced countries vs emerging countries and least developing countries). Second, it is also crucial to investigate and understand which factors are the main determinants of FDI. The various empirical studies that have been implemented to put out the economic, social, and cultural determinants of FDI have commonly focused on economic size and growth,

institutional development, economic freedom, religion, distance between countries, and common culture, inflation, trade openness, financial development, tax rates, physical infrastructure (Saini, Singhania, 2018; Anyanwu and Yameogo, 2015). However, a few studies have focused on the direct interaction between FDI and financial development. In this context, FDI inflows may affect the development of financial sectors positively by increasing funds in a financial system, but it can also have no influence or a negative effect on the development of a financial sector, as FDI inflows are also an alternative external financing tool, which also means, a competitor for domestic financial markets (Levine, 1997; Bayar and Gavriletea, 2018). According to Coulibaly (2015), despite the importance of FDI for host countries, the empirical effect of FDI on financial development is limited, particularly in African countries where the financial sector is still underdeveloped. This paper contributes to this new literature by assessing the long-run and short-run effect of FDI on financial development on a panel of 49 African countries over the period 1990-2016. By establishing this relationship, this paper seeks to analyse the existence of another direction of causality between FDI and financial development, as past studies have analysed the impact of financial development on foreign direct investment (Desbordes and Wei, 2017). Our results document that in the long – run, foreign direct investment affects positively and significantly financial development. Additionally, results show that in the short-run FDI is negatively associated with financial development.

The rest of this paper is organized as follows. Section 2 briefly reviews the literature on FDI- financial development link. Section 3 presents the data and methodology. Section 4 comments and analyses the results and Section 5 concludes with policy implications.

2. Theoretical framework and empirical literature

The related literature has not provided a consistent theoretical framework that explains the direct link between FDI and financial development. However, the theoretically causal link between FDI and financial development has been clarified on three different approaches. First, Henry (2000), Desai et al. (2006), and others defend that an increase in FDI net inflows rises the total amount of funds ready for the local economy and generates financial intermediation through financial markets and the banking system to boost firms involved with overseas investors. Foreign direct investors are also likely to enumerate their shares on the domestic stock market, since they usually come from countries with deep roots in financial capitalism, where stock market financing is the main rule for any enterprise which wants to be taken seriously (Soumaré and Tchana, 2015). Second, a relatively well-functioning financial market

can attract FDI, who apprehend such a market as a signal of an economy in good health, openness by States authorities, and a market-friendly environment. Moreover, a relatively well-developed stock market rise the liquidity available for listed firms and can eventually decrease the cost of capital, thus rendering the country attractive to FDI (Desai et al., 2006). Third, Porta et al. (1998), Rajan and Zingales (2003), Kholdy and Sohrabian (2008), and others use political economy analysis to claim that more FDI decreases rulings elites' relative power in the host economy and can push ruling elites to promote market-friendly regulations policies that reinforce the development of financial markets.

Empirically, the direct link between foreign direct investment and financial development has not been sufficiently investigated, particularly for African countries. Otchere et al. (2016) examined the direct causal relationship between financial market development and foreign direct investment in Africa using data from 1996 to 2009. Based on Granger causality test and multivariate analysis, they conclude to a bidirectional positive relationship between FDI and financial development in Africa. Based on 2SLS panel instrumental variable approach, Agbloyor et al. (2013) show that higher FDI flows can lead to the development of the domestic banking system in Africa. Adam and Tweneboah (2009) used a multivariate cointegration and error correction modelling with quarterly data in Ghana and conclude to a long –run relationship between FDI and stock market development.

Most studies that have dealt with the effect of FDI on financial development focus more on developing or emerging countries, or focus on the role of financial development on the macroeconomic effects of FDI. Soumare and Tchana (2015) empirically investigate the causal relationship between FDI and financial development indicators for a panel of 29 emerging countries over the period 1994-2006. They found a bidirectional causality between FDI and stock market development indicators. For banking sector development indicators, the relationship is ambiguous and inconclusive. In the case of Pakistan, Abdul Malik and Amjad (2013) investigate the impact of FDI on the stock market development, their findings support the positive role of FDI in boosting the aggregate stock market development in the long run.

On a selected sample of ASEAN countries, Abidin and al. (2015) investigate the short-run and long-run relationship between FDI, financial development and trade. The long-run relationship and Granger causality test show no significant long-run relationship among FDI inflows, trade, financial development and energy consumption. Results on Granger causality reveal that in the short-run unidirectional causality running from FDI inflows to energy consumption, energy consumption to financial development, and energy consumption to trade.

The results also suggest the existence of bidirectional causality between trade and financial development during the period under the study. In a sample of 67 countries mostly from Latin America and Asia, with 37 having a deep financial system, Hermes and Lensink (2003) found that level of development of the financial system of the host country is a key precondition for FDI to have a positive effect. A sufficiently developed financial system enhances the efficient allocation of resources and improves the absorptive capacity of a country with respect to FDI inflows. In a panel of Arab countries, Omran and Bolbol (2003) found that FDI's positive effect on growth depends on absorptive capacities, among which one of the most important is financial development. As policy recommendations, they conclude that, domestic financial reforms should precede policies promoting FDI, investment rules should enhance the environment for all investors - foreign and home alike and liberal commercial policies should be designed as initial measures to attract FDI.

3. Data and methodology

To investigate the short-run and long-run effects of foreign direct investment on financial development in African countries, we employ panel Autoregressive Distributed Lag (ARDL) model developed by Pesaran et al. (1999). This modelling technique appears to be the most appropriate to the central question of our study: the short-run and long-run effect of FDI on financial development in African countries. This method is applicable whether the variables are observed to be stationary at $I(1)$ or $I(0)$ or $I(1)$ and $I(0)$. In this section, we describe the sample and variables retained in the study. Then, we carry out an econometric analysis using Pooled Mean Group estimator.

2.1 Data

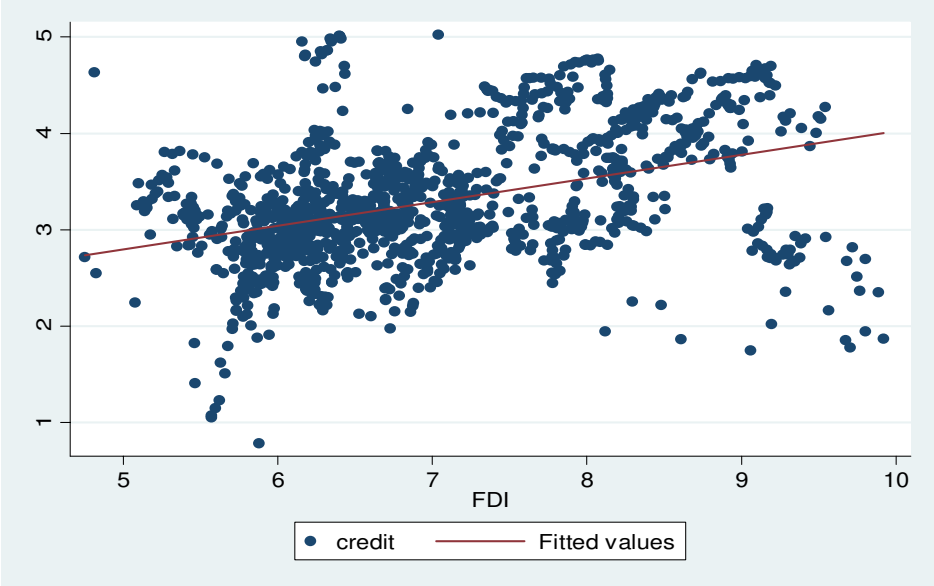
We investigate a panel of 49 African countries over the period 1990-2016. All variables are from World Development Indicators released by the World Bank. The choice of time period and countries is dictated by data availability. Complete list of countries as well as variables definitions and sources are provided in the appendix. In this paper we use two financial development indicators, namely: domestic credit to private sector as a percentage of GDP (credit) and liabilities of financial system measured by the ratio of money and quasi-money (M2). These two financial development indicators are chosen according to financial literature

on Africa, as the financial sector in most African countries is dominated by bank sector (Uddin et al., 2013; Adeniyi et al., 2015; Coulibaly, 2015).

Figure 1: Foreign direct investment vs M2



Figure 2: Foreign direct investment vs credit



Our independent variable is foreign direct investment inflows as a percentage of GDP (FDI). Figure 1 and 2 suggest a positive correlation between FDI and financial development indicators (M2 and credit). However, as correlation does not mean causality, these relationships will be investigated empirically. To ensure that our results are not bias, two control variables

are included namely, GDP per capita (GDP) and trade openness (OPENNESS). Trade openness is measured by the sum of exports and imports as a percentage of GDP. Trade openness has been documented to increase financial development because higher trade openness generates new demand for external finance as firms require credit to surmount cash constraints leading to higher financial sector development (Svaleryd and Vlachos, 2002). Countries with higher income levels have also been documented to be associated with higher levels of financial development (Ibrahim and Sare, 2018).

Table 1: Summary statistics

Variable	M2	CREDIT	FDI	GDP	OPENNESS
Mean	2.585479	3.289498	6.990154	4.449888	4.188755
Median	2.590551	3.179903	6.765649	4.441697	4.15609
Minimum	-.8907295	.7856608	4.751814	-12.28028	2.405814
Maximum	5.075953	5.020909	9.920047	5.500098	6.27615
SD	.9215758	.6456687	1.057563	.4681183	.4788836
Skewness	-.092524	.2480684	.6019641	-34.51354	.3058433
Kurtosis	3.648462	3.238851	2.5359	1235.069	4.199324
Jarque-Bera	23.83623	15.93071	91.28828	83942080	94.32750
Probability	0.000007	0.000347	0.000000	0.000000	0.000000
Observations	1258	1261	1316	1323	1249

SD: Standard deviation. M2: Ratio of money and quasi-money. CREDIT: domestic credit to private sector. FDI: foreign direct investment. GDP: gross domestic product per capita. OPENNESS: trade openness.

Table 2: Correlation matrix

	M2	CREDIT	FDI	GDP	OPENNESS
M2	1.0000				
CREDIT	0.7914	1.0000			
FDI	0.4395	0.4204	1.0000		
GDP	-0.0601	-0.0251	0.0195	1.0000	
OPENNESS	0.2277	0.2212	0.4936	0.4368	1.0000

M2: Ratio of money and quasi-money. CREDIT: domestic credit to private sector. FDI: foreign direct investment. GDP: gross domestic product per capita. OPENNESS: trade openness.

All variables are in log transformed and therefore, the coefficients are interpreted as elasticity. Table 1 presents the summary statistics, while Table 2 provides correlation matrix between all variables. It is apparent from the summary statistics that the variables are comparable from the perspective of mean values. Corresponding standard deviations show substantial variations. Therefore, we can be confident that reasonable estimated nexuses would be obtained from the regressions. We notice from the correlation matrix that foreign direct

investment is positively correlated with each of the two financial development variables. Moreover, the correlation between the two financial development indicators is also positive.

2.2 Methodology

To investigate the long-run effect of foreign direct investment on financial development, it is common to estimate the following basic regression:

$$FinDev_{it} = \beta_1 + \beta_2 FDI_{it} + \beta_3 X_{it} + \varepsilon_{it} \quad (1)$$

Where $FinDev_{it}$ is the level of financial development of country i at time t , FDI_{it} is foreign direct investment, X_{it} stand for a set of control variables, and ε_{it} is the error term. Traditional estimation methods used to estimate Eq (1) does not allow us to capture potential financial development adjustment dynamic (Campos and Kinoshita, 2008; Baltagi, 2008). For this reason, this paper investigates the dynamic link between FDI and financial development by using an autoregressive distributed lag (ARDL) specification by Pesaran et al. (1999). This method is interesting for several reasons. First, it allows us to control for heterogeneity in the relationship between FDI and financial development across countries by including individual-specific effects. Second, it allows us to control for endogeneity. According to Johansen (1995) and Philipps and Hansen (1990), a long-run relationships is possible only when variables have the same order of integration. The third advantage of the Panel ARDL by Pesaran et al. (1999) is that it can be used even with variables with different orders of integration and irrespective of whether they are I(0) or I(1) or I(0) and I(1). Four, this model allows us to estimate simultaneously both the long-run and short-run effects of foreign direct investment on financial development.

The ARDL model is an autoregressive model of order p in the dependent variable and of order q in the explanatory variables and where the dependent and independent variables enter the right-hand side with lags. The modelling of the long-run relationship between FDI and financial development is based on the estimation of and ARDL (p, q, q, \dots, q) model developed by Pesaran et al. (1999) and formulated as follows:

$$y_{it} = \sum_{j=1}^p \lambda_{ij} y_{it-j} + \sum_{j=0}^q \delta'_{ij} x_{it-j} + \mu_i + \varepsilon_{it} \quad (2)$$

Where $i = 1, 2, \dots, N$ is country index, $t = 1, 2, \dots, T$ is a time index, j is the number of time lags, y_{it} = financial development, $x_{i,t}$ = foreign direct investment and other control variables, and μ_i denotes country specific fixed effects.

In order to consider the long run coefficients and the adjustment coefficient, equation (2) is re-parameterized as follow:

$$\left\{ \begin{array}{l} \Delta y_{it} = \phi_i y_{it-1} + \beta_i' x_{i,t} + \sum_{j=1}^{p-1} \lambda_{ij}^* \Delta y_{it-j} + \sum_{j=0}^{q-1} \delta_{ij}^* \Delta x_{it-j} + \mu_i + \varepsilon_{it} \\ \text{with } i = 1, 2, \dots, N \text{ and } t = 1, 2, \dots, T \\ \text{where } \phi_i = - \left(1 - \sum_{j=1}^p \lambda_{ij} \right), \\ \beta_i = \sum_{j=0}^q \delta_{ij}, \quad \lambda_{ij}^* = - \sum_{m=j+1}^p \lambda_{im} \quad j = 1, 2, \dots, p-1 \end{array} \right. \quad (3)$$

$$\delta_{ij}^* = - \sum_{m=j+1}^q \delta_{im} \quad j = 1, 2, \dots, q-1 \quad (4)$$

Where θ_i represents the long-run or equilibrium relationship between y_{it} and $x_{i,t}$. $\lambda_{i,j}^*$ and $\delta_{i,j}^*$ represent the short-run coefficients. The error correction coefficient is given by ϕ_i and measures the speed of adjustment of financial development toward its long-run equilibrium following a change in foreign direct investment and control variables. A long-run relationship between FDI and financial development exists when $\phi_i < 0$. Consequently, a significant and negative value of ϕ_i confirm the existence of co-integration between y_{it} and $x_{i,t}$.

We consider with Pesaran et al. (1999) that the ARDL (p, q, q, ..., q) model (2) is stable in that

the roots of $1 - \sum_{j=1}^p \lambda_{ij} Z^j = 0$ lie outside the unit circle. This assumption ensures that $\phi_i < 0$

and thus confirms the long run relationship between y_{it} and x_{it} , defined by :

$y_{it} = -(\beta_i' / \phi_i) x_{it} + \eta_{it}$ where η_{it} is a stationary process. The long-run coefficients on x_{it} is

given by $\theta_i = -\frac{\beta_i}{\phi_i}$ and are supposed to be the same across groups, namely $\theta_i = \theta$,

$i = 1, 2, \dots, N$.

The linear model to be estimated is obtained from Eqs (3) and (4) and is given as follows:

$$\begin{aligned} \Delta FinDev_{it} = & \beta_{i0} + \phi_i FinDev_{it-1} + \beta_i' x_{i,t} + \sum_{j=1}^{p-1} \lambda_{i,j}^* \Delta FinDev_{i,t-j} \\ & + \sum_{j=0}^{q-1} \delta_{i,j}^* \Delta x_{i,t-j} + \mu_i + \varepsilon_{it} \end{aligned} \quad (5)$$

If we include FDI and control variables, Eq (5) becomes:

$$\begin{aligned} \Delta FinDev_{it} = & \beta_{i0} + \phi_i FinDev_{it-1} + \beta_{i1} FDI_{it-1} + \beta_{i2} gdp_{it-1} + \beta_{i3} trade_{it-1} + \sum_{j=1}^{p-1} \lambda_{ij}^* \Delta FinDev_{it-j} \\ & + \sum_{j=0}^{q-1} \delta_{ij}^1 \Delta FDI_{i,t-j} + \sum_{j=0}^{q-1} \delta_{ij}^2 \Delta gdp_{i,t-j} + \sum_{j=0}^{q-1} \delta_{ij}^3 \Delta trade_{i,t-j} + \mu_i + \varepsilon_{it} \end{aligned} \quad (6)$$

With FinDev: financial development indicators, FDI: foreign direct investment, gdp: GDP per capita and trade stands for trade openness.

Three different dynamic panel methods can be used to estimate Eq (3), namely: the mean group (MG) estimator (Pesaran and smith, 1995), the pooled mean-group (PMG) estimator (Pesaran et al., 1999) and the dynamic fixed effect (DFE) estimator. However, with the dynamic fixed-effect estimator, the intercepts differ across groups, but all slope coefficients and error variances are homogeneous. Under slope homogeneity, estimated coefficients in DFE are affected by a potential serious heterogeneity bias, especially in a small country sample (Pesaran and smith, 1995). To deal with this problem, Pesaran et al. (1999) propose the Pooled Mean Group (PMG) estimator as an alternative to DFE. PMG restricts the long-run parameters to be identical over the cross section, but allows the intercepts, short-run coefficients and error variances to differ across groups on the cross section. With the validity of long-run homogeneity restrictions, MG estimates will be inefficient. Then, the maximum likelihood-based PMG approach proposed by Pesaran et al. (1999) will yield a more efficient estimator.

4. Empirical results

This section presents the results of panel unit root test and Pooled Mean Group estimations.

4.1. Unit root test

Before applying ARDL estimation, we must determine the order of integration. For this purpose, we used the Augmented Dickey-Fuller Fisher Chi-square (ADF Fisher), Phillips Perron Fisher (PP) and Im, Pesaran and Shin (IPS) unit root tests. Results are presented in Table 3. It is obvious from the ADF test results that, some of our variables are I(0) or I(1). Thus, the

unit root test results of individual effect show that CREDIT and FDI are I(0), while M2, GDP and OPENNESS are I(1).

Table 3: Panel Units test

	ADF-test		PP-test		IPS-test	
	Level	First difference	Level	First difference	Level	First difference
M2	78.2539	398.166***	105.533	867.227***	2.8754	-13.9873***
CREDIT	145.245***		87.3738	711.900***	-0.1794	-17.3948***
FDI	182.590***		283.039***		-5.6303***	
GDP	58.7731	328.789***	71.4556	558.316***	7.4029	-11.9400***
OPENNESS	97.6039	483.421***	133.832***		-1.2369	-17.4112***

M2: Ratio of money and quasi-money. CREDIT: domestic credit to private sector. FDI: foreign direct investment. GDP: gross domestic product per capita. OPENNESS: trade openness. . *** denotes a significance of 1%,

4.2.Pooled Mean Group results

Empirical results are presented in Tables 4, 5 and 6. Table 4 presents the results of the estimates of the long-run and short-run effects of foreign direct investment on financial development by using successively PMG, MG and DFE. Table 5 displays the robustness by including two control variables. In Table 6, we split the sample into lower-income, lower-middle-income and upper-middle-income countries according to 2017 World Bank Classification, and redid the estimation procedure by PMG, MG and DFE estimators for each income group. In all tables while Panel A gives the results of the estimations with M2 as a measure of the financial development, Panel B displays the estimated results when credit to private sector is used to measure financial development.

3.2.1 Baseline specification

We report the baseline results obtained when using foreign direct investment as the only independent variable in Table 4. As we said above, Table 4 displays the short-run and long-run effects of foreign direct investment on financial development. For this purpose, three alternative dynamic methods are used: PMG, MG and FDE. However, according to Hausman test and its consistency and efficiency over MG and DFE (Kim et al., 2010), our analysis is based on PMG. Globally, in the long-run, foreign direct investment positively affects financial development in Africa, regardless of the estimation method used to determine the cointegrating relationship. However, the coefficient of FDI is significant for PMG and DFE estimators and non-significant

for MG. When using the PMG and DFE methods to estimate the long -run relationship between FDI and financial development measured by M2 (Panel A), FDI variable has an estimated coefficients of 1.952 and 0.900 respectively, which are significant at 1% level. These results suggest that if FDI increases by 1%, financial development measured by M2 will increase by 1.952% and 0.900% respectively for PMG and DFE estimators. But when using MG approach, the coefficients associated with FDI is positive but non-significant. In Panel B where credit to the private sector is used as a measure of financial development, the results are similar to the previous ones. We find that the coefficient associated with the FDI variable is positive and significant at 1% for the estimates made with PMG and DFE methods. Thus an increase of FDI by 1% leads to an increase of credit to private sector by 0.850% and 0.263% respectively for PMG and DFE estimators. Moreover, when using the MG method, the coefficient associated with the FDI variable is insignificant. Overall, the results present in Table 4 show that foreign direct investment is an important determinant of financial development in Africa in the long-run.

According to Agbloyor et al. (2013) the entry and operation of foreign firms in a local economy requires that it relies on the host country's financial market. The liquidity that these foreign firms will make available to local banks will facilitate the development of these banks. On the other hand, given the size and the quality of service requirements of these multinational companies, domestic banks will have to upgrade to offer services comparable to those offered internationally. However, these changes require a certain amount of time to be effective. Therefore, the presence of foreign firms through FDI should favour the development of the long-run local financial market dominated by the banking sector in Africa. This result confirms the general views that by attracting more foreign firms, African countries can enhance their financial integration with the rest of the world and thus improved their financial development in the long -run. Our results are in agreement with the evidence from Otchere et al. (2016) and Soumare and Tchana (2015) who documented a positive relationship between foreign direct investment and financial development in the long - run.

Although the estimates confirm the existence of a long-run relationship between foreign direct investment and financial development, the short-run coefficients associated with foreign direct investment tell a different story. The coefficients associated with the FDI variable are negative and statistically significant, regardless of the estimation method used and the measure of financial development adopted. This result implies that the entry of multinationals firms has

negative effects for African economies in the short-run, even if this effect becomes positive in the long-run.

Table 4: The effect of foreign direct investment on financial development

Variable	PMG	MG	Hausman test	DFE
Panel A: financial development (measured by M2)				
Long-run coefficients				
FDI	1.952*** (0.0594)	0.893 (1.188)	0,69 [0.4058]	0.900*** (0.153)
ECT (Phi)	-0.229*** (0.0296)	-0.320*** (0.0336)		-0.173*** (0.0153)
Short-run coefficients				
Δ FDI	-0.302** (0.151)	-0.566*** (0.174)		-0.495*** (0.105)
Constant	-2.438*** (0.306)	-3.946*** (0.852)		-0.620*** (0.179)
Observations	1,204	1,204		1,204
Panel B: financial development (measured by Credit)				
Long-run coefficients				
FDI	0.850*** (0.0587)	-2.890 (3.634)	0,99 [0.3188]	0.263*** (0.0890)
ECT (Phi)	-0.205*** (0.0264)	-0.283*** (0.0222)		-0.206*** (0.0173)
Short-run coefficients				
Δ FDI	-0.481*** (0.115)	-0.520*** (0.104)		-0.734*** (0.0764)
Constant	-0.508*** (0.0752)	-1.161** (0.472)		0.327** (0.131)
Observations	1,208	1,208		1,208

Note: The dependent variable is financial development. The values in the parentheses are the standard error [p-value] of corresponding coefficients estimates. ***, **, and * denote a significance of 1%, 5%, and 10%, respectively. ECT is the error correction term.

The error correction coefficient is found to be negative and statistically significant, meaning that financial development adjusts to its long-run equilibrium according to changes in FDI. The adjustment speed from the short-run disequilibrium toward the long-run equilibrium is 22.9% and 20.5% respectively in Panel A and B (according to the PMG estimations), meaning that 22.9% and 20.5% of the disequilibrium from the long-run relationship between FDI and financial development (M2 and credit respectively) are corrected each year. Globally, when comparing the long-run and short-run estimates, a first broad conclusion is that the relationship

between FDI and financial development in Africa depends on the duration of FDI (short-term vs long-term).

3.2.2 Accounting for other factors that may influence financial development

We check whether the baseline specification results in Table 4 hold after controlling for the potential determinants of financial development. For this purpose, we introduce two control variables, namely GDP per capita and trade openness. Table 5 reports these results, which corroborate the findings shown in Table 4. The results in Table 5 show that financial development is associated with an increase in foreign direct investment in the long-run regardless the estimated methods used and financial development indicators adopted. Results from PMG, MG and FDE in Panel A show that the coefficients associated with FDI are positive and statistically significant at 1% level. For example, in Panel A of Table 5 the coefficients of FDI are 1.601, 2.198 and 0.910 respectively for PMG, MG and DFE estimators, meaning that a 1% increase in FDI leads to an increase in M2 by 1.601%, 2.198% and 0.910% respectively. The same results are observed in panel B, were a 1% increase in FDI is associated with an increase of credit to private sector by 0.172%, 1.287% and 0.348% for PMG, MG and DFE estimations respectively. These results confirm that FDI is a key factor for the development of the financial sector in African countries in the long-run. Moreover, the short-run coefficients of FDI confirm the previous findings in Table 4. FDI is found to have a negative and significant effect on the development of the financial sector in Africa.

The control variables have the expected long-run positive signs. GDP per capita has a positive and significant effect on financial development in Panel B but not in Panel A. This result is broadly consistent with the work of Ibrahim and Sare (2018), which shows that GDP is positively correlated with the financial development. Regarding trade openness, its effect on financial development is positive and statistically significant at 1% in Panels A and B. This result confirms the view that the higher trade openness generates new demand for external finance as firms require credit to surmount cash constraints leading to higher financial sector development. This result is consistent with that of Svaleryd and Vlachos (2002). In the short term, GDP per capita and trade openness have no effect on financial development.

Finally, the error-correction terms remains negative and statistically significant at 1% regardless of the estimation method used. The adjustment speed from the short-run disequilibrium toward the long-run equilibrium is 24.5% and 23.6% respectively in Panel A

and B (according to the PMG estimations), meaning that 24.5% and 23.6% of the disequilibrium from the long-run relationship between FDI and financial development are corrected each year.

Table 5: The effect of FDI on financial development with control variables

Variable	PMG	MG	Hausman test	DFE
Panel A: financial development (measured by M2)				
Long-run coefficients				
FDI	1.601*** (0.0828)	2.198*** (0.591)	1.99 [0.5748]	0.910*** (0.140)
GDP	0.480 (0.303)	3.739 (2.917)		2.291*** (0.722)
OPENNESS	0.310*** (0.0448)	-0.149 (0.325)		0.468*** (0.166)
ECT (Phi)	-0.245*** (0.0326)	-0.313*** (0.0679)		-0.187*** (0.0152)
Short-run coefficients				
ΔFDI	-0.309* (0.169)	-0.465 (0.300)		-0.280** (0.117)
ΔGDP	0.367* (0.221)	-0.315 (0.764)		0.00353 (0.116)
ΔOPENNESS	-0.0762 (0.0669)	-0.0836 (0.147)		0.0308 (0.0455)
Constant	-2.878*** (0.365)	-13.29** (5.649)		-2.978*** (0.598)
Observations	1,143	1,143		1,143
Panel B: financial development (measured by Credit)				
Long-run coefficients				
FDI	0.172*** (0.0475)	1.287** (0.528)	0.99 [0.3188]	0.348*** (0.0833)
GDP	1.351*** (0.252)	1.479 (2.431)		1.149*** (0.444)
OPENNESS	0.559*** (0.0466)	0.321 (0.388)		0.410*** (0.104)
ECT (Phi)	-0.236*** (0.0374)	-0.401*** (0.0619)		-0.201*** (0.0169)
Short-run coefficients				
ΔFDI	-0.307** (0.139)	-0.710*** (0.218)		-0.529*** (0.0789)
GDP	0.0886 (0.239)	0.262 (0.597)		0.0545 (0.0782)
OPENNESS	-0.0896 (0.0680)	-0.165 (0.121)		0.0164 (0.0306)
Constant	-1.478*** (0.233)	-5.153 (3.213)		-1.186*** (0.401)
Observations	1,147	1,147		1,147

Note : The dependent variable is financial development. The values in the parentheses are the standard error [p-value] of corresponding coefficients estimates. ***, **, and * denote a significance of 1%, 5%, and 10%, respectively. ECT is the error correction term.

Table 6 : FDI and financial development by income level

	Low-income countries			Lower-middle-income			Upper-middle-income		
	PMG	MG	DFE	PMG	MG	DFE	PMG	MG	DFE
Panel A : financial development (measured by M2)									
Long-run coefficients									
FDI	2.001*** (0.0669)	0.165 (2.283)	1.619*** (0.296)	1.458*** (0.177)	1.835** (0.844)	1.095*** (0.273)	0.983*** (0.0841)	1.370*** (0.507)	0.633** (0.263)
ECT (Phi)	-0.273*** (0.0493)	-0.308*** (0.0557)	-0.213*** (0.0248)	-0.207*** (0.0403)	-0.289*** (0.0432)	-0.154*** (0.0262)	-0.313*** (0.0767)	-0.439*** (0.0641)	-0.157*** (0.0330)
Hausman test	0.60 [0,4404]			0.16 [0.6871]			0.41 [0.5216]		
Short-run coefficients									
ΔFDI	-0.463** (0.233)	-0.829*** (0.245)	-0.778*** (0.156)	0.0763 (0.271)	-0.167 (0.325)	0.124 (0.272)	0.195 (0.352)	-0.442 (0.399)	-0.248 (0.199)
Constant	-2.725*** (0.502)	-4.655*** (1.295)	-1.618*** (0.390)	-1.607*** (0.306)	-2.851** (1.409)	-0.798** (0.336)	-1.490*** (0.279)	-4.163** (2.083)	-0.348 (0.318)
Observations	607	607	607	370	370	370	201	201	201
Panel B : financial development (measured by Credit)									
Long-run coefficients									
FDI	0.889*** (0.104)	-6.451 (7.113)	0.602*** (0.197)	0.710*** (0.0536)	1.039** (0.503)	0.558*** (0.147)	1.291*** (0.117)	0.588 (0.406)	0.113 (0.125)
ECT (Phi)	-0.199*** (0.0326)	-0.267*** (0.0309)	-0.234*** (0.0262)	-0.254*** (0.0618)	-0.295*** (0.0445)	-0.182*** (0.0303)	-0.230*** (0.0748)	-0.329*** (0.0483)	-0.163*** (0.0361)
Hausman test	0.96 [0.3260]			0.36 [0.5464]			2.42 [0.1202]		
Short-run coefficients									
ΔFDI	-0.703*** (0.137)	-0.698*** (0.134)	-0.972*** (0.119)	-0.214 (0.235)	-0.328* (0.194)	-0.0427 (0.173)	-0.255 (0.283)	-0.268 (0.289)	-0.485*** (0.118)
Constant	-0.444*** (0.0849)	-1.011* (0.584)	-0.121 (0.284)	-0.454*** (0.117)	-1.600 (1.094)	-0.113 (0.199)	-1.578*** (0.520)	-1.160 (1.013)	0.453** (0.206)
Observations	609	609	609	370	370	370	203	203	203

Note: The dependent variable is financial development. The values in the parentheses are the standard error [p-value] of corresponding coefficients estimates. ***, **, and * denote a significance of 1%, 5%, and 10%, respectively. ECT is the error correction term.

3.2.3 Accounting for the level of economic development

As mentioned above, the effect of FDI on financial development depends on whether their movements are temporary (short-run) or permanent (long-run). We now investigate if the relationship between FDI and financial development depends on the level of economic development. For this purpose, we divided the sample into lower-income, lower-middle-income and upper-middle-income sub-samples according to 2017 World Bank Classification. The estimated coefficients from PMG, MG and DFE are displayed in Table 6. Due to space constraint, the estimates of control variables are omitted, but available if needed. One more again, results in Table 6 confirm the previous findings in the long-run, but in short-run, results are different. First, in Panels A and B the coefficients of the error correction terms are negative and statistically significant at 1%. This result implies that there is long-run relationship between FDI and financial development in each income group. Second, regarding the long-run relationship between FDI and financial development indicators, the coefficients of FDI is positive and significant in lower-income, lower-middle-income and upper-middle-income countries. This result confirms the previous finding that foreign direct investment has a positive and significant effect of financial development, regardless the method used and financial development indicators adopted.

Third, when looking the short-run relationship between FDI and financial development, the coefficients of FDI vary with the level of economic development. The effect of FDI is negative and statistically significant in Low-income countries, but non-significant in Lower-middle-income and upper-middle-income countries when PMG estimator is used. This result implies that in the short the entry of new foreign firms has a robust negative effect on financial development in countries with less developed financial sector.

5. Conclusion

While the development benefit of foreign direct investment inflows has been largely recognized, the studies analysing the effect of foreign direct investment on financial development is limited. Better understanding the potential effect of FDI on financial development is important given the evidence on the growth-enhancing and poverty-reducing effects of financial development. To fill the gap, this paper assesses the long run and short-run effects of FDI on financial development in 49 African countries during the period 1990-2016. We used two financial development indicators namely: domestic credit to private sector as a percentage of GDP (credit) and liabilities of financial system measured by the ratio of money

and quasi-money (M2). To check if the results are sensitive to model specification, we add two control variables, namely: GDP per capita and Trade openness. Our studies departs from other studies by using the Pooled Mean Group (PMG) estimator in a dynamic framework with a short-run and long-run analysis and a differentiation of country by income level.

On this basis the following findings are established. First, while there is a positive and significant long-run relationship between foreign direct investment and financial development in Africa, in the short-run the effect of foreign direct investment on financial development is negative. These results are robust to the inclusion of control variables. Second, to verify if the relationship between FDI and financial development is possibly country-specific, we classify our sample in three sub-samples depending upon the levels of income. Our results confirm the strong positive effect FDI on financial development in the long-run in all income level sub-samples. This result means that FDI improves long-run financial development in Africa regardless of the receiving country's income level. However, in the short-run the effect of foreign direct investment is negative and significant in lower-income countries and non-significant in lower-middle-income and upper-middle-income countries.

Therefore, a policy implication resulting from the empirical analysis is that, African countries should implement measures to enhance their financial integration with the rest of the world by attracting more foreign firms (MNC) and thus improving their financial development. It is generally agreed that MNCs are relatively more efficient than domestic firms in terms of technological level, capital, international market access, skilled managerial and engineering labours (Choong and Lim, 2009). As a consequence, the presence of MNC firms in African countries could have a negative effect in short-run on domestic firm, but in the long-run this effect will become positive and will boost financial sector.

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Appendix

Table 7: List of countries (49)

Algeria	Cote d'Ivoire	Madagascar	Sierra Leone
Angola	Egypt, Arab Rep.	Malawi	South Africa
Benin	Equatorial Guinea	Mali	Sudan
Botswana	Eritrea	Mauritania	Swaziland
Burkina Faso	Ethiopia	Mauritius	Tanzania
Burundi	Gabon	Morocco	Togo
Cabo Verde	Gambia, The	Mozambique	Tunisia
Cameroon	Ghana	Namibia	Uganda
Central African Republic	Guinea	Niger	Zambia
Chad	Guinea-Bissau	Nigeria	Zimbabwe
Comoros	Kenya	Rwanda	
Congo, Dem. Rep.	Lesotho	Senegal	
Congo, Rep.	Liberia	Seychelles	

Table 8: Variables definition

Variables	Variable definitions (measurement)	Sources
Credit	Domestic credit to private sector (% of GDP)	World Bank (WDI)
M2	Broad money (% of GDP)	World Bank (WDI)
FDI	Foreign direct investment, net inflows (% of GDP)	World Bank (WDI)
OPENNESS	Total amount of exports and imports of goods and services (% of GDP)	World Bank (WDI)
GDP	GDP per capita growth (annual %)	World Bank (WDI)