

On the investigation of the nexus between Financial Development and FDI: evidence by income level

L'investigation du lien entre le Développement Financier et l'IDE : évidence par niveau de revenu

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Date de soumission : 07/05/2021

Date d'acceptation : 16/07/ 2021

Pour citer cet article :

CHERKAOUI, K. & EL FAKIRI, A (2021) «On the investigation of the nexus between Financial Development and FDI : evidence by income level », Revue Française d'Economie et de Gestion «Volume 2: Numéro 7» pp : 69- 89.

Digital Object Identifier (DOI) : <https://doi.org/10.5281/zenodo.5111092>

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Abstract

The current study scrutinizes the relationship between financial development (FD) and foreign direct investment (FDI) over a period of 17 years and on a sample of 135 countries, including 44 high income, 34 upper middle income, 35 lower-middle income and 22 low-income countries. To represent the financial development, we employ a novel proxy which takes the financial system in its multidimensionality representing the depth, efficiency, access to financial markets and institutions. The estimation results for high income and upper middle-income countries indicate that FD is a key determinant for FDI entries. Nevertheless, results for low income and lower-middle income countries, are negative and ambiguous. This could be explained by the financial fragility of these countries as the majority of them, especially those which belong to the low-income countries panel, are underdeveloped. Thus, they fail to effectively perform their financial functions and allocate financial resources. Therefore, policymakers and governments should be more concerned about the financial markets and institutions of their economies in order to make them attractive at the international level.

Keywords: Foreign Direct Investment (FDI); Financial Development (FD); developing countries; developed countries; Dynamic panel GMM.

Résumé

Ce présent article examine la relation entre le développement financier (DF) et l'investissement direct étranger (IDE) sur une période de 17 ans et sur un panel de 135 pays, dont 44 pays à revenu élevé, 34 à revenu intermédiaire supérieur, 35 à faible revenu et 22 à revenu intermédiaire inférieur. Pour représenter le développement financier, nous utilisons un proxy qui prend le système financier dans sa multidimensionnalité représentant la profondeur, l'efficacité, l'accès aux marchés financiers et aux institutions. Les résultats de l'estimation pour les pays à revenu élevé et à revenu intermédiaire supérieur indiquent que le DF est un déterminant clé pour les entrées d'IDE. Néanmoins, les résultats pour les pays à faible revenu et à revenu intermédiaire inférieur sont négatifs et ambigus. Ceci pourrait s'expliquer par la fragilité financière de ces pays car la majorité d'entre eux, notamment ceux qui appartiennent au panel des pays à faible revenu, sont sous-développés. Ainsi, ils ne parviennent pas à assurer efficacement leurs fonctions financières et à allouer des ressources financières. Par conséquent, les décideurs devraient se préoccuper davantage des marchés financiers et des institutions de leurs économies afin de les rendre attrayants au niveau international.

Mots clés : Investissement Direct Étranger (IDE); Développement Financier (DF); pays en développement; pays développés; GMM en panel dynamique.

Introduction

Foreign Direct Investment (FDI) is always seen as a major benefit by host economies. Besides portfolio investments, FDI was perceived as one of the main drivers to economic globalization as it stimulates productivity, creates jobs, bring in new technologies and know-how practices. As a result, many emerging countries have undertaken major reforms such as minimizing entry barriers, offer tax incentives by providing exemptions and open up to new investment sectors in order to attract an important number of foreign direct investors.

A vast majority of previous research on FDI has underlined the most significant determinants and listed them as follow: institutional quality, trade openness, market size, infrastructure, human capital, political risk, financial system and financial incentives (Alfaro et al., 2010; W. Ali & Mna, 2019; Ben Naceur et al., 2007; Mustapha & Khariss, 2021; Oladipo, 2010; Tun et al., 2012). An important number of studies on the determinants of FDI focused on the investigation of the impact of FDI on economic growth. The contributions were contradictory, as some found a weak support for a positive effect of FDI on economic growth indicating that a country's ability to take benefit from FDI inflows is conditioned by the country's specificities. These latter are related to the development of financial markets, financial institutions, geography, political stability and human capital competencies. In the investigation of FDI-economic growth association, (Alfaro et al., 2004) found that in order for a country to fully take advantage of FDI spillovers and foster its economic growth, it should have a sufficiently well-developed financial system.

While there is extensive research on the effects of FDI on economic growth, surprisingly, only few studies broadly examine the direct link between FDI and Financial Development (FD). Therefore, the main idea of this paper is to analyse the FD-FDI linkage in a more direct way. One has to note that the literature on this linkage was indirectly investigated through two main aspects: the relationship between FDI and economic growth, and the role played by the financial development in the linkage. Taking into account the different elements exposed, the research problem of our study centres on the empirical question: How does financial development trigger FDI by country's income level?

Our research contributes to the body of financial literature in different ways. Contrary to various research papers measuring financial development in a unidimensional way, such as using the ratio of private credit to the GDP or the ratio of private credit to GDP and the ratio

of market capitalization, we measure FD by an index developed by the International Monetary Fund (IMF). This index takes into account the complexity and multidimensionality of the financial system through the measurement of depth, access and the efficiency of financial markets and institutions. Also, the research is conducted on a sample of 135 countries, including 44 high income, 34 upper middle income, 35 lower-middle income and 22 low-income countries. This brings in the character of diversity of our sample as host countries, not only, belong to different regions of the world but they differ in their income revenue. This will allow us to understand the impact of FD on FDI in countries with different income levels.

The paper is structured as follow: section 1 of this paper gives a theoretical and an empirical review of the FDI-FD relationship. Section 2 covers the research methodology. Section 3 discusses the estimation model and the main empirical results.

1. Literature Review

One of the main theories which provided a framework underlying the relationship between FDI and financial development is the endogenous growth model called AK model, which was developed by (Pagano, 1993). The basic idea behind the model is to highlight how the financial sector development led to higher economic growth in a relatively closed economy.

The aggregate production function in a closed economy is represented by the following AK model:

$$Y_t = AK_t$$

Where Y represents the output, which is a linear function of the aggregate capital stock (AK) in which K_t is assumed to be composed of human and physical capital. The model is made on some assumptions where only one product being produced is assumed, no population growth, economic growth is solely influenced by financial intermediation and where banks are assumed to be the only financial intermediary to transform savings into investment (Pagano, 1993).

Through the model, (Pagano, 1993) demonstrates the two channels via which financial sectors can impact economic growth, assuming that financial development occurs as a result of increased financial intermediation. The first channel involves the efficiency of banks in assuring their intermediation role between households and investments to which savings are allocated, leading therefore to an increase in savings and therefore an increase in economic

growth. The second channel involves the projects to which savings are allocated. Thus, as the financial intermediation increases, banks gain experiences in terms of projects' feasibility in a way that they direct savings to projects with high capital marginal productivity and less risks.

The model was expanded 7 years later by (Bailliu, 2000) in order to include international capital flows. The modified model is based on the assumption that international capitals flow solely via the host country's domestic banking sector whilst equity and bond markets are not taken into consideration. The new modified endogenous growth model explains the impact of financial sector development on international capital flows through two main channels. Firstly, the efficiency of banks in their financial intermediation ensure that capital inflows are directed to investment activities. Secondly, (Bailliu, 2000) found that international capital flows trigger investments in host countries only if the capital invested is not crowded out. Further, even though two countries receive the same amount of foreign capital inflows, the model assumes that the economy for which the financial system is more developed, have a higher economic growth because of its ability to efficiently direct those inflows into good investments. *Ceteris paribus*, (Bailliu, 2000) demonstrates that foreign capital inflows foster economic growth for a panel of 40 developing economies for which the banking sector has reached a certain level of development.

Empirical studies investigating the linkage between FDI and FD are quite ambiguous and inconclusive. There are mainly two strands of findings, the first strand demonstrates a positive relationship between FD and FDI, whilst the second strand gives evidence of a contradictory impact on FDI beyond a certain threshold level of FD. Some economists like (Alfaro et al., 2010) proposed a theoretical model by using some calibration exercises which demonstrated how financial development triggers FDI inflows via backward linkages. Their model gives evidence of higher FDI in economies for which financial systems are deeper and well developed. Moreover, authors observed that higher intermediation costs were associated with lower levels of development. The financial development was represented by interest rate spreads which measures the cost of intermediation. (Islam et al., 2020) studied the impact of FD on FDI on a sample of 79 Belt and Road Initiative (BRI) partner countries. In order to overcome the limitations of POLS and FE, they used a two-step system GMM for which estimates gave evidence of a positive and significant role of FD in triggering FDI.

The main common point of the second strand of research is the use of threshold regression models. The majority of studies proved that the association between FD and FDI is positive after a threshold level of financial development is reached. However, for higher levels of financial development, the impact becomes negative. The same finding was proved by (Nabamita Dutta & Sanjukta Roy, 2011) who analysed the association in the case of a panel of 97 countries. Their study found evidence of a negative association between FDI and FD beyond a certain threshold level. Using a threshold regression model on a panel of 91 countries over the period 1975 to 2005, (Azman-Saini et al., 2010) base their analysis on the banking sector indicators such as credit provided by financial institutions to the private sector to GDP ratio, credit by deposit money banks to the private sector to GDP ratio, ratio of commercial bank assets to commercial banks and central bank assets and liquid liabilities (ratio of liquid liabilities of the financial system to GDP) of the banking sector. Their analysis' estimates give evidence of a statistically significant and positive association only when, credit to the private sector as a ration of GDP, credit by deposit money banks to the private sector to GDP ratio, ratio of commercial bank assets to commercial banks and central bank assets, exceed a threshold of 49,7%, 43.1%, 43.1% and 68.8%, respectively.

2. Data and Methodology

2.1. Variables and data source

We use annual data for four panels classified by the World Bank database: 44 high income, 34 upper middle income, 34 lower-middle income and 22 low-income countries. We have four balanced panel datasets for which the number of observations differ across panels. Accordingly, high income countries have 792 observations, upper middle income with 612 observations, and 630 and 396 observations for lower-middle income and low-income countries, respectively. An exhaustive list of sample countries is provided in **Table 7**.

The dependent variable examined through our study is foreign direct investments (LnFDI) in stocks rather than net inflows. One needs to keep in mind that financial systems do not develop overnight, therefore the use of FDI in net inflows would yield to misleading conclusions.

The other important variable in this study is the financial development (FD). While the vast majority of studies use banking and stock market indices, described as obsolete indicators by (Svirydzenka, 2016), this study employs a novel proxy to represent financial development, as

developed by the International Monetary Fund (IMF) which takes a value between, 0 and 1. The index is a combination of 20 indicators subdivided into two sub-indices representing financial markets (FMs) and financial institutions (FIs). The use of this new proxy gives our study an original aspect as it is analyzing the financial system in its globality taking into account the depth, efficiency, access to financial markets and institutions (Sahay et al., 2015; Svirydzienka, 2016).

The study, moreover, uses a set of control variables which were found to potentially influence FDI inflows. Therefore, GDP per capita (LnGDPp) is included to measure the country's market size. The greater it is the more attractive it is for foreign direct investors. Moreover, we include trade openness (TR) which is represented by the ratio of exports and imports to the GDP as open economies tend to be attractive to foreign investors as they represent opportunities in terms of doing business. Another variable is included to the equation, representing the macroeconomic stability of our sample. It is represented by inflation (INF) which in turn is represented by the annual percentage change in consumer price index (CPI). We use mobile subscriptions per 100 people (LnM) as a proxy of infrastructure, as some previous research papers' findings suggest the positive and significant impact of infrastructure on FDI. Finally, we include to the equation Gross Fixed Capital Formation (DI) to represent the domestic investment in our sample countries. Accordingly, variables' description and sources are described in **Table 8**.

2.2. Econometric estimation

Following literature on FDI, we investigate the relationship between FDI-FD through the following functional form:

$$FDI_{it} = \int (\ln FDI_{it}, TR_{it}, FD_{it}, GDPp_{it}, M_{it}, DI_{it}, INF_{it})$$

Where:

FDI_{it}= Stock of inward foreign direct investment in country i and at time t.

FD_{it}= Financial development in country i and at time t.

GDPp_{it}= Gross domestic product per capita in country i and at time t.

DI_{it}= Domestic investment in country i and at time t.

INF_{it}= Inflation represented by consumer prices index in country i and at time t.

DI_{it} = Domestic investment in country i and at time t .

TR_{it} = Trade openness in country i and at time t .

M_{it} = mobile subscriptions per 100 people as a proxy of infrastructure in country i and at time t .

The variables are transformed into a natural logarithm, except those in percentage and ratio form. In order to have a more parsimonious model, we use a small set of control variables.

The investigation of the relationship between FDI and FD is conducted through two main models; static models through fixed effect model (FEM) and random effect model (REM) and a dynamic model through the two-step system GMM model (Blundell & Bond, 1998). In order to specify the appropriate model for our study, the Hausman test is conducted which implies the use of a fixed effect model. However, the Durbin-Wu-Hausman test demonstrates that FEM model suffers from endogeneity in variables and fails to provide consistent and unbiased estimates.

Therefore, we address the ‘endogeneity’ problem by internally transforming the data using system GMM. The dynamic representation is as follows:

$$\begin{aligned} LnFDI_{it} = & \beta_1 LnFDI_{i,t-1} + \beta_2 FD_{it} + \beta_3 LnGDPP_{it} + \beta_4 INF_{it} + \beta_5 TR_t + \beta_6 DI_{it} \\ & + \beta_7 LnM_{it} + u_{it} \end{aligned}$$

GMM model is a combination of difference and level equations dynamic equations which incorporate lagged values of the dependent variable and instruments for the level equation. We use for our model lagged values of independent variables as instruments for the difference equation and independent variables with lagged difference as instruments for the level equation.

The appropriateness of GMM is tested through (1) the Sargan/Hansen test and (2) Arellano Bond (AR) test for first order and second order correlation. The Sargan/Hansen test determines whether the econometric model is valid and whether the instruments are correctly specified, whereas the AR is conducted with a null hypothesis that the errors terms of two different time periods are uncorrelated. AR (1) should be statistically significant while AR (2) should be significant. Accordingly, we report FEM, REM and GMM estimates in **Table 5** and **Table 6**.

3. Empirical Results and Analysis

3.1. Summary statistics and correlation matrices:

The section presents the summary of descriptive statistics of main variables of our study. Table 1 and Table 2 present summary statistics of four countries' categories in terms of observations, mean, standard deviation, the minimum and the maximum values for each variable. The number of observations differ for each classification over the period 2000-2017, with the highest number among high income and upper middle-income countries.

Table 1. Descriptive statistics of high income and upper-middle income countries

High income countries					
Variable	Obs	Mean	Std. Dev.	Min	Max
LnFDI	792	4.911	.824	2.488	6.895
LnGDPp	792	4.426	.299	3.518	5.075
LnM	792	1.984	.202	.823	2.401
INF	792	2.589	3.198	-30.243	47.776
TR	792	112.564	79.367	22.154	442.62
FD	792	.601	.201	.14	1
DI	792	22.493	4.655	10.463	48.869
Upper middle-income countries					
Variable	Obs	Mean	Std. Dev.	Min	Max
LnFDI	612	4.063	.904	1.277	5.822
LnGDPp	612	3.704	.267	2.98	4.361
LnM	612	1.71	.478	-.736	2.261
INF	612	6.628	10.551	-1.584	168.62
TR	612	84.481	37.603	21.852	268.243
FD	612	.304	.154	.063	.753
DI	612	23.553	6.81	8.661	53.613

Source: Authors' elaboration on STATA

Table 2. Descriptive statistics of lower-middle income and low-income countries

Lower-middle income countries					
Variable	Obs	Mean	Std. Dev.	Min	Max
LnFDI	630	3.65	.807	.645	5.577
LnGDPp	630	.45	.44	-1.887	1.231
LnM	630	1.404	.755	-1.61	2.181
INF	630	6.923	6.81	-18.109	57.075
TR	630	81.123	35.244	.167	211.149
FD	630	.192	.101	.033	.59
DI	630	24.838	9.374	6.664	68.023
Low-income countries					
Variable	Obs	Mean	Std. Dev.	Min	Max
LnFDI	396	2.926	.768	.122	4.58
LnGDPp	396	1.954	4.326	-31.333	28.676
LnM	396	1.03	.88	-1.729	2.142

INF	396	10.201	33.521	-8.975	513.907
TR	396	60.782	33.615	20.964	311.354
FD	396	.1	.031	.028	.201
DI	396	20.766	8.308	4.82	57.18

Source: Authors' elaboration on STATA

In terms of correlation, the only variable which is positively correlated with FDI among all sample categories is the log of mobile subscriptions. While GDP is positively correlated with FDI in high income, upper middle income and low-income countries, it is negatively correlated with FDI in lower-middle income countries. As predicted, inflation is negatively and weakly correlated with FDI in high income countries, negatively and weakly correlated with FDI in upper middle income and low income and is positively and weakly correlated with FDI in lower-middle income countries.

Table 3. Correlation matrix of high income and upper-middle income countries

High income countries							
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) LnFDI	1.000						
(2) LnGDPp	0.520	1.000					
(3) LnM	0.379	0.470	1.000				
(4) INF	-0.270	-0.220	-0.107	1.000			
(5) TR	0.115	0.136	0.249	-0.065	1.000		
(6) FD	0.746	0.691	0.206	-0.269	0.004	1.000	
(7) DI	0.025	0.049	0.033	0.124	0.050	0.060	1.000
Upper middle-income countries							
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) LnFDI	1.000						
(2) LnGDPp	0.574	1.000					
(3) LnM	0.476	0.712	1.000				
(4) INF	-0.017	-0.183	-0.243	1.000			
(5) TR	-0.312	-0.095	-0.079	-0.020	1.000		
(6) FD	0.646	0.413	0.364	-0.135	-0.072	1.000	
(7) DI	0.046	0.116	0.110	-0.022	0.153	0.011	1.000

Source: Authors' elaboration on STATA

Interestingly, trade openness is positively and weakly correlated with FDI in high income and low-income countries, but negatively and weakly correlated in upper-middle income countries and lower-middle income countries. Financial development is strongly correlated with FDI in both developed countries, nearly not correlated with FDI in low-income countries and

negatively and weakly correlated in lower-middle income countries. The correlation matrices between variables for all countries categories is presented in **Table 3** and **Table 4**.

Table 4. Correlation matrix of lower-middle income and low-income countries

Lower-middle income countries							
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) LnFDI	1.000						
(2) LnGDPp	-0.111	1.000					
(3) LnM	0.418	-0.137	1.000				
(4) INF	0.115	0.092	-0.144	1.000			
(5) TR	-0.311	0.059	0.251	-0.161	1.000		
(6) FD	0.158	-0.110	0.177	0.051	0.034	1.000	
(7) DI	-0.343	0.175	0.036	-0.032	0.208	-0.092	1.000

Low-income countries							
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) LnFDI	1.000						
(2) LnGDPp	0.125	1.000					
(3) LnM	0.396	-0.035	1.000				
(4) INF	-0.029	-0.020	-0.231	1.000			
(5) TR	0.269	0.109	0.085	-0.060	1.000		
(6) FD	-0.005	-0.029	0.150	-0.001	0.094	1.000	
(7) DI	0.524	0.185	0.279	-0.117	0.115	-0.240	1.000

Source: Authors' elaboration on STATA

In order to estimate the relationship under consideration, we opt for system GMM which overcomes the endogeneity problem of explanatory variables found under FE model estimates. The use of the model requires strictly exogenous right hand side variables. Exogeneity implies explanatory variables to be uncorrelated with the error term. Therefore, to test whether residuals are correlated with the explanatory variable, we run a regression on each independent variable with all other independent variables and control variables to predict residuals. A significant test for a given explanatory variable indicated that it is endogenous as it is correlated with its error term. Accordingly, endogeneity estimates for all four categories of our sample are given in **Table 9**.

3.2. Baseline Results

3.2.1. The nexus between FD and FDI in high income and upper-middle income countries:

In **Table 5**, we can find estimates of FE model, RE model and GMM model. Taking into account the Hausman test significance in favour of FE models, we are going to compare estimates of both FEM and GMM. Accordingly, and compared to fixed effect model estimates, variables which were statistically significant are no longer significant in both panels. For instance, GDP per capita, inflation and trade openness are no longer significant in high income countries, while for upper middle-income countries GDP per capita, mobile subscriptions, trade openness and domestic investment are no longer significant.

Table 5. Estimations of high income and upper-middle income countries

	High income countries			Upper middle-income countries		
	FEM	REM	GMM	FEM	REM	GMM
FDI (-1)			0.795(0.000) ¹			0.674(0.000) ¹
LnGDPp	1.09 (0.000) ¹	1.049(0.000) ¹	-0.803(0.393)	0.816(0.000) ¹	0.791(0.000) ¹	0.183(0.400)
LnM	0.645(0.000) ¹	0.633(0.000) ¹	0.263(0.000) ¹	0.238(0.000) ¹	0.222(0.000) ¹	0.084(0.205)
INF	-0.006 (0.014) ²	-0.007(0.011) ²	0.002(0.281)	0.000(0.611)	0.000(0.524)	0.004(0.101)
TR	0.002(0.000) ¹	0.001(0.000) ¹	0.0004(0.170)	0.000(0.027) ²	0.000(0.110)	0.000(0.878)
FD	-0.347 (0.078) ³	0.234(0.197)	0.607(0.000) ¹	1.277(0.000) ¹	1.425(0.000) ¹	1.032(0.081) ³
DI	0.004(0.156)	1.002 (0.409)	0.001(0.452)	-0.006(0.000) ¹	-0.005(0.000) ¹	0.006(0.221)
FC08			-0.051(0.102)			-0.077(0.064) ³
FC09			-0.025(0.061) ³			-0.011(0.527)
Constant	-1.287 (0.000) ¹	-1.324(0.000) ¹	0.424(0.138)	0.329(0.076) ³	0.391(0.060) ³	0.074(0.928)
AR (1)			0.004			0.011
AR (2)			0.153			0.179
Hansen test			0.206			0.153

Note: TR, DI and INF are in percentage of GDP. p values are in parentheses ¹ $p < 0.01$, ² $p < 0.05$ and ³ $p < 0.1$

Source: Authors' calculation

The estimates for control variables do not all have the expected signs. Despite their insignificance, trade openness and domestic investment are both statistically positive for both panels. This could be related to foreign investors' attraction criteria in developed countries,

which is not essentially based on the degree of trade openness and local investments. Foreign direct investments might be essentially attracted to other determinants, such as infrastructure of these countries as a one percent change in mobile increases FDI by 26,3% in high income countries. Surprisingly, inflation has a positive impact on FDI in both categories of countries. This finding aligns with the findings of some previous research studies such as (Busse & Hefeker, 2007; Kinoshita & Campos, 2003).

The effect of finance on FDI is such that if FD increases by 1% there will be an increase of 60,7% of FDI stock in high income countries, and an increase of 103% in upper-middle income countries. The finance variable is statistically significant at the 1% significance level in high income countries, and at 10% for upper middle-income countries. Our estimates go in line with previous research outlining the importance of FD in attracting FDI especially in developed countries.

3.2.2. The nexus between FD and FDI in lower-middle income and low-income countries:

In both panels, the statistically significant positive impact of lagged values of stocks of FDI suggests that FDI stocks are influenced from previous year's FDI inflows. The findings also suggest an insignificant negative impact of trade openness on FDI in lower-middle income countries. While trade openness is found to be the most important determinants of FDI, in previous literature it is however surprisingly inconclusive, suggesting that foreign investors do not take trade openness as an important criterion in this panel of countries. Similarly, although it is statistically insignificant, GDP per capita for low-income countries is negative. The conclusion to be made from both inconclusive results is that foreign direct investors are not market seekers but might be resource seekers in both panels. Moreover, the sign of domestic investment, represented by gross fixed capital formation, is statistically significant and positive in lower-middle income countries. This suggests that domestic investment in lower-middle income countries is an FDI complement which make panel countries attractive to foreign direct investors.

Table 6. Estimations of lower-middle income and low-income countries

	Lower-middle income countries			Low-income countries		
	FEM	REM	GMM	FEM	REM	GMM
FDI (-1)			0.841(0.000) ¹			0.939(0.000) ¹
LnGDPp	-0.025 (0.193)	-0.024(0.227)	0.000(0.962)	-0.001(0.885)	-0.000(0.870)	-0.001(0.532)
LnM	0.370(0.000) ¹	0.376(0.000) ¹	0.087(0.055) ³	0.346(0.000) ¹	0.34620.000) ¹	0.009(0.732)
INF	-0.000 (0.472)	-0.000(0.659)	0.003(0.074) ³	-0.000(0.539)	-0.000(0.633)	0.000(0.856)
TR	-0.000(0.207)	-0.001(0.043) ²	-0.002(0.180)	0.000(0.758)	0.000(0.459)	0.000(0.678)
FD	1.936 (0.000) ¹	1.821(0.000) ¹	-0.213(0.534)	2.708(0.013) ²	2.260(0.033) ²	-0.400(0.591)
DI	0.004(0.001) ¹	0.004 (0.005) ¹	0.005(0.028) ²	0.009(0.000) ¹	0.011(0.000) ¹	0.003(0.224)
FC08			-0.024(0.014) ²			-0.014(0.593)
FC09			-0.024(0.026) ²			-0.022(0.581)
Constant	2.718 (0.000) ¹	2.779(0.000) ¹	0.536(0.119)	2.089(0.000) ¹	2.081(0.000) ¹	0.209(0.109)
AR (1)			0.030			0.051
AR (2)			0.260			0.300
Hansen test			0.789			0.366

Note: TR, DI and INF are in percentage of GDP. p values are in parentheses ¹ $p < 0.01$, ² $p < 0.05$ and ³ $p < 0.1$

Source: Authors' calculation

The impact of FD on FDI stocks in developing countries is ambiguous and inconclusive. In contrast to the overall effect of FD on FDI in developed countries, the impact of FD in developing countries is statistically negative. This could be explained by the financial fragility of these countries as the majority of them, especially those which belong to the low-income countries panel, are underdeveloped. Thus, it appears that well developed financial systems are most likely to attract FDI as their financial markets and institutions effectively assure their financial functions. Therefore, it is a function of policymakers in less developed and underdeveloped economies to boost their financial transactions, contribute to the expansion of their activities and facilitate the entry of FDI to host economies.

Conclusion

This paper empirically investigates the finance-FDI association on a sample of 135 countries, including 44 high income, 34 upper middle income, 35 lower-middle income and 22 low-income countries. Taking into account the endogeneity problem in fixed effect model estimates, we use two-step system GMM which covers this limitation.

While previous papers empirically examine the relationship between FDI and FD by employing the banking or the stock market indicators, our paper employs a novel proxy, which was elaborated by the IMF, to represent Financial Development. The use of this proxy overcomes the problem of unidimensionality analysis of financial system, conducted by previous studies, and takes the financial system in its multidimensionality representing the depth, efficiency, access to financial markets and institutions.

The empirical findings of our paper reveal that FD positively and significantly affects FDI in high income and upper-middle income countries. Nevertheless, for lower middle and low-income countries, the impact is negative but insignificant. Therefore, we may infer that these panels of countries do not effectively perform their financial functions and effectively allocate financial resources. Thus, they are not attractive destinations for FDIs. As the FD variable used in our study is a synthetic index calculated by taking into account the development of financial markets and financial institutions, developing countries must implement initiatives to boost local financial markets and at the same time, facilitate financial institutions' access to the markets.

Nevertheless, as most of studies found a significant impact of financial development on FDI, it is not fair to deduct the impact without analysing the threshold level impact of FD on FDI. Therefore, it is of high interest to empirically find an answer to the following question: what is the minimum threshold level above which financial development can attract more FDI inflows? Also, the difference in findings between previous research studies and our research study might be related to three main limitations: the short time period; the categorisation of our sample countries and the evaluation of financial development by a general index. Therefore, further research could be done by expanding the period frame of research, and using the two sub-indices of financial development representing financial institutions and financial markets in order to check for robustness of findings.

This paper suggests that in order to attract significant amounts of FDI, especially in lower-middle income and low-income countries, policymakers should be more concerned about the financial development of their economies. In order to achieve that, a set of reform policies should be introduced to make financial institutions and financial markets (bond and stock markets) attractive to overseas investors.

Funding

This work was financially supported by the National Center of Scientific and Technical Research (CNRST) Morocco in the context of Research Excellence Fellowship Program.

APPENDIX

Table 7. List of developed (high income and upper-middle income) and developing countries (lower-middle income and low income)

Low-income countries				Lower middle-income countries			
No.	Country	No.	Country	No.	Country	No.	Country
1.	Benin	20.	Tanzania	1.	Armenia	20.	Mauritania
2.	Burkina Faso	21.	Togo	2.	Bangladesh	21.	Mongolia
3.	Burundi	22.	Uganda	3.	Bhutan	22.	Moldova
4.	Central African			4.	Bolivia	23.	Morocco
5.	Chad			5.	Cabo Verde	24.	Myanmar
6.	Congo, Dem Rep			6.	Cambodia	25.	Nicaragua
7.	Ethiopia			7.	Cameroon	26.	Nigeria
8.	Gambia			8.	Congo Rep	27.	Pakistan
9.	Guinea-Bissau			9.	Egypt	28.	Philippines
10.	Liberia			10.	El Salvador	29.	Solomon Islands
11.	Madagascar			11.	Georgia	30.	Sudan
12.	Malawi			12.	Ghana	31.	Tunisia
13.	Mali			13.	Honduras	32.	Ukraine
14.	Mozambique			14.	India	33.	Vanuatu
15.	Nepal			15.	Jordan	34.	Zambia
16.	Rwanda			16.	Kenya	35.	Guatemala
17.	Senegal			17.	Kyrgyz Republic		
18.	Sierra Leone			18.	Lao PDR		
19.	Tajikistan			19.	Lesotho		

Source: Authors' elaboration

High-income countries				Upper-middle income countries			
No.	Country	No.	Country	No.	Country	No.	Country
1.	Australia	24.	Latvia	1.	Albania	23.	Mexico
2.	Austria	25.	Lithuania	2.	Algeria	24.	Namibia
3.	Bahamas	26.	Luxembourg	3.	Argentina	25.	Panama
4.	Barbados	27.	Malta	4.	Belarus	26.	Paraguay
5.	Belgium	28.	Netherlands	5.	Belize	27.	Peru
6.	Canada	29.	New Zealand	6.	Bosnia and Herzegovina	28.	Romania
7.	Chile	30.	Norway	7.	Botswana	29.	Russian Federation
8.	Cyprus	31.	Poland	8.	Brazil	30.	Samoa
9.	Czech Republic	32.	Portugal	9.	Bulgaria	31.	South Africa
10.	Denmark	33.	Qatar	10.	China	32.	Thailand
11.	Estonia	34.	Saudi Arabia	11.	Colombia	33.	Tonga
12.	Finland	35.	Singapore	12.	Costa Rica	34.	Turkey
13.	France	36.	Slovak Republic	13.	Croatia		
14.	Germany	37.	Slovenia	14.	Dominican Republic		
15.	Greece	38.	Spain	15.	Ecuador		
16.	Hong Kong	39.	Sweden	16.	Equatorial Guinea		
17.	Hungary	40.	Switzerland	17.	Fiji		
18.	Iceland	41.	Tirinidad and Tobago	18.	Guyana		
19.	Ireland	42.	United Kingdom	19.	Mauritius		
20.	Israel	43.	United States	20.	Jamaica		
21.	Italy	44.	Uruguay	21.	Kazakhstan		
22.	Korea, Republic			22.	Malaysia		
23.	Kuwait						

Source: Authors' elaboration

Table 8. Variables' summary and data source

Variable	Definition	Expected sign	Source
FDI in stocks	FDI Inward FDI stock per capita in current prices (log form)	+	UNCTAD Stat (UNCTAD, 2018a)
Financial Development Index	FD PCA construction	-/+	IMF database (IMF, 2020)
Market size	LnGDPp GDP per capita annual growth (log form)	-/+	World Bank Indicators (WDI, 2018)

Trade openness	TR	Sum of exports and imports of goods and services as a percentage of GDP	-/+	World Bank Indicators (WDI, 2018)
Inflation	INF	Annual percentage change in CPI	-/+	World Bank Indicators (WDI, 2018)
Domestic investment	DI	Gross Fixed Capital Formation as a percentage of GDP	-/+	UNCTAD Stat (UNCTAD, 2018b)
Infrastructure	LnM	Mobile cellular telephone subscriptions are subscriptions to a public mobile telephone service that provide access to the PSTN using cellular technology. (Log form)	-/+	World Bank Indicators (WDI, 2018)

Source: Authors' elaboration

Table 9. Endogeneity tests for developed and developing countries

	High income countries	Upper middle-income countries	Lower-middle income countries	Low-income countries
LnGDPp	0.000*	0.000*	0.193	0.884
LnM	0.000*	0.000*	0.000*	0.000*
INF	0.013**	0.611	0.471	0.539
Trade	0.000*	0.026***	0.207	0.758
Financial Development	0.077***	0.000*	0.000*	0.013**
Domestic investment	0.155	0.000*	0.001*	0.000*

*, **, *** significance at 1%, 5% and 10% levels, respectively.

Source: Authors' calculation

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