Iran. Econ. Rev. Vol. 24, No. 4, 2020. pp. 885-906

The Effect of Financial Development on Foreign Direct Investment

Mohsen Gholizadeh Keykanloo[1], Shamseddin Hosseini*[2], Karim Emami Jazeh[3], Ali Askari[4]

Received: 2018, December 13 Accepted: 2019, March 3

Abstract

The relationship between financial development indexes and foreign direct investment is studied in this paper. The main objective is to examine the effects of financial development indicators in two groups (the financial markets index and the financial institution index) on the FDI absorption rate. The effects of these indicators have been evaluated in the form of a panel data model for 11 countries including (Saudi Arabia, Argentina, Sweden, Poland, Belgium, Iran, Thailand, Nigeria, Austria, Norway, and Venezuela) in the period 1990 to 2014. The results show that when the financial institutional index including (FID, FIE), financial market index including (FMD), GDP & DCP increase the FDI increases, and when FIA, FMA & FME increase, the FDI decreases. So Expanding the capital market will increase FDI attraction in selected countries, and for countries with weak capital markets, the financial market access index and the financial institution efficiency index has a significant negative effect on FDI absorption and vice versa.

Keywords: Financial Market Index, Financial Institution Index, Foreign Direct Investment, Panel Data.
JEL Classification: D53, G23, P33, C23.

1. Introduction

Indeed, a large body of empirical evidence shows that FDI tends to

1. Department of Economics, Science and Research Branch, Islamic Azad University, Tehran, Iran (Mohsen.gholizadeh@modares.ac.ir).
2. Department of Economics, Allameh Tabataba'i University, Tehran, Iran (Corresponding Author: sh.hosseini@aut.ac.ir).
3. Department of Economics, Science and Research Branch, Islamic Azad University, Tehran, Iran (k-emami@srbiau.ac.ir).
4. Department of Economics, South Tehran Branch, Islamic Azad University, Tehran, Iran (ali.askari@iauctb.ac.ir).

generate net gains for both home and host countries. Many countries actively seek to attract foreign direct investment (FDI) because they believe that multinational enterprises will contribute to economic growth by creating new job opportunities, increasing capital accumulation, and raising total factor productivity. The fact that the tight external financing conditions resulting from the global financial crisis have been partly blamed for this fall (UNCTAD, 2010) suggests that access to external finance is an important determinant of FDI (Rodolphe and Shang-Jin, 2017).

Many problems of absorbing foreign direct investment refer to the degree of financial development. Governments wishing to facilitate the internationalization of their firms and to attract foreign multinational enterprises (MNEs) should thus implement measures to improve access to external finance or maintain it during credit crises. Indeed, given the high sensitivity of FDI to external finance availability, tight credit conditions have certainly played a role in the drastic overall decline of FDI flows during the recent global financial crisis. Deep financial systems also matter to ensure that the ability of domestic firms to obtain external finance does not fall as local borrowing by MNEs increases (Rodolphe and Shang-Jin, 2017).

Inward FDI in financial services can help to improve host countries' financial conditions, at the risk of making the economy more vulnerable to international financial shocks (Goldberg and Linda, 2009).

In this research, the effect of different financial development indicators will be examined on foreign direct investment inflows between 11 countries that are divided according to World Bank studies based on nominal gross domestic product. Those countries include Saudi Arabia, Argentina, Sweden, Poland, Belgium, Iran, Thailand, Nigeria, Austria, Norway and Venezuela[1].

The GDP of the five first countries is more than Iran and the GDP of the five last countries is less than Iran, so the purpose is a cross-sectional comparison between Iran and ten countries.

Previous studies have recognized that the benefits from foreign direct investment (FDI) to recipient countries can only be realized

1. World Bank (2017)

when those countries have reached a certain level of financial development (Chiang and Ping, 2009).

Considering the sanctions conditions, Exchange entry methods are a great help to Iran`s economy. One of the most effective of these methods is foreign direct investment. Therefore, the evaluation of factors affecting the attraction of foreign direct investment has particular importance. It is well known that FDI and domestic financial markets are important sources of capital investment funds for manufacturers, and because the substitutable or complementary relations between them are very important, this paper mainly focuses on the analysis of their interactive relations and a comparison between Iran and referred countries.

Theoretically, FDI may enhance technological change through the spillover effects of knowledge and new capital goods, but underlying the magnitude of FDI's contribution is the overall business climate in recipient countries (Chamarbagwala et al., 2000).

Some local firms might indeed be able to finance new endeavors with internal financing, but when it comes to firms that require technological knowledge, the greater the gap is between current practices and the latest technology, the greater is the need for external financing (Alfaro et al., 2004).

2. Theoretical Literature

Financial development has a dual effect on foreign direct investment, which includes direct effects and indirect effects:

2.1 The Direct Effect

Each new FDI project involves establishing or purchasing a production facility in the destination country (Helpman et al., 2004). The ability of firms to finance the upfront fixed costs of FDI with internal funds varies across sectors. Some sectors are technologically more dependent on external finance, meaning that firms' desired investment levels typically exceed their internal cash flows (Rajan and Zingales, 1998).

Firms in these financially vulnerable sectors will have to rely heavily on external finance to engage in FDI since they will only be able to internally finance a small fraction of the fixed costs of FDI (Buch et al., 2009; 2010)

Firms' access to external finance depends on financial development. Klein et al. (2002) provide some evidence that credit constraints influence outward FDI. They show that the number of FDI projects undertaken by Japanese firms in the United States during the Japanese banking crisis was inversely correlated with the deterioration of the financial health of their main bank. Their results suggest that a rise in firm-specific credit constraints resulted in lower FDI.

If the local financing conditions are favorable, companies can use this external resource (Shapiro, 2006). A significant constraint is placed on FDI if financial institutions are reluctant to cover the costs of FDI (Bilir et al., 2019).

2.2 Indirect Effect

Financial development strengthens competitive conditions among enterprises, On the other hand, stronger domestic competition could encourage firms to allocate a greater fraction of their limited financial resources towards foreign expansion rather than domestic expansion, and greater financial development should allow firms to compensate part of the shortfall in internal funds with external funds. Overall, the growth of local manufacturing sectors induced by higher financial development should have a positive indirect agglomeration effect on inward FDI, which is likely to dominate any potential negative indirect competition effect (Rodolphe and Shang-Jin, 2017).

3. Literature Review

Edison et al. (2002) argued that a more developed financial system is better able to effectively absorb capital inflows, especially if these flows are fungible. Thus, financial development might help explain possible divergent outcomes across countries with different incomes (Hali et al., 2002).

Hermes and Lensink (2003) indicated that the importance of the domestic financial system as a precondition for the positive growth effects of FDI can be illustrated with a simple model of technological change (Niels and Lensink, 2003).

Alfaro et al. (2010) proposed a mechanism that emphasizes the role of local financial markets in enabling FDI to stimulate growth through the creation of backward linkages. When financial markets reach a

certain level of development, the host country benefits from the backward linkages between foreign and domestic firms with positive spillovers to the rest of the economy (Alfaro et al., 2010).

Desbordes and Wei (2017) investigated the various structural effects of financial development on foreign direct investment (FDI) and showed that source and destination countries, financial development jointly promote FDI by directly increasing access to external finance and indirectly supporting overall economic activity (Rodolphe and Shang-Jin, 2017).

Azman-Saini et al. (2010) used a different approach to examine the role of local financial markets play in mediating FDI effects on output growth. They used a regression model based on the concept of threshold effects. Their fitted model allows the relationship between growth and FDI to be piecewise linear with the financial market indicator acting as a regime-switching trigger. Using cross country observations from 91 countries over the 1975–2005 period, they found strong evidence of threshold effects in the FDI-growth link. Specifically, found that the impact of FDI on growth 'kicks in" only after financial development exceeds a certain threshold level. Until then, the benefits of FDI are non-existent (Azman-Saini et al., 2010).

Munemo (2016) investigated whether financial market development has an impact on the relationship between foreign direct investment (FDI) and business start-up, which is a salient feature of entrepreneurship he finds that the ability of FDI to crowd-in business start-ups significantly depends on financial market development in the host economy (Munemo, 2016).

Fromentin (2017) analyzed the dynamic impact of remittances on financial development for emerging and developing countries over the period 1974–2014 employing a Pooled Mean Group (PMG) approach. The result showed that a positive long-run relationship between remittances and financial development coexists with a significant (and slightly positive) short-run relationship, except for low-income countries. Consequently, there is strong evidence supporting the view that remittances promote financial development in developing countries in the long term, but the effect may be different in the short term (Fromentin, 2017).

Alfaro et al. (2004) examined the various links among foreign direct investment (FDI), financial markets, and economic growth. They explored whether countries with better financial systems can exploit FDI more efficiently. Empirical analysis, using cross-country data showed that FDI alone plays an ambiguous role in contributing to economic growth. However, countries with well-developed financial markets gain significantly from FDI. The results are robust to different measures of financial market development, the inclusion of other determinants of economic growth, and consideration of endogeneity (Alfaro et al., 2004)

Sahin and Ege (2015) examined the association between financial development and foreign direct investment (FDI) in Greece and neighboring countries (Bulgaria, Macedonia, and Turkey) for the period 1996-2012. They used Bootstrap causality analyses to examine this causal linkage for these countries which are either European Union (EU) members or candidates for EU accession. The empirical results indicated that FDI has a predictive power to forecast financial development in all of the countries except for Macedonia. Besides, findings indicated that there is bidirectional causality in Turkey (Sahin and Ege, 2015).

4. Data and Methodology

4.1 Method

Panel data methods have been extensively used in applied analyses due to its advantages over cross-section or time-series data in allowing individual heterogeneity, requiring less restrictive assumption, allowing more estimates that are reliable, and studying dynamic behavior (Baltagi, 2005). The basic panel data form can be written as in Equation:

$$y_{it} = x'_{it}\beta + z'_i\alpha + \varepsilon_{it} \quad (1)$$

There are *K* regressors in *X*, and *z* contains constant and unit specific variables or unobserved heterogeneous characteristics. If *z* could be known, then the OLS method can be used to estimate the model.

However, in most cases, *z* is unobserved and estimators will be biased if OLS is used. Therefore, a couple of methods are developed to

solve this problem. Pooled Regression (Pooled OLS) is used when z only contains the constant term, and it gives consistent and efficient estimates of α and β. However, when z contains unobserved variables and they are also correlated with explanatory variables, then $E(X, \varepsilon) \neq 0$ and OLS will give biased estimates. One approach to solve this problem is Fixed- Effects in which unobserved variables are considered time-invariant and $\alpha_i = z_i'\alpha$ becomes a group-specific constant term. Another approach is using the Random-Effects model which assumes unobserved heterogeneity is uncorrelated with the variables $E(X, \varepsilon) = 0$, and includes u_i which is a group-specific random element (Greene, 2003) Then, Eq. (1) can be written as:

$$y_{it} = x_{it}'\beta + E[z_i'\alpha] + [z_i'\alpha - E[z_i'\alpha]] + \varepsilon_{it} \quad (2)$$

$$y_{it} = x_{it}'\beta + \alpha + u_i + \varepsilon_{it} \quad (3)$$

If unobserved individual effects do not exist, Pooled OLS should be preferred over other panel data methods. In this respect, F-Test for the fixed effects method and the Breusch-Pagan LM test for the Random-effects method is conducted to understand the existence of individual effects in data. Afterward, the Hausman test is conducted to select the model, and a series of tests are conducted to overcome correlation and heterogeneity problems in the model (Baltagi, 2005).

4.2 Data

In line with the discussions in the literature, inward FDI inflows are taken as a function of seven financial development indicator, includes: financial institutions depth index(FID), financial institution access index (FIA), financial institutions efficiency index(FIE), financial markets depth index(FMD), financial markets access index(FMA), financial markets efficiency index(FME), domestic credit to the private sector, and GDP per capita.

Data is retrieved from World Bank, World Development Indicators, the international monetary fund, and their definition is as follows:

- Foreign direct investment is the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the domestic investor. It is the sum of equity capital,

reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows net inflows (new investment inflows less disinvestment) in the reporting economy from foreign investors and is divided by GDP (World Bank, 2017).

- GDP per capita: is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. Data are in constant 2010 U.S. dollars (World Bank, 2017).
- domestic credit to the private sector as a percentage of GDP (DCY): Domestic credit to the private sector by banks refers to financial resources provided to the private sector by other depository corporations (deposit-taking corporations except for central banks), such as through loans, purchases of non-equity securities, and trade credits and other accounts receivable, that establish a claim for repayment. For some countries, these claims include credit to public enterprises (World Bank, 2017).
- The financial development index is a relative ranking of the country on the depth, access, and efficiency of their financial institutions and financial markets. It is an aggregate of the financial institutions' index and the financial markets index. Financial institutions index is an aggregate of: • financial institutions depth index (FID), which compiles data in bank credit to the private sector in percent of GDP. Pension fund assets to GDP, mutual fund assets to GDP, and insurance premiums, life, and non-life to GDP. • Financial institution access index (FIA), which compiles data on bank branches per 100.000 adults and ATMs per 100.000 adults. • financial institutions efficiency index(FIE), which compiles data on banking sector net interest margin, lending-deposits spread, non-interest income to total income, overhead costs to total asset, return on assets, and return on equity, According to the definition of these variables, we expect a positive relationship between financial institutions indexes and FDI.

Financial markets index is an aggregate of: • financial markets depth index (FMD), which compiles data on stock market capitalization to GDP, the stock traded to GDP, the international debt of government to GDP, and total debt securities of the financial and non-financial corporation to GDP. • financial markets access index(FMA), which compiles data on the percent of market capitalization outside of the top 10 largest companies and a total number of issuers of debt (domestic and external, nonfinancial corporations) per 100.000 adults. • Financial markets efficiency index (FME), which compiles data on the stock market turnover ratio (stocks traded to capitalization). Given the definition of data, a positive relationship is expected between financial market indexes and FDI (IMF, 2017).

Due to the availability of the data, we set the period starting from 1990 to 2015.

In this paper, our purpose is that the effects of financial development indicators should be considered in two sectors: the financial market indices and financial institution indicators. The effects of each variable, on foreign direct investment, will be considered separately.

All of the data series have been transformed into their logarithmic form. For this set of countries, the data are available for all of the variables we use in this paper, which means that we carry out the estimations with a balanced dataset. The Eviews9 program is used for analysis.

4.3 The Panel Unit Root Tests

Abuaf and Jorion (1990) pointed out that the power of unit root tests may increase by using cross-sectional information. Expanding on the work of Levin and Lin (1992), Levin et al. (2002; henceforth LLC) propose a panel-based ADF test that restricts parameters γ_i by keeping them identical across cross-sectional regions as follows:

$$\Delta y_{it} = \alpha_i + \gamma_i y_{it-1} + \sum_{j=1}^{k} \alpha_i \Delta y_{it-1} + e_{it} \qquad (4)$$

Where t=1,…,T time periods and i=1,…N members in the panel. LLC

(2002) test the null hypothesis of $\gamma_i = \gamma = 0$ for all i, against the alternative $\gamma_1 = \gamma_2 = \cdots = \gamma < 0$ for all i, with the test based on the statistic $t_\gamma = \frac{\hat{\gamma}}{s.e.(\hat{\gamma})}$.

However, one drawback is that γ is restricted since it is kept identical across regions under both the null and alternative hypotheses (Abuaf & Philippe, 1990; Levin & Chien-Fu, 2002).

The highest FDI is noted in Belgium (36.7%), followed by Austria and Sweden (25.8%) and (22.4%) respectively. The lowest FDI, in ascending order, is in Venezuela (0.08%), Saudi Arabia (0.011%), and Iran (0.003%).

On the financial development variable, the highest (FI) ratios are found in Belgium (0.87%), followed by Sweden (0.749%) and Austria (0.746%), whereas the lowest ratios, in ascending order, are in Argentina (0.209%), Nigeria (0.127%), and Iran (0.125%). And the highest (FM) ratios are found in Norway (0.957%), followed by Sweden (0.837%) and Austria (0.75%), whereas the lowest ratios, in ascending order, are in Iran (0.064%), Venezuela (0.051%), and Nigeria (0.01%).

Table 1 presents the results from the panel unit root tests. At the 5% significance level, where all of the variables in Levin, Lin, and Chu test are significant and in Im, Pesaran and Shin test and ADF-Fisher test except two variables (lfmd and lgdp) are significant and finally in PP-Fisher except lgdp all of the variable are significant.

We employ time-series data for 11 countries and examine whether the effect of financial development on FDI varies across different regional groups of countries as well as across countries with different levels of financial development.

Table 1: Results of the Panel Unit Root Tests

variable	common unit root process		individual unit root process					
	Levin, lin & chu t*		Im, Pesaran & shin W-stat		ADF-Fisher chi-square		pp-Fisher chi-square	
	statistic	prob	statistic	prob	statistic	prob	statistic	prob
Lfdi	-3.33891	0.0004	-6.65927	0.0000	92.1029	0.0000	204.748	0.0000
Lfia	-5.4857	0.0000	-5.3723	0.0000	69.8053	0.0000	99.1078	0.0000
Lfid	-4.83963	0.0000	-6.38973	0.0000	85.5551	0.0000	175.524	0.0000

variable	common unit root process		individual unit root process					
	Levin, lin & chu t*		Im, Pesaran & shin W-stat		ADF-Fisher chi-square		pp-Fisher chi-square	
	statistic	prob	statistic	prob	statistic	prob	statistic	prob
Lfie	-6.30815	0.0000	-5.93249	0.0000	83.3801	0.0000	82.1767	0.0000
lfma	-3.75263	0.0001	-3.13825	0.0008	46.9442	0.0015	73.1066	0.0000
lfmd	-3.7939	0.0001	-1.82658	0.339	32.4925	0.0649	42.2157	0.0059
lfme	-3.38156	0.0004	-2.65627	0.004	44.0838	0.0035	47.6225	0.0035
lgdp	-2.94067	0.0016	0.57847	0.7185	17.2283	0.7506	19.4613	0.6167
ldcp	-11.2966	0.0000	-9.07042	0.0000	124.161	0.0000	128.693	0.0000

Source: Research Findings.

Notes: All variables are in natural logarithms. The method used for selecting the lag length is the Modified Schwarz Information Criterion (MSIC). This is one of several criteria discussed by Bai and Ng (2002).

We estimate the following equation:

$$\text{LFDI}_{it} = \alpha_{it} + \alpha_{it}LFIA_{it} + \beta_i LFID_{it} + \beta_i LFIE_{it} + \beta_i LFMA_{it} + \beta_i LFMD_{it} + \beta_i LFME_{it} + \beta_i LGDP_{it} + \beta_i LDCP_{it} + \varepsilon_{it} \quad (5)$$

To select between the pooled or panel data has been estimated without any group effect and used form Lagrange Multiplier Tests that the result rejects the null hypothesis. Table2 represent the tests like (Breusch-Pagan, Honda, King-Wu, Standardized Honda, standardized King-Wu).

Table 2: Lagrange Multiplier Tests for Random Effects

	Test Hypothesis		
	Cross-section	Time	Both
Breusch-Pagan	32.04513** (0.0000)	1.684469 (-0.1943)	33.72960254** (0.0000)
Honda	5.660842** (0.0000)	1.297871 (-0.0972)	4.92055322** (0.0000)
King-Wu	5.660842** (0.0000)	1.297871 (-0.0972)	5.463194706** (0.0000)
Standardized Honda	11.44615** (0.0000)	1.420648 (-0.0972)	1.962967842 (-0.0248)
Standardized King-Wu	11.44615** 0.0000	1.420648 (-0.0777)	3.537408288 (-0.0002)

Source: Research Findings.

Note: ** denotes that rejects the null of random effect testing.

The statistics of all tests are significant at the level of the cross-sections, therefore the null hypothesis is not accepted and the cross-sections have different intercepts. On the other hand, we used from F-limer test so the use of the Panel method is approved.

In the table3 we select the pooled or panel data model, therefore the table3 represents the cross-section fixed effect, and finally, the panel data model is approved.

Table 3: Test Cross-section Fixed Effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	5.170523**	-10,238	0.0000
Cross-section Chi-square	50.52447**	10	0.0000

Source: Research Findings.

** denotes that rejects the null hypothesis at the 5% level.

Co-integration test has been used to prove long-term relationships between the dependent variable and exogenous variables, therefore t-statistic is significant and that means a Long-term relationship exists between independent and dependent variables.

Table4 represents a comparison between two estimates with a different effect, where the result approves the fixed-effect method.

Table 4: Comparison of Panel Cointegration Tests

Coefficient	Redundant-fixed effect test - likelihood ratio	Correlated random effect –Hausman test
C	11.12005** (1.576022)	10.00068 (6.929789)
lfia	0.090533 (0.186021)	-0.34662 (0.427402)
lfid	1.26579** (0.203096)	0.972721 (0.538936)
lfie	1.125254** (0.338179)	0.9799 (0.381426)
lfma	-0.23208** (0.06227)	0.152278 (0.250212)
lfmd	0.385233** (0.080999)	0.388305** (0.17202)
lfme	0.213756** (0.115217)	0.197346** (0.095401)
lgdp	-0.326051** (0.100501)	-0.4727 (0.686595)
ldcp	-1.1776** (0.173878)	-0.5905** (0.294171)

Source: Research Findings.

** denotes that rejects the null hypothesis at the 5% level.

4.4 Panel Long-run Estimates

To deal with the endogeneity bias in regressors, we further consider the bias-corrected estimation methods. Table 5 provides the results of the country-by-country and the panel DOLS for the model: (LFDI, LFIA, LFID, LFIE, LFMA, LFMD, LFME, LGDP, LDCP). As shown at the bottom of Table 5, for (LFIA, LFID, LFIE, LFMA, LFMD, LFME, LGDP, LDCP) the panel parameters are (-0.14, 0.63, 1.05, -0.43, 0.46, -0.21, 1.85, 0.60) respectively, and there are no time dummies for the regressor. Furthermore, as the coefficients are statistically significant at the 5% level and 10% level, the effect of FID, FIE, FMD, GDP, DCP is positive and the effect of FIA, FMA, FME is negative.

For FIA, FIE, FID the panel parameters are 0.14, 1.05, and -0.63, respectively. This shows that the corresponding increase from a 1% increases in Institutional financial development indexes is around 0.14%, 1.05%, and the corresponding decrease is about -0.63%, respectively and for FMD, FMA, FME, the panel parameters are 0.46, -0.43 and -0.21, respectively, that means a 1% increase in market financial development indexes increases LFDI by around 0.46% and decreases around -0.43% and -0.21% respectively.

for GDP, DCP the panel parameters are 1.85 and 0.60 respectively, which means a 1% increase in GDP and DCP increases LFDI by around 1.85% and 0.60%, respectively.

Added to this, Tables 5 illustrates that both of the financial development indicators have a smaller impact on LFDI than does GDP. Therefore, strictly based on our examination above, it is unambiguous that there is a cointegrated relationship among Explanatory variables and FDI, in our sample countries.

On the per country, in 7 of the 11 countries FIA has a significantly negative impact, in 6 of the 11 countries, FID has a significantly positive impact, in 8 of the 11 countries FIE has a significantly positive impact, in 7 of the 11 countries FMA has a significantly negative impact, in 9 of the 11 countries FMD has a significantly positive impact, in 6 of the 11 countries FME has a significantly positive impact, GDP has a significantly positive impact in 7 of the 11 countries and finally, in 6 of the 11 countries, DCP has a significantly negative impact on LFDI. These results increasingly show the

potential gains associated with financial development in the countries under study.

Table 5: Results of Dynamic OLS Estimates (Dependent Variable: LFDI)

Country	coefficients							
	LFIA	**LFID**	**LFIE**	**LFMA**	**LFMD**	**LFME**	**LGDP**	**LDCP**
Saudi Arabia	-1.63** (0.041)	-7.79** (0.029)	-6.57* (0.078)	-5.49 (0.1560)	2.84** (0.021)	-1.51* (0.100)	-18.45* (0.060)	5.89* (0.01)
Argentina	-8.12** (0.006)	3.27* (0.085)	0.58** (0.034)	-2.00** (0.031)	0.19* (0.063)	0.03* (0.084)	3.03** (0.044)	1.47** (0.038)
Sweden	-4.11* (0.067)	-0.82* (0.087)	10.69** (0.033)	6.45* (0.099)	-6.62* (0.059)	3.52** (0.030)	6.15** (0.046)	-2.77** (0.035)
Poland	-3.71** (0.035)	2.45** (0.036)	2.33* (0.056)	2.76 (0.160)	0.70** (0.043)	0.20* (0.083)	-1.61* (0.068)	0.02* (0.097)
Belgium	40.24* (0.066)	-39.92* (0.057)	19.76** (0.045)	-2.99** (0.044)	2.82* (0.081)	3.18* (0.055)	-70.78* (0.057)	33.22** (0.027)
Iran	7.43** (0.015)	9.98** (0.030)	1.99* (0.061)	-0.50* (0.077)	0.41* (0.071)	-1.83** (0.000)	9.47 (0.174)	-11.54** (0.020)
Thailand	0.03** (0.0098)	-9.90** (0.008)	0.43** (0.043)	0.23* (0.090)	0.79** (0.042)	0.53* (0.058)	3.40* (0.054)	2.76** (0.028)
Nigeria	-0.22** (0.006)	0.56* (0.073)	-1.30* (0.064)	-0.32** (0.015)	0.81** (0.045)	-0.05** (0.007)	-0.70 (0.445)	-0.07* (0.094)
Austria	-19.11** (0.010)	19.05** (0.016)	23.80** (0.048)	-1.05** (0.037)	1.74** (0.045)	-0.28* (0.075)	4.58** (0.037)	9.46** (0.033)
Norway	-3.10** (0.007)	9.23** (0.0001)	22.54** (0.0001)	1.90** (0.001)	-2.66** (0.0019)	-0.25 (0.424)	3.88** (0.412)	-2.62** (0.003)
Venezuela	0.63* (0.094)	-0.65* (0.042)	-2.69* (0.052)	-0.35** (0.049)	5.59* (0.065)	0.23** (0.030)	13.27** (0.021)	-1.80** (0.039)
Panel	-0.14** (0.008)	0.63** (0.041)	1.05** (0.049)	-0.43** (0.045)	0.46** (0.037)	-0.21** (0.012)	1.85** (0.025)	0.60** (0.023)

Source: Research Findings.

Notes: p-value in parentheses. Asymptotic distribution of t statistic is standard normal as T and N go to infinity. ** and * indicate statistical significance at the 5% and 10% levels, respectively.

4.5 Determining the Optimal Interruption for Causality Test

for executing the causality test it`s necessary that has determined their optimal lag, We estimate the model with three lags in a constant fixed-effect method, Optimum lags are determined based on the minimum criteria of Schwarz-Baysian (SBC).

Table 6: The Result Is an Optimum Lag

Lags	Akaik information criteria	Schwarz Baysian criteria
0	2.903455	3.165838
1	2.878844	3.156874
2	2.679591	2.957621*
3	2.793207	3.071238

Source: Research Findings.
Note: * indicate a minimum of SBC

4.6 The Result of the Granger Causality Test

We use a panel-based error correction model to identify the nature of the long-run relationship using the Engle and Granger (1987).(Engle & Granger, 1987) So the Granger causality model has been estimated with the dynamic error correction as follows:

$$\Delta LFDI_{it} = \theta_{1i} + \lambda_1 \varepsilon_{it-1} + \sum_k \theta_{11k} \Delta LFDI_{it-k} + \sum_k \theta_{12k} \Delta LFIA_{it-k} + \sum_k \theta_{13k} \Delta LFID_{it-k} + \sum_k \theta_{14k} \Delta LFIE_{it-k} + \sum_k \theta_{15k} \Delta LFMA_{it-k} + \sum_k \theta_{16k} \Delta LFMD_{it-k} + \sum_k \theta_{17k} \Delta LFME_{it-k} + \sum_k \theta_{18k} \Delta LGDP_{it-k} + \sum_k \theta_{19k} \Delta LDCP_{it-k} + u_{1it} \quad (6)$$

$$\Delta LFIA_{it} = \theta_{2i} + \lambda_2 \varepsilon_{it-1} + \sum_k \theta_{21k} \Delta LFDI_{it-k} + \sum_k \theta_{22k} \Delta LFIA_{it-k} + \sum_k \theta_{23k} \Delta LFID_{it-k} + \sum_k \theta_{24k} \Delta LFIE_{it-k} + \sum_k \theta_{25k} \Delta LFMA_{it-k} + \sum_k \theta_{26k} \Delta LFMD_{it-k} + \sum_k \theta_{27k} \Delta LFME_{it-k} + \sum_k \theta_{28k} \Delta LGDP_{it-k} + \sum_k \theta_{29k} \Delta LDCP_{it-k} + u_{1it} \quad (7)$$

$$\Delta LFID_{it} = \theta_{2i} + \lambda_2 \varepsilon_{it-1} + \sum_k \theta_{21k} \Delta LFDI_{it-k} + \sum_k \theta_{22k} \Delta LFIA_{it-k} + \sum_k \theta_{23k} \Delta LFID_{it-k} + \sum_k \theta_{24k} \Delta LFIE_{it-k} + \sum_k \theta_{25k} \Delta LFMA_{it-k} + \sum_k \theta_{26k} \Delta LFMD_{it-k} + \sum_k \theta_{27k} \Delta LFME_{it-k} + \sum_k \theta_{28k} \Delta LGDP_{it-k} + \sum_k \theta_{29k} \Delta LDCP_{it-k} + u_{2it} \quad (8)$$

$$\Delta LFIE_{it} = \theta_{3i} + \lambda_3 \varepsilon_{it-1} + \sum_k \theta_{31k} \Delta LFDI_{it-k} + \sum_k \theta_{32k} \Delta LFIA_{it-k} + \sum_k \theta_{33k} \Delta LFID_{it-k} + \sum_k \theta_{34k} \Delta LFIE_{it-k} + \sum_k \theta_{55k} \Delta LFMA_{it-k} + \sum_k \theta_{36k} \Delta LFMD_{it-k} + \sum_k \theta_{37k} \Delta LFME_{it-k} + \sum_k \theta_{38k} \Delta LGDP_{it-k} + \sum_k \theta_{39k} \Delta LDCP_{it-k} + u_{3it} \quad (9)$$

$$\Delta LFMA_{it} = \theta_{4i} + \lambda_4 \varepsilon_{it-1} + \sum_k \theta_{41k} \Delta LFDI_{it-k} + \sum_k \theta_{42k} \Delta LFIA_{it-k} + \sum_k \theta_{43k} \Delta LFID_{it-k} + \sum_k \theta_{44k} \Delta LFIE_{it-k} + \sum_k \theta_{45k} \Delta LFMA_{it-k} + \sum_k \theta_{46k} \Delta LFMD_{it-k} + \sum_k \theta_{47k} \Delta LFME_{it-k} + \sum_k \theta_{48k} \Delta LGDP_{it-k} + \sum_k \theta_{49k} \Delta LDCP_{it-k} + u_{4it} \quad (10)$$

$$\Delta LFMD_{it} = \theta_{5i} + \lambda_5 \varepsilon_{it-1} + \sum_k \theta_{51k} \Delta LFDI_{it-k} + \sum_k \theta_{52k} \Delta LFIA_{it-k} + \sum_k \theta_{53k} \Delta LFID_{it-k} + \sum_k \theta_{54k} \Delta LFIE_{it-k} + \sum_k \theta_{55k} \Delta LFMA_{it-k} + \sum_k \theta_{56k} \Delta LFMD_{it-k} + \sum_k \theta_{57k} \Delta LFME_{it-k} + \sum_k \theta_{58k} \Delta LGDP_{it-k} + \sum_k \theta_{59k} \Delta LDCP_{it-k} + u_{5it} \quad (11)$$

$$\Delta LFME_{it} = \theta_{6i} + \lambda_6 \varepsilon_{it-1} + \sum_k \theta_{61k} \Delta LFDI_{it-k} + \sum_k \theta_{62k} \Delta LFIA_{it-k} + \sum_k \theta_{63k} \Delta LFID_{it-k} + \sum_k \theta_{64k} \Delta LFIE_{it-k} + \sum_k \theta_{65k} \Delta LFMA_{it-k} + \sum_k \theta_{66k} \Delta LFMD_{it-k} + \sum_k \theta_{67k} \Delta LFME_{it-k} + \sum_k \theta_{68k} \Delta LGDP_{it-k} + \sum_k \theta_{69k} \Delta LDCP_{it-k} + u_{6it} \quad (12)$$

$$\Delta LGDP_{it} = \theta_{7i} + \lambda_7 \varepsilon_{it-1} + \sum_k \theta_{71k} \Delta LFDI_{it-k} + \sum_k \theta_{72k} \Delta LFIA_{it-k} + \sum_k \theta_{73k} \Delta LFID_{it-k} + \sum_k \theta_{74k} \Delta LFIE_{it-k} + \sum_k \theta_{75k} \Delta LFMA_{it-k} + \sum_k \theta_{76k} \Delta LFMD_{it-k} + \sum_k \theta_{77k} \Delta LFME_{it-k} + \sum_k \theta_{78k} \Delta LGDP_{it-k} + \sum_k \theta_{79k} \Delta LDCP_{it-k} + u_{7it} \quad (13)$$

$$\Delta LDCP_{it} = \theta_{8i} + \lambda_8 \varepsilon_{it-1} + \sum_k \theta_{81k} \Delta LFDI_{it-k} + \sum_k \theta_{82k} \Delta LFIA_{it-k} + \sum_k \theta_{83k} \Delta LFID_{it-k} + \sum_k \theta_{84k} \Delta LFIE_{it-k} + \sum_k \theta_{85k} \Delta LFMA_{it-k} + \sum_k \theta_{86k} \Delta LFMD_{it-k} + \sum_k \theta_{87k} \Delta LFME_{it-k} + \sum_k \theta_{88k} \Delta LGDP_{it-k} + \sum_k \theta_{89k} \Delta LDCP_{it-k} + u_{8it} \quad (14)$$

All the variables here are as previously defined, Δ denotes the first difference of the variables, θ_{ji} (j = 1, 2, 3) represent fixed country effect, and k is the lag length. Term λ_j (j = 1, 2, 3) is the adjustment coefficient and u_j (j = 1, 2, 3) is the disturbance term assumed to be uncorrelated with mean zero. The short-run adjustment coefficients are constrained to be the same for all countries (Al-Iriani, 2006; Coiteux et al., 2000).

The directions of causation can be identified by testing for the significance of the coefficient of each of the dependent variables in equations (6) to (14).

First, For short-run causality, we test $H_0 : \theta_{jik} = 0$ for explanatory variables, all k in equation (6) to (14); $H_0 : \theta_{12k} = 0$ for LFIA or $\theta_{13k} = 0$ for LFID, $\theta_{14k} = 0$ for LFIE, $\theta_{15k} = 0$ for LFMA, $\theta_{16k} = 0$ for LFMD, $\theta_{17k} = 0$ for LFME, $\theta_{18k} = 0$ for LGDP, $\theta_{19k} = 0$ for LDCP , for all k in equation (6); and H0 : $\theta_{22k} = 0$ for LFIA or $\theta_{23k} = 0$ for LFID, $\theta_{24k} = 0$ for LFIE, $\theta_{25k} = 0$ for LFMA, $\theta_{26k} = 0$ for LFMD, $\theta_{27k} = 0$ for LFME, $\theta_{28k} = 0$ for LGDP, $\theta_{29k} = 0$ for LDCP , for all k in equation (7) and so on. If there is no causality in either direction, the neutrality hypothesis supports.

Table 6 shows the F-test results of our panel causality test for the model (LFDI LFIA LFID LFIE LFMA LFMD LFME LGDP LDCP). The financial institutions' index is not significant in the LFDI equation at the 5% level. But one of the financial markets index (LFME) is significant at the 5% level. Nevertheless, a causal relationship is apparent between FDI and financial markets index.

The result shows that unidirectional causality runs from LFDI to LFME in the short run, but the reverse does not hold. This implies that, in the short run, stock market turnover ratio can be treated as a catalyst attracting FDI inflows and to promote financial development.

When the relationships among the eight variables are in disequilibrium in the financial market efficiency index can restore equilibrium to the economic system in the long run.

Table 7: The Result Granger Causality Test

Dependen variable	ΔLFD	ΔLFIA	ΔLFID	ΔLFIE	ΔLFMA	ΔLFMD	ΔLFME	ΔLGDP	ΔLDCP
ΔLFDI	-	0.51752	0.46429	0.49579	2.0877	0.24424	7.6917**	1.71631	0.40869
ΔLFIA	0.5385	-	0.05601	0.17628	0.6934	0.5173	0.04047	2.69177*	0.56255
ΔLFID	0.2246	2.63623*	-	6.051**	0.1707	1.96419	1.23514	3.84303**	3.72209*
ΔLFIE	0.2357	2.2412	3.07436*	-	2.1685	2.18286	1.01622	1.22929	4.27857*
ΔLFMA	0.8829	0.23309	1.03839	2.26597	-	3.55212*	2.00702	1.09764	1.04862
ΔLFMD	0.7809	1.19855	1.20579	1.92185	1.4710	-	0.27152	0.3178	0.25931
ΔLFME	1.1655	5.91279*	2.21967	5.4904**	0.3675	0.52143	-	5.58144**	1.99661
ΔLGDP	1.1560	1.86821	0.30502	3.4567**	0.4306	4.80789*	1.75128	-	0.83648
ΔLDCP	0.3984	1.25135	0.59271	5.23693*	0.5689	1.67418	3.83326*	6.63907**	-

Source: Research Findings.

Notes: the null hypothesis is that explanatory variables do not granger cause dependent variable. Figures denote F-statistic values. ** and* indicates statistical significance at the 5% and 10% level respectively.

5. Concluding Remarks

In panel long-run estimate, the result shows That when the financial institutional index including FID, FIE (bank credit to the private sector in percent of GDP, Pension fund assets to GDP, mutual fund assets to GDP, and insurance premiums (life and non-life) to GDP, banking sector net interest margin, lending-deposits spread, non-interest income to total income, overhead costs to total asset, return on assets, and return on equity) increase the FDI increases about %0.63 and %1.05 respectively, and when financial market index including FMD(stock market capitalization to GDP, the stock traded to GDP, an international debt of government to GDP, and total debt securities of the financial and non-financial corporation to GDP), GDP and DCP increase the FDI increase around %0.46, %1.85 and %0.60.

So Expanding the capital market will increase FDI attraction in sample countries, and when FIA[1], FMA[2], and FME[3] increase, the FDI decreases around -%0.14, -%0.43, and -%0.21 respectively.

By and large, the panel cointegration testing results of the Johansen and Larsson et al. (2001) methods provide substantive evidence that there is a fairly strong long-run relationship among FIA, FID, FIE, FMA, FMD, FME, LGDP, LDCP, and LFDI. Apart from this, our panel DOLS estimates indicate that our financial development indicators have a smaller effect on growth than does GDP. Moreover, from our panel causality tests, whereas evidence of a short-run relationship is weak, that of a long-run relationship among the variables is unambiguous. Important to note is that this is a clear sign of bi-directional causal linkages among GDP, financial development, and FDI. More specifically, there is a bi-directional causal relationship between GDP and the financial development indicators in the long run, and this is indicative of a truly complementary relationship among all of the variables.

The relationship between FDI and GDP is endogenously influenced by the development of the domestic financial sector. In light of this

1. bank branches per 100.000 adults and ATMs per 100.000 adults
2. Percent of market capitalization outside of top 10 largest companies and total number of issuers of debt (domestic and external, nonfinancial corporations) per 100.000 adults.
3. stock market turnover ratio (stocks traded to capitalization)

financial development lead to Attracting more foreign direct investment or FDI-driven financial development, when the influence of financial development is taken into account, then it is incumbent upon policymakers to develop and improve the domestic financial system so that it can be more effective in channeling and transforming the advantages embodied in financial development on FDI inflows (Choong et al., 2004)

This signifies that the responsibility of the government should be redirected, so that it focuses on developing the economy and on building and nurturing a good investment climate to attract foreign capital, thereby creating one perfect financial system in the short run. Naturally, with such a sound foundation, mutual relationships between FDI and growth can be observed and preserved in the long run (Chiang and Ping, 2009).

The table.5 represents that all of the explanatory variable (except the FMA, FME, and DCP) has a positive effect on FDI in Iran, where the result indicates that all the explanatory variable except (FMD, DCP) have a negative effect on FDI in Saudi Arabia and finally in Venezuela, FIA, FMD, FME, GDP have a positive effect And the rest have a negative on FDI. So we can conclude that In countries with a weak capital market, the financial market access index has a negative effect on FDI (some countries like Iran, Venezuela, Nigeria) and vice versa (some countries like Norway and Sweden), and in countries whit a high banking sector net interest margin, extensive lending system, a high non-interest income to total income, low overhead costs to total asset, high return on assets, the financial institution efficiency have a positive effect on FDI (some countries like Belgium, Sweden and Austria), whereas in countries with the opposite features listed above have a negative effect on FDI (some countries like Argentina and Venezuela).

References

Abuaf, N., & Philippe, J. (1990). Purchasing Power Parity in The Long Run. *Journal of Finance, 45*(1), 157–174.

Alfaro, L., Areendam, C., Sebnem, K. O., & Selin, S. (2010). How Does Foreign Direct Investment Promote Economic Growth?

Exploring the Effects of Financial Markets on Linkages. *Journal of Development Economics, 91*(2), 242-256.

---------- (2004). FDI and Economic Growth: The Role of Local Financial Markets. *Journal of International Economics, 64*(1), 89–112.

Al-Iriani, M. A. (2006). Energy–Gdp Relationship Revisited: an Example from GCC Countries Using Panel Causality. *Energy Policy, 34*(17), 3342–3350.

Azman-Saini, W. N. W., Law, S. H., & Abd Halim, A. (2010). FDI and Economic Growth: New Evidence on the Role of Financial Markets. *Economics Letters, 107*(2), 211–213.

Baltagi, B. H. (2005). *Econometric Analysis of Panel Data* (3rd Ed.). Chichester: John Wiley & Sons.

Bilir, L. K., Chor, D., & Manova, K. (2019). Host Country Financial Development and MNC Activity. *European Economic Review, 115*, 192-220.

Buch, C. M., Kesternich, I., Lipponer, A., & Schnitzer, M. (2010). Exports versus FDI Revisited: Does Finance Matter? *GESY Discussion, 340*, Retrieved from https://ssrn.com/abstract=2785367.

---------- (2009). Financial Constraints and the Margins of FDI. *GESY Discussion, 29*, Retrieved from https://ssrn.com/abstract=2785358.

Chamarbagwala, R., Sunder, R., & Phanindra, V. (2000). The Role of Foreign Capital in Domestic Manufacturing Productivity: Empirical Evidence from Asian Economies. *Applied Economics, 32*, 393–398.

Chiang, L. C., & Ping C. C. (2009). FDI, Financial Development and Economic Growth: International Evidence. *Journal of Applied Economics, XII(2)*, 249-271.

Choong, C. K., Zulkornain, Y., & Siew-Ohoo, S. (2004). Foreign Direct Investment, Economic Growth, and Financial Sector Development. *ASEAN Economic Bulletin, 21*, 278–289.

Coiteux, M., & Simon, O. (2000). The Saving Retention Coefficient in The Long Run and in The Short Run: Evidence From Panel Data. *Journal of International Money and Finance, 19*, 535−548.

Edison, H. J., Ross, L., Luca, R., & Torsten, S. (2002). International Financial Integration and Economic Growth. *Journal of International Money and Finance, 21*, 749–776.

Engle, R. F., & Granger, C. W. J. (1987). Cointegration and Error Correction: Representation, Estimation, and Testing. *Econometrica, 55*, 257–276.

Fromentin, V. (2017). The Long-run and Short-run Impacts of Remittances on Financial Development in Developing Countries. *Quarterly Review of Economics and Finance, 63*, 1-338.

Goldberg, L. (2009). Understanding Banking Sector Globalization. *IMF Staff Papers, 56*(1), 171–197.

Greene, W. H. (2003). *Econometric Analysis.* New York: Prentice-Hall.

Helpman, E., Melitz, M. J., & Yeaple, S. R. (2004). Export versus FDI with Heterogeneous Firms. *American Economic Review, 94*(1), 300–316.

Hermes, N., & Robert, L. (2003). Foreign Direct Investment, Financial Development, and Economic Growth. *Journal of Development Studies, 40*, 142–163.

Klein, M. W., Peek, J., & Rosengren, E. S. (2002). Troubled Banks, Impaired Foreign Direct Investment: The Role of Relative Access to Credit. *American Economic Review, 92*(3), 664–682.

Levin, A., & Chien-Fu, L. (2002). Unit Root Tests in Panel Data: Asymptotic and Finite-Sample Properties. *Journal of Econometrics, 108*, 1–24.

Munemo, J. (2016). Foreign Direct Investment and Business Start-up in Developing Countries: The Role of Financial Market Development. *Quarterly Review of Economics and Finance, 61*, 1-260.

Rajan, R. G., & Zingales, L. (1998). Financial Dependence and Growth. NBER *American Economic Review*, *88*(3), 559–586.

Rodolphe, D., & Shang-Jin, W. (2017). The Effects of Financial Development on Foreign Direct Investment. *Journal of Development Economics, 127*, 153- 168.

Sahin, S., & Ege, I. (2015). Financial Development and FDI in Greece and Neighboring Countries: A Panel Data Analysis. *Procedia Economics and Finance, 24*, 583–588.

Shapiro, A. C. (2006). Multinational Financial Management, Wiley. Retrieved from https://www.academia.edu/23867264/Multinational_Financial_Manageme_by_Alan_C_Shapiro_10edition.