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Financial development indicators and FDI: international evidence

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ABSTRACT

The relationship between financial development indexes and foreign direct investment is studied in this paper. The main objective was to examine the effects of two groups of financial development indicators (the financial markets index and the financial institution index) on the FDI absorption rate. The happenstance of these indicators was evaluated in the form of panel data models for 10 countries: Saudi Arabia, Argentina, Poland, Belgium, Iran, Thailand, Nigeria, Austria, Norway and Venezuela, in the 1990 to 2017 period. The results show that when the financial institutional index, financial market index and GDP increase, the FDI increases; and when FIA, FMA & FME increase, the FDI decreases. Thus, expanding the capital market increased FDI attraction in the sample countries, and for countries with a 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 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 suggests that access to external finance is an important determinant of FDI (Rodolphe & Shang-Jin, 2017).

Many problem of absorbing foreign direct investment refers 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 & 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 & Linda, 2009).

In this research, the effect of different financial development indicators will be examined on foreign direct investment inflows between 10 countries that are divided according to World Bank studies based on nominal gross domestic product. That countries includes: Saudi Arabia, Argentina, Poland, Belgium, Iran, Thailand, Nigeria, Austria, Norway and Venezuela.

The GDP of four first countries is more than Iran and the GDP of 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 when those countries have reached a certain level of financial development (Chiang & Ping, 2009).

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). It is true that some local firms might 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 & Zingales, 1998).

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.

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 & 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 & Lensink, 2003).

Alfaro & et al (2006) 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, 2006).

Desbordes & 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 & 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 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 & Ege (2015), examined the association between financial development and foreign direct investment (FDI) in Greece and neighbouring 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. In addition, findings indicated that there is bidirectional causality in Turkey (Sahin & 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 reliable estimates and studying dynamic behavior. The basic panel data form can be written as in Equation:

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

There are K regressors in X , and z contains a constant and unit specific variables or unobserved heterogeneous characteristics. If z could be known, then 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 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. Then, Eq.(1) can be written as:

$$y_{it} = x'_{it}\beta + E[z'_i\alpha] + [z'_i\alpha - E[z'_i\alpha]] + \varepsilon_{it} \quad \text{Eq. (2)}$$

$$y_{it} = x'_{it}\beta + \alpha + u_i + \varepsilon_{it} \quad \text{Eq. (3)}$$

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

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 private sector, and GDP per capita.

The series for all countries cover the period 1990–2017; the data are obtained from World Development Indicators (WDI) 2017, published by the World Bank (2017a):

- Foreign direct investment are 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 (word 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 for depletion and degradation of natural resources. Data are in constant 2010 U.S. dollars (word bank, 2017).
- domestic credit to private sector as a percentage of GDP (DCY): Domestic credit to private sector by banks refers to financial resources provided to the private sector by other depository corporations (deposit taking corporations except central banks), such as through loans, purchases of nonequity securities, and trade credits and other accounts receivable, that establish a claim for repayment. For some countries these claims include credit to public enterprises (word bank, 2017).
- Financial development index is a relative ranking of 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 relation 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, stock traded to GDP, international debt of government to GDP, and total debt securities of financial and nonfinancial coorporation to GDP. • financial markets access index(FMA), which compiles data on 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. •financial markets efficiency index(FME), which compiles data on stock market turnover ratio(stocks traded to capitalization). Given the definition of data a positive relation is expected between financial market indexes and FDI.

Due to the availability of the data, we set the time period starting from 1990 to 2017. 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 has been transformed to 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. Eviwes 9 program is used for analysis.

4. 3. The panel unit root tests

Abuaf & Jorion (1990) pointed out that the power of unit root tests may increase by using cross-sectional information. Expanding on the work of Levin & 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:

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

where $t = 1, \dots, T$ time periods and $i = 1, \dots, N$ members in the panel. LLC (2002) test the null hypothesis of $\gamma_i = \gamma = 0$ for all i , against the alternative $\gamma_1 = \gamma_2 = \dots = \gamma < 0$ 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 (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%) 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 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 variable 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
Lfia	-5.4857	0.0000	-5.3723	0.0000	69.8053	0.0000	99.1078	0
Lfid	-4.83963	0.0000	-6.38973	0.0000	85.5551	0.0000	175.524	0
Lfie	-6.30815	0.0000	-5.93249	0.0000	83.3801	0.0000	82.1767	0
lfma	-3.75263	0.0001	-3.13825	0.0008	46.9442	0.0015	73.1066	0
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

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 among several criteria discussed by Bai and Ng (2002).

We estimate the following equation:

$$LFDI_{it} = \alpha_{it} + \alpha_{it}LFIA_{it} + \beta_iLFID_{it} + \beta_iLFIE_{it} + \beta_iLFMA_{it} + \beta_iLFMD_{it} + \beta_iLFME_{it} + \beta_iLGDP_{it} + \beta_iLDCP_{it} + \varepsilon_{it} \quad \text{Eq. (5)}$$

To select between the pooled or panel data has been estimated without any group effect and used form Lagrange Multiplier Tests that the result reject the null hypotheses. Table 2 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)

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 intercept. On the other hand we used from F-limer test so the use of Panel method is approved.

In the Table 3 we select pooled or panel data model, therefore the table 3 represent 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

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

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

Table 4 represent a comparison between two estimate with different effect, where the result approve 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)

** 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. Tables 5 provides the results of the country-by-country and the panel DOLS for the model: (LFDI, LFIA, LFID, LFIE, LFMA, LFMD, LFME, LGDP, LDGP). As shown at the bottom of Table 5, for (LFIA, LFID, LFIE, LFMA, LFMD, LFME, LGDP, LDGP) 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, That 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.

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)
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)
<u>Iran</u>	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)
<u>Thailand</u>	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)
<u>Nigeria</u>	-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)
<u>Austria</u>	- 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)
<u>Norway</u>	-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)

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 there 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 Schwartz Bayesian(SBC).

Table 6. The result is an optimum lag.

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

Note: * indicate minimum of (SBC)

4. 6. The result of 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:

$$\begin{aligned} \Delta LFDI_{it} = & \theta_{1i} + \lambda_1 \varepsilon_{it-1} + \sum_k \theta_{11k} \Delta LFDI_{it-k} + \\ & \sum_k \theta_{12k} \Delta LFIA_{it-k} + \sum_k \theta_{13k} \Delta LFID_{it-k} + \sum_k \theta_{14k} \Delta LFIE_{it-k} + \\ & \sum_k \theta_{15k} \Delta LFMA_{it-k} + \sum_k \theta_{16k} \Delta LFMD_{it-k} + \\ & \sum_k \theta_{17k} \Delta LFME_{it-k} + \sum_k \theta_{18k} \Delta LGDP_{it-k} + \\ & \sum_k \theta_{19k} \Delta LDPC_{it-k} + u_{1it} \end{aligned} \tag{Eq. (6)}$$

$$\begin{aligned} \Delta LFIA_{it} = & \theta_{2i} + \lambda_2 \varepsilon_{it-1} + \sum_k \theta_{21k} \Delta LFDI_{it-k} + \\ & \sum_k \theta_{22k} \Delta LFIA_{it-k} + \sum_k \theta_{23k} \Delta LFID_{it-k} + \sum_k \theta_{24k} \Delta LFIE_{it-k} + \\ & \sum_k \theta_{25k} \Delta LFMA_{it-k} + \sum_k \theta_{26k} \Delta LFMD_{it-k} + \\ & \sum_k \theta_{27k} \Delta LFME_{it-k} + \sum_k \theta_{28k} \Delta LGDP_{it-k} + \\ & \sum_k \theta_{29k} \Delta LDPC_{it-k} + u_{2it} \end{aligned} \tag{Eq. (7)}$$

$$\begin{aligned} \Delta LFID_{it} = & \theta_{2i} + \lambda_2 \varepsilon_{it-1} + \sum_k \theta_{21k} \Delta LFDI_{it-k} + \\ & \sum_k \theta_{22k} \Delta LFIA_{it-k} + \sum_k \theta_{23k} \Delta LFID_{it-k} + \sum_k \theta_{24k} \Delta LFIE_{it-k} + \\ & \sum_k \theta_{25k} \Delta LFMA_{it-k} + \sum_k \theta_{26k} \Delta LFMD_{it-k} + \\ & \sum_k \theta_{27k} \Delta LFME_{it-k} + \sum_k \theta_{28k} \Delta LGDP_{it-k} + \\ & \sum_k \theta_{29k} \Delta LDPC_{it-k} + u_{2it} \end{aligned} \tag{Eq. (8)}$$

$$\begin{aligned} \Delta LFIE_{it} = & \theta_{3i} + \lambda_3 \varepsilon_{it-1} + \sum_k \theta_{31k} \Delta LFDI_{it-k} + \\ & \sum_k \theta_{32k} \Delta LFIA_{it-k} + \sum_k \theta_{33k} \Delta LFID_{it-k} + \sum_k \theta_{34k} \Delta LFIE_{it-k} + \\ & \sum_k \theta_{35k} \Delta LFMA_{it-k} + \sum_k \theta_{36k} \Delta LFMD_{it-k} + \\ & \sum_k \theta_{37k} \Delta LFME_{it-k} + \sum_k \theta_{38k} \Delta LGDP_{it-k} + \\ & \sum_k \theta_{39k} \Delta LDPC_{it-k} + u_{3it} \end{aligned} \tag{Eq. (9)}$$

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

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

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

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

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

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 expelnatory 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 $H_0 : \theta_{22k} = 0$ 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, causal relationship is clearly apparent between FDI and financial markets index. The result shows that uni-directional causality runs from LFDI to LFME in the short run, but the reverse absolutely does not hold true. 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.

Dependent variable	Δ LFDI	Δ LFIA	Δ LFID	Δ LFIE	Δ LFMA	Δ LFMD	Δ LFME	Δ LGDP	Δ LDCP
Δ LFDI	-	0.51752	0.46429	0.49579	2.08773	0.24424	7.6917**	1.71631	0.40869
Δ LFIA	0.53856	-	0.05601	0.17628	0.6934	0.5173	0.04047	2.69177*	0.56255
Δ LFID	0.2246	2.63623*	-	6.051**	0.17071	1.96419	1.23514	3.84303**	3.72209**
Δ LFIE	0.23579	2.2412	3.07436**	-	2.1685	2.18286	1.01622	1.22929	4.27857*
Δ LFMA	0.88299	0.23309	1.03839	2.26597	-	3.55212**	2.00702	1.09764	1.04862
Δ LFMD	0.78091	1.19855	1.20579	1.92185	1.47104	-	0.27152	0.3178	0.25931
Δ LFME	1.1655	5.91279**	2.21967	5.4904**	0.3675	0.52143	-	5.58144**	1.99661
Δ LGDP	1.15605	1.86821	0.30502	3.4567**	0.43066	4.80789**	1.75128	-	0.83648
Δ LDCP	0.39848	1.25135	0.59271	5.23693**	0.56899	1.67418	3.83326**	6.63907**	-

Notes: the null hypothesis is that explanatory variables does 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, stock traded to GDP, international debt of government to GDP, and total debt securities of financial and nonfinancial 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 FIA¹, FMA² and FME³ increase, the FDI decreases around -%0.14, -%0.43 and -%0.21. 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 longrun 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. It is evident that the relationship between FDI and GDP is endogenously influenced by the development of the domestic financial sector. In light of this 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 policy makers 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 so as 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 & ping, 2009). The Table.5 represents that all of explanatory variable (except the FMA, FME and DCP) have a positive effect on FDI in Iran, where the result indicate 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 (like Norway), 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 and Austria), whereas in countries with the opposite features listed above have a negative effect on FDI (some countries like Argentina and Venezuela).

There seems to be a threshold for financial development indicators that, above it, have a positive effect and under the threshold effects have a negative effects on FDI absorption rates.

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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))

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