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DETERMINANT OF FDI: EVIDENCE FROM ORGANIZATION OF THE PETROLEUM EXPORTING COUNTRIES (OPEC)

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ABSTRACT

The paper examined the determinants of foreign direct investment inflows in OPEC countries. This paper aims to find out the major determinants of foreign direct investment in the periods 1985 - 2014 using the Generalized Method of Moment (GMM) and panel data. The results show that GDP, exchange rate, imports, FDI in previous periods and gross fixed capital formation have had a positive and significant effect and government size has a negative and significant effect on FDI inflow in OPEC. Also, inflation and economic openness have no significant effect on FDI.

Keywords: FDI, OPEC, GMM, Investment, Economic openness.
JEL Classification: C23, E22, F21.

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1. INTRODUCTION

Accessing to foreign financial resource seems quite necessary for developing countries as complementary to domestic resources. Foreign capital transferring due to compensating foreign monetary resources will cause facilitating trade for countries. In additionally multinational firms provide remarkable resources to the host country by technology and capital inflow. Economic growth, export improvement and emerging alternative technical through south east Asia, china, India and many other newly industrialized countries all have caused due to attracting FDI. These countries this way have met a higher welfare (Trade Survey Institute, 1990). Impacts of FDI in increasing export and country's economy interaction with other countries is thoroughly vivid. The most important role of FDI is transferring the host countries from exporting raw materials to factory merchandises and industrial ones. In some cases, it will be causing to export goods bearing high technologies. OPEC countries economy is rich in terms of oil, natural and population. They almost possess two third of global oil resources. OPEC has produced %41 of the world oil in 2005. available and extractable oil resources of these countries reached to 1064/28 billion barrels in 2009, which comes to 59/6 of global oil resources. According to the oil global statistics OPEC members in 2012 and 2013 respectively had 1154 and 1117 billion dollars as oil incomes. It is while in 2010 they had $1026 billion oil incomes. Average per capita coming from oil in these countries was 2683 dollars in 2011 (World Bank, 2012). These colossal resources will require investment and also this definitive and limited natural resources and the importance of investment through development and economic growth in these countries seems severely will require FDI.

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2. THEORETICAL BACKGROUND

Empirical literature in FDI effective factors has focused in developing countries on recognizing geographic and encouraging or limiting policies of governments. In most of the cases it has not been presented a strong models (Billington (1999) and Bevan and Estrin (2000)). Kamaly (2004) believes there is no acceptable and comprehensive theory about FDI. In fact, FDI empirical studies must use a realistic solution for choosing explanatory variables in regressions.

In general, FDI acts as capital transfer channel to economies, indeed in a way that FDI is a appropriate stimulus to transfer technology and capital (Koko and Blomstrom, 2003). It also causes enhancing the productivity through manufacturing firms (Markusen *et al*., 1996). Finally FDI has got a direct effect on economic growth in all countries.

In general, FDI in developing countries could enhance their economic performance via technology, productivity and national investment boost (Zahra and George, 2002). Several reasons about the importance of FDI could be mentioned in different countries, Which affecting the citizen welfare, First; increasing FDI will cause increasing aggregate demand and this way higher investment means the society has hired better and more economic resources. Another benefit it has for the society is that the higher FDI will bear higher incomes for individuals and eventually it will cause increase in government tax which increasing infrastructural and welfare expenditures. Also, boosting investment on new machines and capital increase multiplier coefficient of demand component and finally higher and sustainable FDI as the government's economic performance will be enhanced private and entrepreneur trust, Because FDI with its positive effects on firm's benefit and capital market prosperity will bring growth and improving firm efficiencies and management. FDI in addition to financing projects have another positive results over macroeconomic indices: including improving domestic good`s quality, Reducing unemployment, reducing investment risk due to making diversity in properties, decreasing prices and marginal cost, improving manufacturing and economic growth, educating and improving human capital productivity and technology. Import could help FDI because enabling firms via new technology and cause innovation improvements (Coe and Helpman, 1995). About the ultimate influence of import on developing countries, there is no common idea: on one hand a group of economists such as Schmidt (1997) argues: importing high quality goods from developing countries cause the domestic firms try to produce more newer goods with lower costs(competitive effect). In other hand, Bloom *et al.* (2008) argues import allows developing countries to use importing technologies, hence innovative tasks increase through develop countries (reverse engineering effect). Considering about absorbing FDI and compressed competitions to gain that, particularly about key industries such as oil has created prominent changes in economic literature. Oil sector in OPEC countries which bears a high capacity in their economy could be regarded as a prominent sector to attract FDI. We should know this item that most of these countries are developing ones, which are not able to finance their capital and the technology about their oil sector. Therefore FDI seems quite crucial for their economic performance, economic growth and development.

3. LITERATURE REVIEW

Bosworth and Collins (1999) have investigated the influence of FDI inflow over domestic investment within 58 developing countries in 1900-1996. Results show increasing one dollar in importing capital will cause an increase 50 cents in domestic investment which demonstrates the significant differences between the types of investment. Baniak *et al.* (2003) studied effective factors over FDI in developing countries. Results show FDI causes to absorb other countries capital, facilitating manufacturing, transfer technology and to some extend creating new vocations and Specialization through management in the host country. Rapid changes through economy variables causes to reduce FDI inflow, also continuous change in economic and trading rules will weaken FDI inflow. Instability in macroeconomic status and rules changing plays a remarkable role in investor`s decisions. Mossa (2002) has studied

effects of eight elements upon FDI inflow through 38 countries: results show that three variables: export ratio of GDP, telephone lines and the risk has significant impacts FDI in these countries. Loungani *et al.* (2003) has assessed 130 countries to determine effective factor on FDI in 1998-1981. He find out that distance had negative effect but GDP and common language have positive effect on investment inflow. Kim (2003) has investigated effective factors on FDI through the Japan and Europe. Results show infrastructures quality, globalization indices and tax rate had positive effect on FDI in Japan and Euro, and inflation has negative effect.

Egger and Pffafermayr (2004) through a paper entitled FDI and Europe integration, analyzed the gravity model for assessing FDI regarding population and GDP. The results shows the higher population of exporter country, increase FDI in the importer country, Also the host and guest per capita both increase FDI inflow.

4. MODEL

According to theoretical and empirical studies in developing countries, northern Africa and MENA countries and according economic geographic and political status of OPEC, the overall form of the model which is used in this paper is as following:

$$FDI = f(GDP/\ {}^{IMP}/_{G}\ OPEN/\ {}^{G}/_{GDP}\ /\ INF/\ EXCH) \qquad (1)$$

This study has been used to Ben and Giorgioni (2007) model to investigate effective factor on FDI inflow in OPEC countries in 1985-2014. The method for analyzing and estimating model is panel data, in which invisible effect of any country could be evaluated. Final model which is used is as follow:

$$FDI_{it} = \alpha_0 + \alpha_1 GDP_{it} + \alpha_2 ({}^{G}/_{GDP})_{it} + \alpha_3 INF + \alpha_4 EXCH + \alpha_5 OPEN_{it} + \alpha_6 ({}^{IMP}/_{GDP})_{it} + \alpha_7 EXP_{it} + \alpha_8\ GFCF + \dot{\eta}_i + U_{it} \qquad (2)$$

In this equation $\dot{\eta}_i$ is the countries special effect which is determined by dummy variable. i is country, t for year and U_{it} denote error terms. EXP_{it} is export in t and GDP indicating the attractiveness of the market and INF= inflation are used as instability indicators. ($OPEN_{it}$) is economy openness index that is measured by export and import ratios of GDP. IMP/GPP is used as an indicator of demand for foreign commodities has been used before by Hisarciklilar *et al.* (2006). In this models government costs ratio to GDP is G/GDP which is an indicator of government's size. Exchange rate (EXCH) is an indicator of anxiety about risk, instability, economic countries and no friendly relation of the host country with other countries can cause reducing FDI. Ratio of import means the proportion of import to GDP of that country and ratio of export means the proportion of export to GDP of that country, proportions of export or import and economic openness index each one to some extend are economic openness in import, export or both of them which are investigated one by one.

GFCF denote fixed capital formation which includes firm's expenditure through durable machines. According to Wheeler and Mody (1992) and Hisarciklilar *et al.* (2006) which have investigated effective factor on FDI, positive effect of FDI in previous periods was confirmed which will cause to absorb FDI. This way, two year lag of FDI is added to model.

$$FDI_{it} = \alpha_0 + \alpha_1 FDI_{it-1} + \alpha_2 FDI_{it-2} + \alpha_3 GDP_{it} + \alpha_4 ({}^{G}/_{GDP})_{it} + \alpha_5 INF + \alpha_6 EXCH + \alpha_7 OPEN_{it} + +\alpha_8 ({}^{IMP}/_{GDP})_{it} + \alpha_9 EXP_{it} + \alpha_{10}\ GFCF + \dot{\eta}_i + U_{it} \qquad (3)$$

5. METHODOLOGY

The first question in estimating panel data is whether special countries effect is fixed or random. The first hypothesis in random effect is special effect of a country is independent from explanatory variables. Baltagi (2005) believes due to reject of recent hypothesis it will not be proper for estimation using random effect method. Existing relation between special effect of country and explanatory variable are not problematic in fixed effect method, but it is not able to solve the endogenous bias of explanatory variables (Fegheh and Zarranzhad, 2011). On the other hand due to dynamic structure of the model Arellano and Bond (1991) show fixed effect method turn out inconsistency estimates. One of these methods is for this problem through Arellano and Bover (1995) by using this method dependent variable with specified logs is entered; in addition explanatory variables might have serial correlation with error terms. For which Arellano and Bond (1991) suggests two methods. One of them is using first difference of variables for eliminating fixed effects and the other is using orthogonal deviation. In Arellano and Bond (1991) model, instrumental variable matrix is used to make consistency estimate and then Sargan statistic is used for determining equation identification. In this test if null hypothesis is accepted, it show that the equation had been identified more than ordinary magnitude and the model needs instrumental variable, thus log of dependent variable to instrumental variables must be used to eliminate correlation between explanatory variable and error terms, plus respect to first difference method error terms follow Auto-regression process, hence Arellano and Bond (1991) model in order to cause consistent estimators, it is necessary to check Auto-regression. Arellano and Bond (1991) is consistent if Auto-regression is not of degree two, because according to first difference method, error terms follow first degree process.

6. MODEL ESTIMATION

An important issue in estimating economic models is stationary of variables, because in the case of non-stationary t and F statistic lose their efficiency and it is more likely spurious regression emerge.

6.1. Unit Root Test

Necessary and sufficient conditions for a Auto-regression model to be stationary is that the roots get out of unit, also the necessary condition to use Ordinary Least squares (OLS) estimation is non autocorrelation of error terms. So in this study unit root test of PP, ADF, IPS and LLC is used. Stationary test of variables were carried out which the results are as following:

Table-1. Test results for stationary with intercept

variable	*LLC*	*IPS*	*ADF*	*PP*
Log GDP	4.6960	6.2769	3.5166	4.72072
Log FDI	-1.242	-1.395	25.654	27.828
Log IMP/GDP	-2.219	-1.364	30.287	37.317
Log OPEN	-0.655	-1.27	28.05	29.37
Log IMF	-2.275	-3.592	697.43	44.043
Log EXCH	-0.454	-2.909	24.004	24./462
Log EXP	6.9485	6.3570	9.7522	0.4281
Log GFCF	6.85	7.270	0.57	0.57
Log FDI_{t-1}	0.235	0.9354	20.9694	30.1042

Source: the research findings

Table-2. Results of stationary tests with intercept and trend

variable	*LLC*	*ADF*	*PP*
Log GDP	-2.4294	42.2275	66.7991
Log FDI	-10.4081	125.044	204.365
Log IMP/GDP	-13.381	175.06	186.62
Log OPEN	-14.06	194.53	260.46
Log IMF	-13.0031	164.998	230.908
Log EXCH	-28.6509	105.943	151.242
Log EXP	-7.3974	71.8679	133.466
Log GFCF	-3.029	22.97	20.84
Log G/GDP	-6.3986	72.6594	117.022

Resource: the research findings

Results of Stationary tests of variables have been shown in (1),(2) tables. According to LLC statistics every variable including both intercept and trend (except the common border in constant and trend state) are stationary. In the following after doing Chow test, the results have been shown as following

Table-3. Test results F

test	Value F	*probe*
test F	14.12	000/0

Resource: the research findings

The test results indicate the hypothesis null rejects. Hence, to estimate the panel data model should be used. Baltagi (2005) argues that two important hypotheses exist about cross effects of panel model:

1. In the random model, cross effects are not integrated with explanatory variables
2. In the fixed effect model, countries cross effect integrate with explanatory variables:

Hausman test are used to determine the Fix or Random effects for estimating models. The Hausman null hypothesis is that no relation between error term tied with intercept and explanatory variable and they are completely independent. In another word if null hypothesis is rejected and the other one is accepted, then fixed effect method would be consist and random effect as one would be inconsistent and the model should be estimated according to fix effect. Hausman- statistic has Z distribution and if it probe is smaller than %5, fix effect one would be accepted in level %95. Than Hausman test has been done for estimated models. Results are as bellow.

Table-4. Results of the Hausman test

test	χ^2	*probe*
Hausman test	98.86	000/0

Source: the research findings

Hausman test results show that model has fixed effect, hence regression has been estimated with fixed effects and there had been no necessity to estimate with random effect. Parameter λ shows the effect of time upon trend with ceteris paribus.. Regression results in 1985 to 2014 have been shown in table (5) for ten countries.

Table-5. Results of regression fixed effects model

Regressor	Coeff.	S.e.	p-value
Log GDP	0.5660	0.939	0.602457
Log OPEN	0.355158	1.30231	0.0012
Log IMF	-.271955	0.086174	0.0041
Log G/GDP	0.703671	0.46115	0.1396
Log FIX capital formation	0.028428	0.824908	0.9728
Log EXPORT	-0.787607	0.357348	0.037
Log IMPORT	0.770923	0.46115	0.0802
Constant	0.45126	2.650253	0.8662
Log EXCH	0.076509	0.052928	0.1607
R^2	0/96		
F	23.43		0/000

Resource: the research findings

According to results t, R^2 and F statistic are appropriate. inflation and the degree of economy openness coefficient is statistically significant, but coefficients of other variable have not significant. According to the results of the fixed effect model, theories about dynamic of FDI and unobservable effects of any country GMM is used to estimating the model.

3-6- Model Estimation Using GMM

Due to dynamic identify of FDI equations and the unobservable effects of any country using the panel data would be problematic, hence the compatible method such as GMM should be used. Effective factors on FDI through 1985-2014, using the (GMM) have been estimated and evaluated. Results of estimation have been shown in table (6):

Table-6. Model Estimation with GMM)

variable	Coefficient	S.e.	p-value
Log GDP	0/327034	0.03941	0.000
Log OPEN	-0/0932406	0.07868	0.24
Log IMF	-0.0728771	0.1797	0.68
Log FDI_{-1}	0.488858	0/222	0.000
Log G/GDP	-0.127235	0.05055	0.01
Log FIX capital formation	0.520131	0.03664	0.000
Log EXPORT	0.11095	0.06173	0.07
Log IMPORT	0.056468	0.02815	0.05
Constant	0.00950765	1.24	0.22
Log EXCH	0.0678091	0.1351	0.000
AR(2) test (p-value)	3.055		0.14
Sargan test	1.00		
J-test (p-value)	0.000		

Resource: the research findings

One of the problems in regression model is the correlation between error terms. The Autocorrelation has been rejecting to one of regression standard hypothesis and it should be test of Autocorrelation between error terms. To evaluate the existence of this problem in this paper, test AR (2) or M (2) have been used. H_0 hypothesis test is the lack of Autocorrelation. Wald test which has $\chi 2$ distribution with freedom degree of explanatory variables sum minus intercept, show whether the estimated coefficient are significant or not. In other word H_0 hypothesis is explanatory variables are zero.

Consistency of GMM estimators depend on used instrument credibility. To assess this subject, we use the Surgan test. This test has been recommended by Arellano and Bond (1991). Surgan statistic is used to test the credibility of

instrumental variables. It should be said that regarding to table (6). AR (2) statistic with hypothesis zero depending on lack of Autocorrelation have been confirmed. Respect to results in table (6) Surgan test, confirms using instrumental variable to control the correlation between explanatory variable and error terms. According to table (6) and concentrating on results of (GMM), ceteris paribus it is seen, GDP coefficient is positive and significant which shows one percent increase in GDP has caused a %33 increase through OPEC countries FDI. FDI increase rate in (t-1) is positive and significant which is expectable. In fact by increasing %1 in FDI_{t-1}, FDI_t rises up by %48. The government expenditure coefficient is negative and significant and shows %1 governments expenditures increasing of these countries, FDI would decline up by %12. Exchange rate index statistically is completely significant and positive. Indeed in OPEC countries by %1 increasing in exchange rate, FDI rises by %67. Inflation variables index and economic openness coefficient through model have been expectable but not significant. Fixed capital formation variable index is expectably positive and significant, in other word, per any %1 increase in that would cause %52 increases in OPEC countries FDI. Import index statistically is significant and positive that shows with Ceteris Paribus %1 increase in OPEC countries import, FDI raises by %32. According to results of GDP, exchange rate, fixed capital formation, FDI (t-1), ratio of government expenditure and import have a significant effect in FDI description among OPEC countries.

7. ANALYSIS OF FINDINGS

GDP variable has positive effect on FDI through these countries; it is to say with increasing market size, FDI tend to grow in there. Benefit can increase through appropriate economic situation markets, in another word proper markets have had a crucial role in increasing FDI inflow both from demand and supply side. Large coefficient of FDI_{t-1} is due to the impact of first step of FDI. This result, according to the theory which exists in many studies such as Wheeler and Mody (1992). In fact accumulated FDI has a positive and significant effect on FDI in these countries. According to results (G/GDP) is negative and significant, if considered as private investment complementary, tend to prepare the private sector presence in productive economic sectors and domestic capital would increases. On the other side countries by increasing productivity via enhancing training and health and any other effective factor in enabling human capital could help rising FDI and per capita. Totally, it could be said that when governments intervention get more than the optimum in economy, the government`s inefficiency would be clarified more via crowding out effect. On the other side in this paper government expenditure as index was declared of government intervention in economic activities doesn't necessarily mean its negative effect over every activity. Thus politicians and policy makers not only should consider the government's expenditures segments optimally: including current and other expenditure through economic activities. Thus governments by knowing influence extremity and magnitude of their expenditure fragments could influence FDI dramatically. In OPEC countries, import technically could import R&D. It means they could promote their technical knowledge by importing capital goods and localizing them. Exchange rate index statistically is completely significant and bears positive sign. Exchange rate sign has been unexpected that money depreciation causes to absorb FDI in these countries, if currency appreciation is considered as a sign for more increases in the future (due to better management or political stability) it could cause the FDI to increase. Since agglomeration might happen, this interpretation could be accurate in another word former FDI inflow has positive effect on current inflow.

8. CONCLUSION

The aim of this paper is to study, the determining factors of foreign direct investment (FDI) inflows in OPEC over the period of 1985-2014 by using a GMM model and panel data. Results shows GDP exchange rate, import and fixed capital formation had positive and significant effect on FDI. In another word, with increasing GDP, exchange

rate, import, FDI_{t-1} and fixed capital formation FDI increase. Government size bears a negative and significant effect on FDI in OPEC countries. Also, inflation and economic openness variables are not significant statistically.

9. POLITICAL ADVICES

Accessing to high economic growth and development as a fundamental objective of macroeconomic policy has been always concentrated by decision makers and economist. Regarding to FDI is an influential way over economy demand and supply, hence making right decisions to access considered objectives regarding to FDI plays a crucial role in economy of these countries. Considering the findings of this paper following cases are revealed as advices: first, it is crucial to provide condition to absorb FDI in this way, improving financial market, improving infrastructures. According to the results: negative effect of government size over FDI: it would be better government activities get moderated via increasing private sector activities. Respect to exchange rate bears positive and significant effect on FDI in the OPEC countries, therefore, it is advised to reducing trading limits such as tariff.

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REFERENCES

Arellano, M. and S.R. Bond, 1991. Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. Review of Economic Studies, 58(2): 277-297.

Arellano, M. and O. Bover, 1995. Another look at the instrumental-variable estimation of error-components models. Journal of Econometric, 68(1): 29-51.

Baltagi, B.H., 2005. Econometric analysis of panel data. 3rd Edn., England: John Wiley & Sons, Ltd.

Baniak, A., J. Cukrowski and J. Herczynski, 2003. On determinants of foreign direct investment in transition economics. Problems of Economic Transition, 48(2): 6-28.

Ben, T.H. and G. Giorgioni, 2007. The determinants of foreign direct investment. Liverpool Business School, and Moors University.

Bevan, A. and S. Estrin, 2000. The determinants of foreign direct investment in transition economics. Working Paper, No. 342, Centre for New and Emerging Markets, London Business School.

Billington, N., 1999. The location of foreign direct investment: An empirical analysis. Applied Economics, 31(1): 65-76.

Bloom, N., M. Draca and J. Van Reenen, 2008. Trade induced technical change? The impact of Chinese imports on IT andInnovation. Retrieved from www.Stanford.edu,~nbloom,TITC.pdf.

Bosworth, P.B. and M.S. Collins, 1999. Capital flows to developing economies: Implications for saving and investment. Brookings Papers on Economic Activity, Economic Studies Program, The Brookings Institution, 30(1): 143-180.

Coe, D. and E. Helpman, 1995. International R&D spillovers. European Economic Review, 39(5): 859-887.

Egger, P. and M. Pffafermayr, 2004. FDI and integration in the 1990s. World Economy, 27(1): 99-110.

Fegheh, M.A. and M. Zarranzhad, 2011. Examined the economic convergence of nations. Ph.D. Dissertation, Martyr Chamran University.

Hisarciklilar, M., S. Kayam and O. Kayalica, 2006. Locational drivers of FDI in MENA countries: A spatial attempt. Department of Management Engineering, Istanbul Technical University, MPRT Pepar, No. 2085.

Kamaly, A., 2004. Evaluation if FDI flows into the MENA Region. Economic Research Forum Working Paper Series, Cairo, Egypt.

Kim, Z.K., 2003. The effects of international economic on FDI determinants Japanese and US FDI in Europe. In: blake. Montclair.Edu Conference USA3.

Koko, A. and M. Blomstrom, 2003. The economics of FDI incentives. Journal Review of World Economics, 144(1): 151-118.

Loungani, P., A. Mody, A. Razin and E. Sadka, 2003. The role of information in driving FDI theory and evidence. Paper Presented in North American Winter Meeting of the Econometric Society, January.

Markusen, J., A. Venables, D. Konan and K. Zhang, 1996. A unified treatment of horizontal direct investment, vertical direct investment and the pattern of trade in goods and services. NBER Working Paper No 5696.

Mossa, I., 2002. Foreign direct investment theory, evidence and.

Schmidt, K., 1997. Managerial incentives and product market competition. Review of Economic Studies, 64(2): 191-213.

Trade Survey Institute, 1990. Annual Report, Iran, Tehran.

Wheeler, D. and A. Mody, 1992. International investment location decisions: The case of US firm. Journal of International Economics, 33(1): 57-76.

World Bank, 2012. WDI. Washington DC: CD.

Zahra, S.A. and G. George, 2002. Absorptive capacity: A review, reconceptualization, and extension. Academy of Management Review, 27(2): 185-203.

BIBLIOGRAPHY

Ari, K. and B. Magnus, 2003. The economics of FDI incentives. Journal Review of World Economics, 144(1): 151-118.