Impact of Foreign Direct Investment on The Industrial Development: Evidence from Asian Countries

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Abstract

This study is conducted to examine the effect of Foreign Direct Investment (FDI) on industrial development in Asian countries. A sample of six Asian countries including Bangladesh, China, India, Malaysia, Sri Lanka and Pakistan has been taken from a period of 1991 to 2013 and panel data model has been used. Panel diagnostic tests such as Chow test, Hausman specification test and Breusch-Pagan test have been used to decide which panel model is to be used. These tests suggest Pooled OLS model as it got higher votes. In this research, the impact of four explanatory variables including Foreign Direct Investment (FDI), Trade openness, interest rate and infrastructure are measured on Industrial development using Pooled OLS model. The findings of the study suggest that FDI has significant positive relation with industrial development which shows that FDI is a very crucial element for the industrial development of any country. Whereas trade openness has insignificant relation with industrial development. Interest rate has significant negative association with industrial development which states that if the government increases interest rate, it will discourage the investors to make investment. Infrastructure have significant negative relation with industrial development. In case of infrastructure, the negative sign shows that despite of poor infrastructure facilities, foreign investors make investment in these countries which is a good sign. The findings of current study are similar with the Neo-Classical Theory of Growth. The results of current study show that foreign direct investment is beneficial for industrial development as it has a positive relation.

Keywords: FDI, Industrial development, Manufacturing Sector.

Foreign direct investment (FDI) is a source of globalization. Most of the countries in the world including both develop and developing countries consider FDI as a key factor for economic and industrial development of any country. FDI can be best explained as, "(FDI) is an investment made by individuals and companies in another country, in the form of acquiring business asset or beginning business operations, as controlling interest or ownership OECD (2000). As per definition, FDI is a cross-border financing made by a company/country into another company/country having an objective of obtaining long lasting profit or benefit. The country/company that makes investment has full control over the firm where investment is to be made. Simply the home country has full control over the host country.

According to Hymer (1959), FDI is a means of transferring tangible assets in the form of latest technology, equipment, machinery and intangible assets in the form of managerial skills, labor skills to start production at international level. According to Pan (2002) research, FDI has been a key area of study for the last ten years by international economies. Previous studies clearly show the importance of foreign direct investment in bringing latest technology, capital and infrastructure development to the country in which investment is to be made from the country which make investment. It also improves living standard of people of host country. FDI is not only the transfer of tangible assets like capital and technology to the host country but also the movement of those assets that can't be touched in the form of managerial skills, marketing skills and labor skills. Foreign direct investment is a basis of money. In FDI countries which are financially weak acquire funds from those countries that are financially strong in the form of FDI.

In recent decades, FDI has performed a vital role in the industrialization of the industries across the world. The major effect of FDI on growth and development has been seen in those developing nations which are more open to investment and trade. (UNCTAD). The FDI are more attracted to those countries which provide an open environment to the investors in the form of removing trade barriers, trade duties. According to Wong (2003), the part of FDI in the development of a country in which investment is made is becoming important. The movement of funds through FDI enables both host country and home country to get benefit from exchange of funds. Foreign direct investment perform a function of catalyst in the development of those countries that lack of funds, both the tangible assets like latest technology and intangible assets like capital, managerial skills to make investment in huge projects. Thus the transfer of the tangible and intangible assets to the host country helps the host country to make industrial growth and increase productivity. Findlay (1978) also finds that FDI boosts up the productivity of the country in which investment is made. It is because of the fact that there will come the latest and more advanced technology and method of production in the host country which will boost up the production in all the sectors including industrial and manufacturing sector.

Literature shows that other researchers have also worked on this topic. However, those studies have considered single country as their sample (see for example, Wong, 2003; Adelegan, 2000; Chen, 1996; Yang, 1999; Broadman and Sun, 1997; Globerman, 1979; Blomstrom, 1986; Hsieh, 2006). Whereas, the present study has used a sample of multiple Asian countries including Bangladesh, China, India, Malaysia, Sri Lanka and Pakistan. The present research contributes to the literature in the sense that a panel of multiple countries has been created and the panel data models have been used rather than that of time series models for the purpose of studying a single country. Thus, the findings of the

present study are more generalized than the previous studies**.** The main objective of this study is to analyze the impact of foreign direct investment on industrial development in Asian countries.

Literature Review

If we examine the literature on FDI, then it shows positive effect, negative effect or mix effect. This change comes due to many reasons like due to different regions or due to the variables of the study for which the research have taken place. FDI help the local firms to take the advantage of latest technology and to produce at low cost and to compete at international level.

Azam and Khattak (2009) found a tendency of FDI in Pakistan. Their study examined that the main purpose of the home country is profit maximization while the basic objective of the country in which investment is made or the host country is to make development and growth. Study reveals that 70% of FDI in our country comes from stocks of oil and gas, telecom, banking. After 2001, when the government provide friendly environment for foreign investors, then FDI increased in Pakistan. The investors are attracting towards Pakistan as they consider it to be safer for investment.

Mahmood and Choudhry (2013) found the effect of foreign direct investment on taxes in Pakistan. The study consist of GDP and FDI as independent variables, whereas their dependent variable is tax revenue. The purpose of studying short and long run association among these variables they used ARDL and error correction model. The study finds a significant positive association of foreign direct investment and GDP on Pakistan tax revenue. The study finds that FDI contribute a lot for generating tax in Pakistan which directly increases growth of Pakistan.

Yasin and Ramazan (2013) studied that either FDI effects economic growth and if so then how it effects economic growth in Pakistan. The basic purpose was to find that either exports or imports brings growth and development in a country through FDI or not. This purpose annual data has been collected from the period of 1976-2010. To find relationship between variables auto regression distributed (ARDL) model has been used and results revealed no significant association among the variables in long run.

Anwar and Afza (2014) examined the effect of various factors like political instability, unsatisfactory law and order situation, electricity problem on that of FDI. They want to know that either these effect FDI or not. To know the effect, a time series data from a period of 1970-2010 has been taken and various FDI variables are used in Pakistan. For detailed analysis, regression techniques were used. The results of regression model showed that 98% changes in the dependent variable are explained by explanatory variables. They found that there are many factors that have significantly negative assoication with FDI inflows in

Pakistan. These are the major hurdles of FDI inflow in Pakistan. These include political instability, terrorism, electricity and gas shortage that have significantly negative relationship with FDI. Gas is the main factor that adversely affect industrial growth, because if there comes shortage of gas, then it result in gas load shedding that on the other hand effect the industrial/manufacture sector.

Blomstrom et al., (1992) considered a sample of more than one developing countries and gets the same results. They found that the effect of foreign direct investment on economic development and industrial development in those countries which are developing is very strong and on contrary this impact is low in developed countries. Human resource is very important to get fully benefit from it. For this purpose he take a sample of 69 developing nations and performed a cross country regressions. They also found the same result that foreign direct investment contribution in development is more than that of investment made by local firms Borensztein et al., (1998).

Hale and Long (2006) found a positive effect of foreign direct investment on host country. For this, they take a sample of 1500 companies from china in order to investigate the effect of spillover effects from foreign country to the country in which investment is made i.e. host country firms operating in the same industry.

Nunnanenkamp and Spatz (2003) conducted study on the impact of FDI on economy of the country and their industrial growth. For their study they used data of United States stock in abroad. They found a weak association of FDI on that of growth. They further noticed that the relationship between FDI and growth is much stronger in those countries that have more favorable conditions for trade like trade openness, good political situation, and skilled labour force. They said that it is too easier to attract the FDI rather than that of getting benefit from foreign direct investment.

Thomas et al., (2008) investigated the impact of FDI on the development in the host country. They argued that FDI creates competition in the country in which investment is made. This results in increase in production. Sasidharan (2006) study the impact of FDI on the manufacturing sector of Indian firms from a period of 1994 to 2002. He took a sample of 2700 manufacturing sectors from India and he came to the result that there is no impact of FDI on the manufacturing sector in India.

Djankov and Hoekman (2000) took a sample from a period of 1992-1996 of Czech industries and found the same results that FDI plays a main part in the development of firms. They found that FDI play a vital role in industrial growth of a country. Economy of a country will boost up if there come FDI in a country. They present the reason behind this that due to foreign direct investment, latest technology and managerial skills come from home country to host country.

Busse and Groizard (2006) made study to know the impact of FDI on development. They found that foreign direct investment has no effect on those countries that are highly restricted and highly regulated. Whereas some of the studies shows that FDI is good in those countries that are restricted or have restricted environment.

Ram and Zhang (2002), took the data of large cross section of countries from the period of 1990s and they also come to the same result that FDI is good and has positive significant impact on industrial development and growth. Their result is consistent with that of neo classical theory of growth. Their study shows that FDI bring development in the economy of a country. Karpaty and Poldahl (2006) made a detail study on the impact of FDI in Sweden at industry sector. They found a positive effect of technology, labour skills and managerial skills on such inflows.

Research Methodology

This research methodology includes a sample of the current study, data collection sources, variables of the study and techniques for data analysis. The current chapter provides information about the data collection sources, the independent variables and dependent variable in the study and their brief explanation. The different techniques for data analysis including Pooled OLS model, REM and FEM and various panel diagnostic tests including Breusch-Pagan test, chow test and Hausman specification test that will suggest which model should be used in the current study.

Universe and Sample of the study

The current study examines how FDI affects the industrial development. All of the 48 Asian countries are the population of current study. The sample of current study include six developing countries of Asia including: Bangladesh, China, India, Malaysia, Pakistan and Sri Lanka. There were 138 annual observations in the study from the period of 1991 to 2013.

Data Collection Sources

The current study is based on the secondary data of six countries that include Bangladesh, China, India, Malaysia, Pakistan and Sri Lanka. The required data for the current study is obtained through different sources i.e. website of world data bank, world development indicators (WDI), IMF IFS database. The data of the sample countries have been organized in the form of panel data, having 138 observations.

Variables of the Study

The independent and dependent variables of the current study are mentioned below.

Dependent Variable

The industrial development is the variable of interest of the study. The manufacturing sector value-added is used as a proxy for industrial development to estimate the effect of foreign direct investment on industrial growth as suggested by johansen (1998), and Philips and Hansen (2000). The data of foreign direct investment consists of FDI net inflow (as a percentage of GDP) as suggested by Lardy (1995) and Pomfred (1997).

Independent Variables

The independent variables of current study include FDI, interest rate (IR), infrastructure (IF), trade openness.

Foreign Direct Investment

FDI is measured as percentage of GDP as suggested by Te Velde and Morrissey (2002), Lipsey (2002), Lardy (1995), and Pomfred (1997).

Trade Openness

Suggested by Malik (2015), Levin and Renelt (1992), Beck et al., (2000), Anoruo and Ahmad (2000), and Cotsomitis (1991), Sachs and warner (1995).

$$Trade\ openness = \frac{Exports + Imports}{GDP} * 100$$

Interest Rate

Discount rate is used as a proxy to measure interest rate as suggested by John Maynard Keynes (1936) and Gross and Trevino (1996).

Infrastructure

Telephone lines per thousand people are used as a proxy to measure infrastructure as consider by Sahoo et al., (2010), Khaliq and Noy (2007), Perkins et al., (2005), Aker and Mbiti (2010), Muto and Yamano (2009), Jensen (2007), Tsen (2005).

Model Specification

$\text{Manf}_{it} = \alpha + \beta_1\,\text{FD}_{it} + \beta_2\text{TOP}_{it} + \beta_3\text{IR}_{it} + \beta_4\text{IF}_{it} + e_{it}$

Where,

Manf_{it} = Manufacturing

α = Intercept

FDI = Foreign Direct Investment

TOP = Trade Openness

IR = Interest Rate

IF = Infrastructure

e = Error term

Data Analysis and Results

This section explains and summarizes the results of the study and other conversions in the light of the hypothesis and objective of the study. This section includes the results of the data and their interpretation with proper justification. The current study gives new results and information on the basis of new data which are used in the research. The results are interpreted with proper explanations stepwise. The results are discussed below.

Panel Diagnostic Tests

The current study used panel regression models in the panel data. These panel regression models include Random effect model, fixed effect model and Pooled OLS. To select between these panel regression models, panel diagnostic tests including Chow Test, Breusch-Pagan Test and Hausman Specification test are used. These panel diagnostics test are explained one by one below.

Table 1. *Chow Test*

Variables	Coefficient	SE	p-value
FDI	0.86164	0.38396	0.02690
Trade Openness	-1.0258	2.944	0.72822
Interest Rate	-0.27666	0.12959	0.03508
Infrastructure	-0.075612	0.028445	0.00907
Constant	9.9167	1.977	0.00000
F (5, 106) = 1.31787		P-value =0.262084	

For the purpose of selecting the most appropriate model between Pooled regression and FEM, Chow test is used.
The hypothesis of Chow test are:

Ho: Pooled OLS model is better than fixed effect model
H1: Pooled OLS model is not better than fixed effect model.

The null hypothesis cannot be rejected if the tabulated P-value is greater than 0.05, which recommends that the Pooled OLS is appropriate model. However, if the P-value is below 0.05, alternative hypothesis is accepted which states that the fixed effect model is consistent. The results from Table 1 shows that the P value (0.2620) is more than 0.05. Hence, we cannot reject the null hypothesis and is suggested that Pooled OLS model is better than FEM.

Table 2. *Breusch-Pagan Test*

Variables	Coefficient	SE	p-value
FDI	1.0463	0.31039	0.00103
Trade openness	-0.075761	1.962	0.96927
Interest rate	-0.25556	0.094438	0.00788
Infrastructure	-0.077519	0.026426	0.00407
Constant	9.0015	1.3602	0.00000

Prob (Chi^2)>0.0235972	P-value = 0.877914

Breusch-Pagan test is used in the study to decide the best model among Pooled OLS model and REM. The hypothesis of Breusch-Pagan test are as follows:

H0: Pooled OLS model is better than Random effect model.
H1: Pooled OLS model is not better than Random effect model.

The null hypothesis cannot be rejected if the tabulated P-value is greater than 0.05 which recommends the Pooled OLS as the appropriate model. However, alternative hypothesis is accepted if the P-value is less than 0.05 which states that the random effect model are consistent. The results from Table 2 shows that the P-value (0.8779) is greater than 0.05, hence we cannot reject the null hypothesis that Pooled OLS is better than the Random effects model. Thus we can conclude that Pooled OLS model is better than REM.

Table 3. *Hausman Test*

Variables	Coefficient	SE	p-value
FDI	1.02330	0.31039	0.03103
Trade openness	-0.09576	1.33563	0.07292
Interest rate	-0.34542	0.045434	0.03468
Infrastructure	-0.077519	0.045524	0.00204
Constant	9.0015	1.3602	0.00033
	Prob (Chi^2)>1.63355	P-value = 0.80275	

Hausman specification test is a statistical test which is used to make selection between FEM and REM in panel data. The hypothesis of Hausman test are

H0: Random effect model is better than fixed effect model.
H1: Random effect model is not better than fixed effect model.

If the P-value of this test is large then FEM is used and if it is small then the REM is used. (Green, 2008).The results given above shows that the P value (0.80275) is greater than 0.05, hence we can't reject the null hypothesis and conclude that random effect model is better than fixed effect model.

Table 4. *Summary of the Panel Diagnostic Tests*

Tests	Null hypothesis (H$_0$)	P-Value	Recommended Model
Chow test	Pooled OLS model is better than FEM	0.2620	Pooled OLS model
Breusch-pagan test	Pooled OLS model is better REM	0.8779	Pooled OLS model

Hausman test	REM is better than FEM.	0.8027	Random Effect model

Table 4.4 shows the summary of the panel diagnostic tests which were conducted in order to know that which model is appropriate for the present study. Among the panel diagnostic tests the Chow and Breusch-Pagan tests suggest that the Pooled OLS is appropriate while the Hausman test indicates the random effects model is suitable. On the basis of various tests conducted it is concluded that pooled OLS is more suitable for the present study since it has got higher votes.

Test for the Problem of Heteroscedasticity
The white test of heteroscedasticity has been used to check the problem of hetero in the model. Table 4 shows result of white test for heteroscedasticity in the model.

Table 5. *White's Test of Heteroscedasticity*

Variables	Coefficient	SE	t-ratio	P-value
FDI	15.9578	7.10675	2.245	0.0269
Trade openness	-152.926	49.9832	-3.060	0.0028
Interest rate	-1.23060	2.16244	-0.5691	0.5706
Infrastructure	-1.64893	1.51617	-1.088	0.2794
Constant	37.9669	17.2323	2.203	0.0298
$Chi^2 (14) = 21.857830$		$Prob > chi^2 = 0.081583$		

Following are the underlying hypothesis of the white test…
H_0: heteroscedasticity does not exist in the model
H_A: heteroscedasticity problem exists in the model.

If the error variance is not persistent for all of the observation, then it is called as that of heteroscedasticity problem (Maddala, 1992). One of the basic assumption of Ordinary Least Square is that the variables must have constant error term i.e. the variables must be Homoscedastic. Table 5 shows the results of white test for heteroscedasticity. The null hypothesis can't be rejected if tabulated P-value is greater than 0.05 and the alternative native hypothesis is rejected and null hypothesis is accepted which shows that there is no issue of heteroscedasticity in the model.

Multicollinearity Test

Table 6. *Results of Variance Inflation Factor Test*

Variables	VIF
FDI Net inflows	2.361
Trade openness	2.068

Interest Rate	1.165
Infrastructure	1.096

Minimum possible value = 1.0
Values > 10.0 may indicate a collinearity Problem

Multicollinearity indications the interdependency of one explanatory variable with other explanatory variables in the model. The association among variable of interest and explanatory variable cannot be measured precisely if there is a problem of multicollinearity in the data. Variance inflation factor is used in the study to verify multicollinearity among explanatory variables. Table 6 the value of variance inflation factor (VIF) test outcome comes above 10, then it suggests the multicollinearity problem in the model. If the value of variance inflation factor test is less than 10 and above 1, then it shows that there is no problem of multicollinearity among variables.

Table 7 clearly shows that all of the values of explanatory variables are below 10, so there is no problem of multicollinearity problem in the model.

Table 7. *Pooled Regression, (Dependent Variable - Industrial Development)*

Variables	Coefficient	Std. Err	t-ratio	P-value
FDI	1.1678	0.2667	4.378	0.0000
Trade Openness	0.1752	1.6414	0.1068	0.9152
Interest Rate	-0.2335	0.0697	-3.347	0.0011
Infrastructure	-0.0792	0.0250	-3.156	0.0021
Constant	8.4589	0.9045	9.351	0.0000
R-squared = 0.385402		F-value = 17.40144		p-value =0.00000

Table 7 reports results of the pooled regression. R-square shows how close the data is fitted to regression line and it shows that 38% of the variations in the industrial development is described by independent variables i.e. FDI, trade openness, interest rate,   and infrastructure. F-value and its underlying P-value show the overall fitness of the model. Since P-value is less than 0.05 hence it is an indication of the good fit of the model.

The coefficient of FDI is1.16787 which shows that by increasing one unit in FDI, brings an increase of 1.16787 unit in that of the industrial development. And at 5% level the coefficient of foreign direct investment is significant because the p-value for foreign direct investment coefficient (p-value=0.0000) which is less than 0.05. So we can say that there is a significantly positive bond among that of FDI and that of Industrial development. This determinant plays a vital role in defining the association between that of dependent variable and

independent variable and it is also an important part of independent variables. If there come more investors in a country and bring more capital in the the country in which they are going to make investment, then it increase the economy of the country. If the foreign direct investment in a country increases then it increases the industrial development in that country because more funds come in that country and that country gets benefit from it if they have lack of funds. These results are matching with the results of Rivera-Batiz and Rivera-Batiz (1991), Findlay (1978), Globerman (1979), Aitken and Harrison (1999), Hsieh (2006) and Blomstrom (1986), Ayanwale and Bamire (2001), Javorick (2004), Kugler (2006) and Liu (2008), Hale and Long (2006) who also found a positive association between foreign direct investment and industrial development. These results are same with the neo-classical theory of growth which states that if there comes foreign direct investment in a country, then it will boost up the economy and industrial development of that country.

The coefficient of Trade Openness is 0.175281 which shows that one unit change in trade openness brings a positive change of 0.175281 unit in Industrial development. As the p-value for trade openness coefficient is 0.9152 which is greater than 0.05, so there is an insignificant relationship between that of trade openness and industrial development which means that there is no effect of trade openness on industrial development. These results are same with the study of Demidova and Rodriguez-Clare (2013), Adenikinju and Olofin (2000), Lucas (1988), Grossman and Helpman 1989; 1991 and Romer (1990), Krishna and Mitra (1998), Harrison (1994), and Lecraw (1991) who also found the same relationship between trade openness and industrial development. It means that if a country decrease tariffs and other duties related to trade it will directly affect industrial development. The investors get encouragement to make investment in those countries that are open to trade.

The coefficient of interest rateis-0.233592 which clearly indicates that with one unit increase in that of interest rate bring a decline of -0.233592 units in that of Industrial development. The p-value of the coefficient of interest rate is 0.0011 which is less than 0.05, so it shows that the relationship between interest rate and industrial development is significant. The negative sign indicates a negative association among that of interest rate and industrial development. So there is significant and inverse relationship or significant and negative relationship between these two variables. It is a main thing that will inspire those of the investors either to make investment decision or not. The investors search those countries to invest where they got more favorable conditions for investment and where less risk is involved for the investors. When the interest rate in a country is high then it is not good for that country and the investors feel hesitation to invest in that country because if bank rate is high they can't be able to get loans on a high interest rate which is the

major factor that stop the investors to invest in the country. The study by Khan and Khan (2010), Udoka and Roland (2012) also found similar results

The coefficient of infrastructures -0.0792038 which indicates that with one unit increase in infrastructure brings a decline of -0.0792038 units in that of industrial development. Here the p-value of the coefficient of the coefficient of infrastructure is 0.0021 which is less than 0.05. So there is a significant association among that of infrastructure and industrial development. The negative sign shows that there is a negative and significant association between that of infrastructure and industrial development. As the infrastructure of our country is very poor, which is insufficient to attract foreign investors to come and make investment. The study shows that despite that poor infrastructure, foreign direct investment comes in our country.

Conclusion

The current study shows that foreign direct investment has positive and significant effect on the industrial development. This positive relationship shows that increase in FDI brings an up rise in industrial development in a country. The results are consistent with that of neo-classical theory of growth which states that through foreign direct investment, there comes latest technology, managerial skills and labor skills to the host country that will boost its economy and will promote its industrial development. Trade openness has insignificant relationship on the industrial development which shows that liberalization in trade is good for industries. If the government liberalizes the trade, more investors will come to a country and make investments. Interest rate had negative and significant relationship with industrial development which shows that with an increase in interest rate, there comes a decrease in industrial development. Infrastructure had negative and significant impact on industrial development of selected countries. Normally in general case if the infrastructure of a host country is good, more investors are attracted towards that country. There should be a positive relationship between infrastructure and industrial development. But in this case, the results showed that infrastructure had negative relationship with industrial development. It means that despite poor infrastructure facilities, FDI comes these countries which is a good sign.

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