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Impact of FDI on GDP: An Analysis of Global Economy on Production Function

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ABSTRACT

This study examines the effects of Foreign Direct Investment Inflows on Gross Domestic Product on the production function theory by balanced panel data of World Development Indicators from 1992 to 2010 of 59 countries representing the global economy.

The empirical analysis on basis of generalized least squares estimator with random effects suggests that there is a significant positive relationship between all the variables of Production Function including Gross Domestic Product and Foreign Direct Investment Inflows. The unit root test confirms the model's predictive validity and all the three variables significantly explain variation in the Gross Domestic Product, Co-integration test confirms the long-run relationship and Granger causality test finally identifies the presence of unidirectional causality among Gross Domestic Product and Foreign Direct Investment Inflows and Bidirectional causality between the all variables of the original production function.

It is recommended for the host nations to emphasize on pro-capital polices to attract and maximize foreign direct investment inflows which will ultimately increase Gross Domestic Product of the host nations.

Key words

Foreign Direct Investment, Gross Domestic Product, Production Function.

INTRODUCTION

Background

A straight forward description for general understanding can be understood as Foreign direct investment refers to the country A's long term partaking into country B, typically involving contribution in knowledge, management, transmit of technology and joint-venture. Many of the different institutions describe Foreign Direct Investment in a different way and the most acknowledged one is that specified by International Monetary Fund in which it states that it is referred to as the gaining the common stock, private venture by overseas sponsor or voting authority in a public by the means of at least ten percent. Foreign Direct Investment engages

a long-lasting importance in the management of a venture or enterprise and involves continuous investment of profits.

In this age of modernization our world is experiencing substantial influence of rapid globalization completely changing the dynamics of how the businesses were done in the past. The consequences of such globalization are being felt considerably as it has resulted in the global expansion of Foreign Direct Investment.

At the same time such remarkable expansion has resulted along with a significant growth in the global business. There is no substantial constraint in performing global business and boundaries of performing business have blurred overtime and this phenomenon is termed as “Global Village”. FDI has proven to be a critical element in strengthening the relation among businesses, constituencies and nations. The increasing worldwide direct investment and portfolio flows, worldwide trade and business are all elements of this process and it is through this particular process that the less developed or the developing countries have an unparallel opportunity for accelerated growth and prosperity through the mean of global investment and trade.

1970 was a period was a rapid growth in the global trade was observed and it was more rapid increase then the FDI itself so at that time global trade was a better option by far than any other worldwide economic activities. This scenario was radically altered in the heart of the 1980s when the surge in the world FDI started with a sharp increase. A result of this FDI proved its magnitude of importance by strengthening procuring and marketing networks for proficient manufacturing and sales globally.¹ Foreign Direct Investment from the past two decades has changed the traditional economic relations in the world economy. FDI stock of the world reached more than \$ 4 trillion by year 1998 about 800% more than what it was in 1980. The outsized increase in the FDI volume in the past decades not only highlights its significance but in addition offers strong motivation for carrying out such study on this phenomenon as well.

Problem Statement

Many researches in the past have been conducted regarding the impact of FDI on GDI but the center of those studies remained on single country analysis, bi-country analysis or comparison of few countries relating to their continents, regions or any other part of the world where these countries are located. As compared to this far less work has been done in analyzing the impact of FDI on the global economy where as some studies have used similar approach but an assessment particularly by considering the top economies of the world by the measure of GDP by PPP to represent the world economy itself lacks where a considerable space exists that pleads to be fulfilled.

Objective of the Study

The heart of this study is to examine the influence of foreign direct investment on the global economy.

Research Question

- What is the impact of foreign direct investment on the global economy?

Scope of the study

The scope of this study concentrates on how the foreign direct investment influences the global economy. In this study we identify that how all the variables of production function including Gross Capital Formation, Labor Force and Foreign Direct Investment, impact the

¹ Urata (1998)

Gross Domestic Product further we analyze that which of these predicting variables are the most and the least important variables in explaining the Gross Domestic Product representing the global economy. Furthermore this study will draw certain conclusions and implications that might prove beneficial and assist the policy makers in suggesting and prioritizing future policies.

Limitations

Like any other man made creation this study is also plagued with limitations and chiefly with the limitation of the data scarcity that has resulted in reducing the sample period to 19 years from 1992 to 2010 in constructing the balanced panel for data analysis.

LITERATURE REVIEW

Theoretical Background

FDI encourages Growth: Robust Evidences

All nations in this world are determined and working towards economic development as a consequence of which they are attracting and welcoming foreign investors to engage in their factors of production. Numerous factors promote or restrict the development of any country such factors are frequently recognized as stimulants that are: (1) Big capital investment, (2) Superior Technologies, (3) Expert and Qualified Labor, (4) Developed infrastructure including transportation as well as communication, (5) Steady and favorable political and social organizations, (6) Minimal taxation, furthermore, (7) Encouraging regulating environment.² Variation in the pace of growth of different countries can be explained by the change and variation in the level and intensity of these particular factors.³

For long FDI has been acknowledged as a key supply of technology and knowledge to the less developed countries. Without a doubt FDI has the ability to transmit the production knowledge but as well as the managerial expertise that renders it different from all sorts of investments whether we consider aid or portfolio capital. In some cases the foreign portfolio investment in developing countries might contribute to the formation of capital but capital flows from this route are often limited where the technology improvements are also not offered that are essential in competing in the global markets. Not only FDI can help in picking up the pace of economic growth through breeding employment opportunities, facilitates in reducing the saving and investment gap but also through disbursing knowledge, competence and skills in the host nations.⁴ Besides the existence of foreign firm with superior knowledge and technical know-how in the economy of any host nation can trigger healthy competition that may prove to be favorable as a result of which domestic firms might also invest in order to stay shoulder to shoulder with the competition. The competition among the domestic firms using their own funds in research and development might force the firms abroad to fetch and deploy advanced technology and superior knowledge. The host country experiences the spillovers of the productivity generated by FDI.⁵ A thought is that transnational companies have enhanced production capabilities and management skills out of which some are acquire by the domestic firms of the host nation when these transnational companies exist in the economy. In short the skills brought in by the foreign firms improve the capital stock's productivity and boosts the growth of the host nation.⁶ Some points here in

² World Investment Report UNCTAD (1994)

³ Dondeti and Mohanty (2007)

⁴ Frenkel *et al.* (2004)

⁵ Blomstrom and Kokko (1998)

⁶ Wang and Blomstrom (1992)

consideration also support the concept of FDI promoting the economic growth: (1) Host country is provided financial resources needed through FDI, (2) Through FDI superior manufacturing technologies are transferred from the developed countries to the less developed countries where it acts as a vehicle, (3) FDI boosts the competition in the markets of the host nation, (4) FDI promotes the foreign exchange reserves that ultimately increases the exports of the host nation, (5) Knowledge and skills related to management are also brought by FDI that are essential for operations, (6) FDI improves the opportunities for better training and employment for the people residing in the host nation, (7) FDI trims down the burden of import on the host nation through the substitution of the imports, (8) FDI performs as a medium for enhancing the domestic investment as well as savings.⁷ FDI is a conduit through which a host country can take part in the process of globalization and gain access to the markets worldwide.⁸ If the FDI inflows are properly managed they can stimulate the growth rate of the host nation.⁹ The extent up to which the FDI benefits can be utilized for economic growth primarily depends upon the economic environment. If such environment is not present FDI might prove to be destructive or it might blemish rather than promoting the growth.

Empirical Studies

Chadee *et al.* (1997) the relationship between Foreign Direct Investment and economic growth has drawn the attention of researcher quite recently than other research works discuss some aspects of foreign direct investment in the Asia-Pacific Region and conclude that FDI has made a positive contribution to all the economies of that particular region.

Borensztein *et al.* (1998) developed a research of 69 developing countries confirms that FDI contributes towards the economies of the less Developed countries, if they have the capabilities to absorb advanced technologies. The World Investment Report UNCTAD of 1999 also describes some econometric models for determining the impact of FDI on growth after analyzing the data from 11 countries East Asia and Latin America, using econometric techniques such as unit root and co-integration tests.

Fan *et al.* (2000) analyzed the involvement of FDI to the growth and steadiness of Indonesia, Singapore, Thailand, Malaysia and the Philippines during the period of 1987–1997. They used the Cobb-Douglas regression models to evaluate the impact of FDI on economic growth. The results of the study showed that FDI is significant and positively related to the economic growth of these five ASEAN economies.

Zhang (2001) examined the data of 11 countries in East Asia and Latin America of the period 1970-1995. Stationarity test and co-integration techniques were used to evaluate the relationship between FDI and growth. The study found that FDI improved growth in five of the eleven countries. The study indicated that the impact of FDI on growth varied with the economic environment of the host country.

Baliamoune-Lutz (2004) investigated FDI against growth and exports and findings of his study show there is a strong negative correlation between the export ratio and economic growth in the post 1993 years which is the liberalized FDI era for Morocco. He also suggested that Growth does not cause FDI; Growth does not cause exports further FDI and exports have bidirectional causality, apart from having a positive impact from exports to economic growth.

Reynolds *et al.* (2004) examined the observed relationship between FDI flows and the level of telecommunications infrastructure using data from 212 countries of the period 1960-1998.

⁷ Ram and Zhang (2002)

⁸ Dondeti and Mohanty (2007)

⁹ Bezuidenhout (2009)

He proved that there is the positive relationship between FDI and telecommunications infrastructure, and FDI and GDP also have a positive relationship.

Carkovic *et al.* (2005) analyzed the relationship between FDI flows and economic development in 72 countries over the period 1960-1995 using a dynamic panel data. The results show that the FDI flow is positively related to economic growth, and from the sensitivity analysis it was identified that relationship between FDI and TFP (total factor productivity) is not significant. Further study revealed there is no positive impact on economic growth from portfolio investment.

Seetanah *et al.* (2005) analyzed the impact of FDI on economic growth of 39 Sub-Saharan African countries by using panel data for the period of 1980-2000 using Cobb Douglas production function. The study found that FDI is a crucial part of economic deliverance in Sub-Saharan African countries. Further, the positive link is also confirmed by using GMM panel estimation.

Ilhan *et al.* (2007) investigated the impact of FDI on economic growth of Turkey and Pakistan over the period of 1975-2004 using Engle-Granger co-integration and Granger causality techniques. They found that increment in GDP is caused by FDI in the case of Pakistan; however, whereas evidence of bidirectional causality existed between FDI and GDP in the context of Turkey.

Herzer *et al.* (2007) has argued by examining data of with 28 developing countries, that there is neither a long-term nor a short-term relation of FDI with growth and there is not a single country where a positive unidirectional long-term effect from FDI to GDP is found.

Mortaza *et al.* (2007) studied relationship among FDI, trade liberalization and economic growth for five Asian countries over the period of 1980-2004 by using panel data. He explored positive relationship between FDI and economic growth. He also examined the causality among FDI, trade liberalization and economic growth using particular data of each country over the sample period. They stated that FDI makes huge impact on local investment and trade liberalization along with FDI makes country's economic growth upward for Bangladesh and Pakistan.

Miankhel *et al.* (2009) investigated the data of 6 emerging countries of China, India, Mexico, Malaysia, Pakistan and Thailand over the period of 1970-2005 using vector error correction mechanism (VECM) to observe the relationship between export, FDI and GDP. Their results suggested that FDI drives the economic growth of India while exports drive the economic growth of Pakistan and bidirectional causality between GDP and FDI in Thailand while no causal relationship in Malaysia among East Asian countries.

Rudra *et al.* (2009) examined the relationship between FDI and economic growth of five ASEAN over the period of 1970-2007 using co-integration and causality test in by using individual and combined panel approach. Their result suggested that foreign direct investment and economic growth have a long-run relationship and also suggested that there was bidirectional Granger causality between GDP and economic growth for all countries except Malaysia. They stated that FDI is widely accepted as an agent to country's economic growth and it is very important in developing countries due to reduce the savings and investment gap.

Sridharan (2009) analyzed the causality between FDI and economic growth of the BRICS countries over the different periods of selected countries based on the Johannes co-integration test and vector error correction model (VECM). Results suggested that there was bidirectional causality between FDI and GDP for Brazil, Russia and South Africa and one way Granger relationship that FDI caused with economic growth for India and China.

METHODOLOGY

Model

To construct our model we started with basic production function equation. Suppose the level of output in an economy is determined by the factors of production and the production technology adopted by the host nation:

$$Y = f(K, L)$$

Wherein the above mentioned function Y represents the output level or GDP, K represents the amount of capital which is measured by Gross Capital Formation (GCF), and L represents the amount of labor which is measured by the total labor force of the country. Hereby any increase in either amounts labor or capital or increase in both of them will result increase in the level of output in the economy assuming that the level of technology remains constant. Further this production function was further enhanced in the new growth theory.¹⁰

Foreign direct investment is a key resource for the integration and growth for the developing countries in the global economy.¹¹ Another study suggests that there exists a positive constructive role perform by FDI is well recognized.¹² FDI exerts positive impact on the economic growth of the host nations. A different persuasive argument exists on the part of the FDI that it is a package of capital, an access to the markets and management of technology. FDI seems to be aimed at those infrastructures and manufacturing facilities that enjoy a competitive edge because of the fact that they are in a better position to create the economies of scale and attain production advantages. When foreign investors make profits they tend to reinvest the profits in the system again so the actual repayment burdens are nullified. Developing confidence is also an upside on the part of FDI although it is a fact that the overall degree of investment confidence is determined by the domestic environment. FDI inflows can strengthen the confidence of the investors causing the formation of constructive cycle that not only influences the foreign and domestic investment positively but the production as well. In view of the fact that FDI has a substantial role in influencing the production of any host nation it is therefore included in the model to estimate its impact on the global economy.

Considering the above production function in context of panel generalized least square estimator and in the light of theory and past studies the evaluation of the above function can be done on the basis of following equation:

$$Y = \beta_0 + \beta_1 (K) + \beta_2 (L) + \beta_3 (FDI) + \varepsilon \quad (\text{Eq1})$$

Where:

Y = Gross Domestic Product

K = Gross Capital Formation

L = Labor Force

FDI = Foreign Direct Investment

Furthermore β_0 represents the total level of output that is not accounted by all the three factors and error term in this econometric model is denoted by ε . In this study the log values of the variables are used for model estimation in order to enhance the data normality and to facilitate the application of the statistical techniques.

¹⁰ Sala-i-Martin (1995)

¹¹ Ogutcu (2002)

¹² Chen (1992)

Data

This study uses the Balanced Panel generated with the data sourced from the World Development Indicators,¹³ where a sample of 59 countries,¹⁴ by the measure of Gross Domestic Product by Purchasing Power Parity was selected to represent the global economy for the period from 1992 to 2010 resulting in 59 cross-sections to identify the effects of foreign direct investment inflows on global economy. Further out of the available data of 214 countries at WDI the data of 155 countries was dropped from the balanced panel because of data scarcity, not conforming to the mathematical transformation used in this study and because of not meeting the criterion set for the time period chosen for the formation of balanced panel for this particular analysis. The data set used in this study consists of Gross Domestic Product by Purchasing Power Parity in current international US Dollars, Gross capital formation in current US Dollars, Labor force in total and Foreign Direct Investment, net inflows by Balance of Payments in current US Dollars.

Estimation and Results

Data analysis was conducted with the help of Microsoft Excel 2010 and statistical software including E-Views 8 and Gretl 1.9.12. Results of the statistical techniques and estimations performed in this study are discussed below.

Unit Root Test

The integration and bonding properties of the data are scrutinized by using unit root tests. Because of the possible and suspected structural breaks in the series themselves, unit root test were performed using the Hadri Test. In the model there might be a chance of trend or non stationarity which may be arising from and other sources of structural instability and external shocks, and might have occurred in the period under examination that might render our further analysis spurious.

Unit root tests for stationary were performed on at levels, first differences and second differences for all variables to be used in the model. Two different models have been considered while performing tests (i.e. individual intercept (*II*) individual intercept and trend (*II and T*)). The results of the unit root tests are reported in Table 1.1.¹⁵

The test results validate the rejection of the null hypothesis that there is stationarity at level for each variable on the basis of the Hadri test. First differencing of the variables also yields the rejection of null hypothesis for each variable. Further the second differencing of the variables yields acceptance of the null hypothesis that there is stationarity; for all variables. Based on these test results, it is, therefore, concluded that all series are second difference stationary in both models of individual intercept (*II*) individual intercept and trend (*II and T*).

Co-Integration Test:

After running stationary test we run the co-integration test because of the fact that our model might exhibit long run validity. So we investigate such phenomenon by using the Gross Domestic Product as dependent, Gross Capital Formation, Labor Force and Foreign Direct Investment as the independent variables at both trend specifications in particular at

¹³ World Development Indicators (WDI) is the primary World Bank collection of development indicators.

¹⁴ 59 countries in their alphabetical order are: Albania, Armenia, Bahamas, The, Bangladesh, Belarus, Brazil, Bulgaria, Burkina Faso, Chile, China, Colombia, Costa Rica, Cyprus, Dominican Republic, Egypt, Arab Rep., Ethiopia, France, Ghana, Guatemala, Guinea, Honduras, India, Israel, Kazakhstan, Kenya, Korea, Rep., Malaysia, Mexico, Moldova, Mongolia, Morocco, Mozambique, Namibia, Netherlands, Nicaragua, Pakistan, Panama, Paraguay, Philippines, Poland, Portugal, Romania, Russian Federation, Rwanda, Singapore, Spain, Sri Lanka, Switzerland, Syrian Arab Republic, Tanzania, Thailand, Tunisia, Turkey, Uganda, Ukraine, United Kingdom, United States, Vietnam and Zambia.

¹⁵ See Appendix, Page#13

Individual Intercept and at Individual Intercept and Individual Trend. To authenticate this we use the Panel co-integration test with the Pedroni Engle-Granger test type that has been previously used and validated in the empirical studies.

Beginning with the null hypothesis of no co-integration between the variables is rejected as shown in the table 1.2 in favor of general alternative that there is co-integration as values of Phillips-Peron and Augmented Dickey-Fuller statistics in both Panel and group at both trend specifications are smaller than 0.100.¹⁶

GLS (Random Effects)

To determine the relationship of the considered variables of production function generalized least squares estimator with random effects is applied. Results of the test are shown in Table 1.3,¹⁷ which suggests that all variables are statistically significant at 1% level of significance. Therefore it is clear that there is a significant positive impact of FDI K and L on GDP.

Breusch-Pagan Test

To develop our model the generalized least squares estimator technique is pursued but in order to authenticate whether it is adequate for developing our model we applied the Breusch-Pagan Test. As apparent from the Table 1.4,¹⁸ the p-value of Breusch-Pagan Test is 0.063 which indicates the rejection of our null hypothesis that variance of the unit-specific error equals zero at 10% level of significance and concludes that the GLS estimator is appropriate.

Hausman Test

As the generalized least squares estimator is generated using random effects so we need to determine that whether random effects are appropriate for developing our model, to validate this we applied the Hausman test. Results of the test are shown in Table 1.5.¹⁹ Results show the acceptance of our null hypothesis that the GLS estimates are consistent and random effects are appropriate as the p-value of Hausman test is 0.481.

Variance Inflation Factor

As a rule of thumb in regression model it is important that there is a bare minimum correlation among the independent variables. By analyzing variance inflation factor it is identified that in our model the problem of multicollinearity does not exist because values of VIF for all the independent variables are less than 10 as in the table 1.6.²⁰

Causality Analysis

The direction of causality between Gross Domestic Product, Gross Capital Formation, Labor Force and Foreign Direct Investment remain unspecified. One approach of dealing with such a concern is to discover the direction of causality using Granger causality method. The standalone Granger causality leads to spurious outcomes unless or until the variables in level are co-integrated where in this study we have determined that the variables considered are co-integrated. On the other hand Toda and Yamamoto (1995) procedure uses a modified Wald (*MWALD*) test which can be applied irrespective of order of integration.

¹⁶ See Appendix, Page#13

¹⁷ See Appendix, Page#13

¹⁸ See Appendix, Page#13

¹⁹ See Appendix, Page#14

²⁰ See Appendix, Page#14

The results of Granger causality test based on Toda and Yamamoto procedure are reported in Table 1.7.²¹ The values in parentheses are probability values while rests of the estimates are F-statistics.

We reject our hypothesis: K does not Granger Cause GDP because of the prob. value that is 0.000 and as well as, we reject our hypothesis GDP does not Granger Cause K because of the prob. value that is 0.000. We reject our hypothesis: L does not Granger Cause GDP because of the prob. value that is 0.000 and as well as, we reject our hypothesis GDP does not Granger Cause L because of the prob. value that is 0.000. We accept our hypothesis: FDI does not Granger Cause GDP because of the prob. value that is 0.214 and we reject our hypothesis GDP does not Granger Cause FDI because of the prob. value that is 0.000. We reject our hypothesis: L does not Granger Cause K because of the prob. value that is 0.000 and as well as, we reject our hypothesis K does not Granger Cause L because of the prob. value that is 0.000. We reject our hypothesis: FDI does not Granger Cause K because of the prob. value that is 0.001 and as well as, we reject our hypothesis K does not Granger Cause FDI because of the prob. value that is 0.000. We reject our hypothesis: FDI does not Granger Cause L because of the prob. value that is 0.001 and as well as, we reject our hypothesis L does not Granger Cause FDI because of the prob. value that is 0.000.

Descriptive Statistics

Descriptive statistics were also drawn from the data to explain additional information regarding its characteristics which will further explain the actual data structure and the weight of each variable against the other. The descriptive statistics from the data are reported shown in the table 1.8.²² The results indicate that Gross Domestic Product has the highest mean, median, maximum and minimum values among all the variables considered in the data which confirms it to be the most weighted part of the data followed by Gross Capital Formation, Foreign Direct investment and Labor Force respectively.

FINDINGS

Observed outcomes of this study are in complete harmony with theoretical framework further this study identifies and confirms that the FDI exerts a positive impact on the global economy and this phenomenon is similar to the previous studies and in the general context of global economy we can conclude that FDI positively influences the global economy.²³ Further analysis also revealed that the nature of this relationship is unidirectional where the FDI doesn't directly cause the increase in the GDP further FDI also has a bidirectional causal relationship with the original factors of the production function i.e. Capital and Labor and they in return contribute positively and have bidirectional causal relation with the GDP. So it is evident that in the context of global economy FDI influences and positively contributes in the GDP indirectly through causing other factors of production by the means of facilitating capital formation and employment opportunities which is again in line with the theory, however the results might be different when we take a country or region specific approach as suggested in the past studies.²⁴

The maximum value of Gross Domestic product was observed in the country United States of America in the year 2010 while the minimum value was observed in the country Rwanda in the year 1994 further the average Gross Domestic Product throughout the considered period of all 59 countries was about \$531 billion. The maximum value of Gross Capital Formation was observed in the country China in the year 2010 while the minimum value was observed

²¹ See Appendix, Page#14

²² See Appendix, Page#14

²³ Chadee *et al.* (1997) and Reynolds (2004)

²⁴ Ilhan *et al.* (2007), Herzer (2007), Miankhel *et al.* (2009) and Sridharan (2009)

in the country Armenia in the year 1992 further the average Gross Capital Formation throughout the considered period of all 59 countries was about \$88.4 billion. The maximum value of Labor Force was observed in the country China in the year 2010 while the minimum value was observe in the country The Bahamas in the year 1992 further the average Labor Force throughout the considered period of all 59 countries was about 36.393 million. The maximum value of Foreign Direct Investment was observed in the country United States of America in the year 2007 while the minimum value was observed in the country Rwanda in the year 1994 further the average Foreign Direct Investment throughout the considered period of all 59 countries was about \$9.92 billion.

This study also reveals an estimate of changes in our dependent variable with respect to the movement of our independent variables that are considered as the factors of production function in this context and since it is previously confirmed that co-integration exists in our model so these estimates will also be valid in the long run as well. Findings suggest that 1% increase in Gross Capital Formation would result in 0.69% increase in Gross Domestic Product while other things remain constant. Whereas 1% increase in Labor Force would result in 0.25% increase in Gross Domestic Product while other things remain constant. Furthermore 1% increase in Foreign Direct Investment would result in 0.036% increase in Gross Domestic Product while other things remain constant.

CONCLUSION

Present research aims to investigate the effect of FDI on the global economy and special care is taken on the issue of structural changes by choosing the appropriate time period with the help of empirical studies. The factors included as per the modified production function model were Gross Domestic Product, Gross Capital Formation, Labor Force and Foreign Direct Investment among which GDP was dependent variable while rest three were independent variables. First of all the factors were check for stationarity and all the variables were found second difference stationary. Secondly the model formed was scrutinized through the co-integration test to validate the long run validity. After running GLS estimator with random effects we confirmed that all factors of production function i.e. Capital, Labor and FDI promote GDP and further provides an estimate that every 1% increase in FDI would result in 0.036% increase in GDP, while other things remain constant. Finally causality analysis revealed the bidirectional causality among all the variables of the original production function except unidirectional causality exists among the GDP and FDI where GDP exerts causal effects on FDI and FDI in return has no causal effect on GDP.

RECOMMENDATIONS

In the light of this study following are some recommendations that are suggested for exerting positive impact on a countries economy by attracting high levels of FDI inflows:

- Primarily the law and order situation of a host nation are to be stabilized by the government of the host nation in order to provide a working ground and a safe zone in order to lure the foreign investor to bring their capital investment along with them.
- Taxation of the foreign investor should be nominal and the government should adapt to a minimal taxation policy.
- The other way round such policies should be formulated that curb the capital flight from the host nation.
- The provision of sound, friendly and favorable environment to the foreign investors is the responsibility on the part of the Policy makers.
- Foreign investors should be given amplified incentives for transmitting technology to the host nation which will ultimately prove beneficial for local firms as well.

- Firm implementation on the import-substitution policy might prove beneficial for attracting FDI inflows in the host nation.

FUTURE STUDIES

- It is suggested that studies in the future may be conducted with the inclusion of more countries or different countries may also be used in the future studies so that further value adding conclusions might be drawn.
- Moreover it is suggested that other variables might also be included in the future studies so that a broader and diverse picture of this particular domain may also be revealed.
- The problem of data scarcity might also be reduced in a way that if those variables are used in the future studies that are less plagued with the problem of data scarcity.
- This study is conducted with the sample size of 1121 where future studies can increase the sample size in order to further strengthen the accuracy of the findings.

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APPENDIX

Table 1.1

Stationarity Test Results

Variables	Hadri test statistics			
	Second Difference			
	Individual Intercept		Individual Intercept and Trend	
	Hadri Z-Stat	Prob.	Hadri Z-Stat	Prob.
GDP	-5.451	1.000	-4.738	1.000
K	-4.863	1.000	-3.571	1.000
L	-4.441	1.000	-2.678	0.996
FDI	-5.642	1.000	-4.911	1.000

Source: Authors' estimations

Table 1.2

Co-integration Test Results

	Individual Intercept		Individual Intercept and Individual Trend	
	Statistic	Prob.	Statistic	Prob.
Panel PP-Statistic	-2.721	0.003	-2.815	0.002
Panel ADF-Statistic	-2.131	0.017	-4.322	0.000
Group PP-Statistic	-1.639	0.051	-15.683	0.000
Group ADF-Statistic	-1.956	0.025	-8.008	0.000

Source: Authors' estimations

Table 1.3

Long Run Determinants of Global Economy

Variable	Coefficient	T-ratio	P-value
C	4.387	41.747	<0.001 ***
K	0.696	63.443	<0.001 ***
L	0.256	30.541	<0.001 ***
FDI	0.036	4.698	<0.001 ***

***, **, * Denote significance at a 1%, 5%, 10% level.

Note: Log values of the variables are used for model estimation

Source: Authors' estimations

Table 1.4

Breusch-Pagan Test

Test Summary	Chi-square(1)	P-value
Asymptotic test statistic	3.449	0.063

Source: Authors' estimations

Table 1.5
Hausmen Test

Test Summary	Chi-Square(3)	P-value
Asymptotic test statistic	2.470	0.481

Source: Authors' estimations

Table 1.6
Variance Inflation Factor

Variable	VIF
K	6.487
L	2.141
FDI	4.447

Source: Authors' estimations

Table 1.7
Causality Test Result

Dependent Variables		GDP	K	L	FDI
GDP	F-Statistic	-	13.217	17.790	1.547
	Prob.	-	0.000	0.000	0.214
K	F-Statistic	97.934	-	14.179	12.061
	Prob.	0.000	-	0.000	0.001
L	F-Statistic	29.095	17.094	-	10.733
	Prob.	0.000	0.000	-	0.001
FDI	F-Statistic	101.997	114.583	19.971	-
	Prob.	0.000	0.000	0.000	-

Source: Authors' estimations

Table 1.8
Descriptive Statistics

	GDP	K	L	FDI
Mean	\$531,000,000,000	\$88,400,000,000	36,393,477	\$9,920,000,000
Median	\$84,500,000,000	\$7,930,000,000	8,191,259	\$860,000,000
Maximum	14,419,400,000,000	\$2,859,619,007,443	799,541,706	\$340,065,000,000
Minimum	\$1,913,915,167	\$20,759,025	133,689	\$1,000

Note: Values in the above table are non-log and expressed in their original units.

Source: Authors' estimations