THE DETERMINANTS OF FOREIGN INVESTMENT IN PAKISTAN: A GRAVITY MODEL ANALYSIS

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ABSTRACT. Background: During the last two decades Pakistan was one of the most attractive countries that received Foreign Direct Investment (FDI) among developing economies, and especially in first half of the last decade the growth was so rapid and sustainable in different industries as well as in agriculture. In Pakistani economy the role of Foreign Direct Investment is very important. Policies are clear about the foreign investment even then adjustments are made according to the time, objective, needs and economic circumstances in the country.

Methods: The present study aims to investigate the determinants of foreign investment in Pakistan by using Gravity model. By using panel data of FDI which is used as dependent variable and Gross domestic product, Gross domestic product per capita, Gross domestic product growth rate, Inflation rate, Trade, Total government expenditure, Population growth and Distance used as independent variable from 1999 to 2009 for empirical consequences, the study encompasses the examination of Foreign Direct Investment inflows from different countries and their geographical distance from Pakistan.

Results: Two type of test is used (1) fixed and (2) random effect to check the relationship among foreign direct investment and independent variables. In our both models distance shows a negative impact on the decision to make an investment by investing partner while GDP and GDP growth have a positive and significant impact. Gravity in this regards does not effect that much for foreign direct investment attraction because results are negatively significant in this case that shows higher distance is a hurdle for the inflow of foreign investment but rest of the variables are significantly positive and related to the inflow of foreign investment except population growth which is negatively correlated.

Conclusion: This research concludes that there is a strong evidence of existence of gravity between Pakistan and its investing partners. It is also conclude that those countries have less distance from Pakistan, having more investment in Pakistan, therefore, attracting these countries for investment in Pakistan would cause a greater chance of economic growth in Pakistan.

Key words: gravity model, foreign investments, Pakistan.

INTRODUCTION

World is transformed into global village and the developing countries and developing countries also try to be part of this transformation. To overcome the scarcity of technology and capital therefore they always try to attract foreign investment inflow in their economy. Both the investor and the investee are having mutual benefit of foreign investment. The local market provides the facility of withdrawing the skill resources within the host country. This provides the employment opportunities to the local ones and this act of foreign direct investment (FDI) helped its contribution in the economic growth as compared to the local investment in the country. It is also said that external financing is one of the major sources of the foreign direct investment that contributes along with the savings of the host country. As foreign direct investment accompanies the technical know how, so this also help the host country to be more innovative in research and development (R&D) sector which also leads towards self dependency, higher GDP and at the end contribute in the expansion of exports, more employment and higher tax revenue for government [Mirza 2004]. In 1990s the global foreign direct investment grows significantly which shows rise of about 54000 transnational corporations. These corporation as

recorded were responsible of global inflows to developing countries of almost average of 13% of total inflows from 1990-1997 [Carson C. S. 2003]. Over inflow of 70% and outflow of 94% is accounted by the developed countries of the world [International Monetary Fund 2003]. In the last couple of decades the trend of Regional Trading Agreements (RTAs) and Bilateral Trade Agreements (BTAs) have grown remarkably. A large number of World Trade Organization (WTO) Countries are the members of Regional Trading Agreements. World Trade Organization notified total 312 Regional Trading Agreements out of 170 are in position in 2005, whereas remaining are in operation [Rahman, Shadat & Das 2006].

Pakistan started to facilitate foreign investor and for this market based economic reorganizational policies are introduced in early 1980 and in late 1980s. At the same time government has also taken the start towards the liberalization of trade and investment attraction, like offering the generous fiscal and trade incentives to the upcoming investors like provision of credit facility, tax and tariff concessions as well as relaxing the control over foreign exchange [Khan & Kim 1999]. In start political stability, peaceful law and order situation, level of technical labor force and mineral resources and liberal policies of the government became main forces to attract foreign investors in Pakistan [Aqeel & Nishat 2005]. But later political instability rumors and inconsistent policies, electricity shortage and then law and order situation affect the inflow of foreign investment in Pakistan. These are the main contributors of very low foreign investment in last couple of years. The economic policies of Pakistan shows heavy reliance on foreign investment, this decade brought significant amount of 22881 million dollars of FDI in Pakistan. The specific objectives of this research include; evaluation of the foreign investment in Pakistan, to evaluate the determinants of foreign investment inflows into Pakistan using Gravity Model and to the improvement of investment climate in Pakistan for the attraction of FDI, policy recommendation are provided to the makers of policy.

As this is one of the main concerns of government to increase foreign direct investment inflow in country. Panel estimation with the help of gravity model is done to see the inflow of foreign direct investment from different countries and see the impact of different determinants on the policies to make investment in Pakistan. This study targets GDP growth, GDP p/c, Inflation and the distance as main factor which may influence the decision of investing partner to invest and see what should be done to increase the trend of FDI inflow in Pakistan, as Pakistan was an emerging market for foreign investment, therefore an empirical solution is needed to find out the rational of liberalization and deregulation and its impact on FDI, this study tries to provide the answer to all these problems.

LITERATURE REVIEW

Foreign investment plays an important role in the development of the any country, foreign investment not only provide the capital necessary for the growth but also helps out by providing job opportunities to the people of host countries. Foreign direct invest and foreign portfolio investment are the two kinds of foreign investment, where direct investment relates investment of a country or MNEs multinational enterprises in a particular field while portfolio investment focuses to invest in different fields. From home to host country attraction of foreign investment heavily rely on some incentives and factors that could include tax exemptions, market size, demand of investment in particular investing area, expectation of return, political environment etc. According to Razin and Loungani [2001] foreign direct investment faces a threat of being reversed to home country through financial transaction and benefits are limited by leverage. They also point out that FDI excess in total country's capital reflects weakness rather strength. Habib and Zurawick [2002] study examine the impact of corruption on foreign direct investment (FDI), panel data of 89 countries including developed and developing countries is used. Two models are used OLS regression and PROBIT. The result provides support for the negative impacts of corruption and foreign direct investment (FDI). The findings leads that the foreign investors usually stay away from corruption because it is taken as a wrong and it guide towards the operational inefficiencies. FDI helps out the countries that are very much behind in innovation and technology because of FDI the investing countries shift somehow the technology for the operation purposes in host countries. The shifting of that technology gives the opportunities to the

host countries to excel in the innovation and technology field. Hejazi and Pauly [2003] study keep focus on the changing pattern of foreign direct investment (FDI) and its impact on the domestic gross fixed capital formation (GFCF), they regress the data of 15 available Canadian industries over the period from 1984 to 1995. They find that the increase in inflow of foreign direct investment (FDI) contributes to domestic capital formation, on the other case increased outward flow of FDI reduces it, and this generalization is inappropriate. They find that rapid growth in outward FDI, relative to inward growth, should not be considered as a negative development, and may reflect success. Empirical identification of determinants of growth in foreign direct investment in Pakistan from 1961 to 2003 by using different variables like GDP, Wages, Tariff and Exchange rate and also indicators that reflects trade, fiscal and liberalization in financial sector that helps in the attraction of FDI in Pakistan [Aqeel and Nishat 2005]. They use co-integration and error correction techniques, results indicates that the share price index and wage rate are insignificants for the attraction of FDI while others are, besides the policy of attraction of FDI on both long and short run in Pakistan. The base of gravity model is linkage and interaction of different countries across border. This model has indirect relationship between the destination and base. Ratnayake and Townsend [1999] applied the Gravity Model to analyzing the geographical pattern of international trade. The researcher had worn the concept of the Gravity Model from Anderson [1979] and Bergstrand [1985] to convey the function of variables representing the supply and demand conditions of exporters and importers and trade resisting and promoting factors. The findings of the researchers showed that distance and exporter and importer incomes are highly significant in all year's estimated (1987-1992). The coefficient for the exporter population is also highly significant. However, the coefficient for the importer population is major in only three out of six years. The dummy variable is positive in all years as expected, but it is considerably different from the relationship among group members. The Gravity Model can estimate the cause of international trade on international debt [Rose and Spiegel, 2004]. Rose and Spiegel estimated a wealth of potential variables. Their study showed a significantly positive effect of bilateral trade on bilateral lending patterns, debtors tended to borrow more from creditors with whom they shared more international trade ties. Africano and Magalhães [2005] study the relationship between FDI stock and geographical prototype of flow of trade in Portuguese economy. The gravity model applied to trade between Portugal and organization of economic cooperation and development countries including Brazil of two year from 1998-2000. The attraction of inflow of FDI is positively associated with the trade and closely linked between two countries. Due to increase inflow of FDI reflects its strength in the shape of increasing the export as compared import and this helps the country to maintain a good trade balance. Outflow of FDI has no significant impact on exports and imports of Portugal. They also find out that FDI helps to maintain above normal exports to other countries and EU while below normal imports from the candidates countries.

THEORETICAL FRAMEWORK

Foreign investment flows from home to host country which have several reason of flowing like low labor cost, low material, tax exemptions, market size and possibility of growth etc. one of the basic aim of every investor is to maximize the profit so that's why keeping in view of highest return the foreign investment travels from home to host country. The investing firms and countries keep a close look on the abundance of the resources the host one have and lack of competition because of lower quality of production. Electric paradigm is theory of economics that analytically views all the researches and studies of foreign direct investment and international production. Internationalization theory is the base of Electric paradigm which includes specific factors by location of different countries from the determination of foreign investment. Internationalization theory itself base on transaction cost theory and according to that theory internationalization is when transaction cost in free market is higher than within institution [Dunning 1980]. Resource-Based Theory, Grant [1980] states that competitive advantage can be gained by the business according to their market share by keeping in view of two things where and how to compete. The competitive advantage can be defined as the advantage that a firm have in particular field over its competitors. Internal and external forces help

a lot for the attainment of Competitive advantage [Barney 2001]. According to the Resource-Based Theory, firms can beat their competitors even if they have short, rare and unique resources by improving their performance of using those resources that is how the competitive advantage can be attained. For the better use of resources, resources are the base like financial, human resource and organizational resources. Definition of network as described by Porras, Clegg, & Crawfor, [2004] is "a long-term relationship between organizations as actors that share resources to achieve negotiated actions for joint objectives". The idea behind of networks is to bring FDI and explore those resources which are still waiting to exploit. Networks are one of the biggest ways to attract FDI and will help towards sustainable development and attaining the competitive advantage. These advantages are attaining expertise in the business field, market intelligence etc. [Chen and Chen 1998, Gulati, Nohria, & Zaheer 2006]. Newton's law of Gravitation is the base of resemblance of gravity model which is used for the prediction of commodities and movement information between different countries and distances among them [Rosenberg 2004]. The base of gravity model is linkage and interaction of different countries across border. This model has indirect relationship between the destination and base.

William J. Reilly set up the Reilly's Law of Retail Gravitation in 1931.

Written as

$$F_{ij} = \frac{A\ M_i\ M_j}{D_{ij}}$$

where:

F_{ij} is the gravity forces

M_i and M_j are the national incomes in country i and j, respectively,

D_{ij} is the distance between country i,

A is a constant of proportionality.

METHODOLOGICAL NOTES AND DATA SOURCES

Previously, many studies target to see and evaluate the determinants of foreign investment and effect of gravity on the inflow of foreign investment. This study also tries to see the influence of different factors on FDI inflow in Pakistan. Gravity model has been used by many researchers to analyze the role of different factors to attract FDI inflow in different economies but in Pakistan yet no research made for the determinants of foreign investment using Gravity model. Therefore this study may a driving force to start research on this issue in Pakistan.

DATA SOURCES

This study evaluates determinants of FDI by using gravity approach. FDI is dependent variable and GDP, GDP Per Capita (PCGDP), GDP Growth Rate, Inflation Rate, Trade, total government expenditure (TOTGOVEXP), population growth (POPGR) and Distance are independent variables. The data source for the foreign direct investment which is dependent variable and of trade which is independent variable is board of investment of Pakistan (BOI) while data for the independent variables GDP, GDP Per Capita (PCGDP), GDP Growth Rate, Inflation Rate, total government expenditure (TOTGOVEXP), population growth (POPGR) are taken from world development indicators [WDI 2007].

THE FIXED AND RANDOM EFFECT MODELS

This research tries to investigate of causal impact of foreign investment determinants with Gravity model by using panel data and for this purpose it uses fixed and random effect models to analyze its research problem. As discussed earlier, that a lot of researches also successfully tried to show a significant impact of foreign investment determinants on the economic growth e.g. Anderson [1979], Bergstrand, [1985] and Africano and Magalhães [2005] analyzed the impact of determinants with the help of gravity model by using panel data, at the same time many other researchers also showed the impact of foreign investment determinants on the economic growth in cross section framework that involves the estimation of single cross country regression. Thanyakhan, [2008] study used the fixed effect and random effect model, the importance of determinants of foreign investment cannot be ignored. However the primary use of the applying random effect model is its thriftiness and it added only a single to the model. On the other hand some researchers prefer to use fixed-effect models only when inferences are being made about the sample under consideration but prefer Random effect models when making inferences about larger population and if there is possibility to have some nuisance parameters, this decision rule is not relevant and this study focus on both random as well as fixed effect methods.

This present study focuses on fixed and random effect models both, purpose is to analyze the determinants of foreign investment: a gravity model approach. After the investigation of fixed and random effect, this study will also focus to see the causal relationship of foreign investment and gravity. This research focuses on to scrutinize the determinants of foreign investment in Pakistan. For this purpose it uses both theoretical base evidence and data base approach. The theoretical findings reveals that the FDI in Pakistan is function of GDP, GDP Per Capita, Wage Rate, GDP Growth Rate, Inflation Rate, Trade, total government expenditure (TOTGOVEXP), population growth (POPGR) and Distance plays an important role in defining gravity for FDI in Pakistan. On the other hand, Gravity model for panel data helps to analyze the theoretical findings with the help of available data. This gravity model is very famous among researcher to evaluate FDI in many countries and they estimate the cause of international trade on international debt with the help of this model. As Rose and Spiegel [2004] applied gravity model and estimate a wealth of potential variables with the help of trade, exchange rate, inflation, geographical distance and market size (GDP, GDP Per Capita, and GDP Growth Rate) with same pattern. This study also focuses on the factor which initiate foreign investment in Pakistan, therefore takes Pakistan as a host country and 9 major investing countries which invest in different sectors of Pakistan. The gravity model called for its analogy with Newton's law of universal Thanyakhan [2008] used the gravity equation for the determination of FDI and FPI The study use Thanykhan's model to check the gravity and intensity of impact of different variables on foreign investment in Pakistan.

FDI = f (GDP, CAP, GDPGR, D, T, X, INFL)

For estimation purposes, the extended gravity equation for FDI inflows into Pakistan applied in log-linear form expressed as follows:

$$\ln FDI_{it} = \alpha + \beta_1 (GDP_{it} \times GDP) + \beta_2 (PCGDP_{it} \times PCGDP_t) + \beta_3 (GDPGR_{it}) + \beta_4 DIS_{it}$$
$$+ \beta_5 TRADE_{it} + \beta_6 INFL_{it} + \beta_7 TOTGOVEXP_{it} + \beta_8 POPGR_{it} + \varepsilon_{it}$$

Whereas FDI_{it} represents the bilateral flow of FDI inflow from investing partner i to Pakistan in year t that is dependent variable in this study, GDP_{it} is the gross domestic product of investing partner i in year t, GDP_t is the gross domestic product of Pakistan in year t, $PCGDP_{it}$ is the gross domestic product per capita of investing partner i in year t, $PCGDP_t$ is the gross domestic product per capita of Pakistan in year t, $GDPGR_{it}$ is the gross domestic product growth rate of investing partner i in year t, DIS_{it} is the geographic distance between investing partner i and Pakistan, $TRADE_{it}$ is the total amount of imports and exports between investing partner i and Pakistan in year t, $TOTGOVEXP_{it}$ represents

the total government expenditure in year *t*), *INFLit* is inflation rate of investing partner *i* in year *t*, *POPGRit* represents the population growth both in host and investing partner it is error term.

FOREIGN INVESTMENT IN PAKISTAN

Historically, economy of Pakistan is heavily dependent on the foreign direct investment inflows from United States, Switzerland, Germany, Japan and Saudi Arabia. That is accounted for about 50% of all foreign direct investment inflows. This geographic pattern of foreign direct investment remains almost constant except the inclusion of more countries U.A.E and China from 1998 and there portion increased especially from 2000. And a new geographical diversified pattern of foreign direct investment inflows countries evolves that includes United States, Switzerland, Germany, Japan, U.A.E, China and Saudi Arabia. Pakistan is opened itself for international community for investment especially in early new millennium.

Table 1 shows the last decade distribution of foreign direct investment flows to Pakistan since 2001. Foreign direct investment inflow just started with 484.7 $ million in 2001towards Pakistan and started exceed and became 786 $ million and pace continues till 2007-08 when foreign direct investment of 5409 $ million came in Pakistan. This was highest of the decade and then sudden decline in FDI inflow in 2008-09 when Pakistan able to attract foreign direct investment of 3719.9 $ millions which was about 31 percent less of last year and same trend shows on 2009-10 [BOI 2010]. Pakistan be able to attract of 310.5 $ millions FPI in 2009-10 which is of 6 months. The reason of decline in FDI and FPI is of financial crisis in world and the power scarcity in Pakistan as well as terrorism, with continues improvement in worlds economies will leads toward improvement of foreign direct investment and foreign portfolio investment in Pakistan as well [economic survey 2010]. Due to weak economic condition and import oriented culture exist in Pakistan that is one of the major causes of deprecation of rupee against dollar that depreciated up to 41 percent against dollar since 2005-06 [SBP, 2010].

Table 1. Growth Indicators
Tabela 1. Wskaźniki wzrostu

Indicators	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
Population (millions)	139.9	144.7	148.1	153.55	159.3	162.91	166.41	169.94	173.51
GDP growth rate	3.1	4.7	7.5	9.0	5.8	6.8	3.7	1.2	4.1
Inflation Rate (%) CPI	3.54	3.10	4.57	9.28	7.92	7.77	12	22.35	11.49
Exchange rate (Rupee per 1 US $)	-	-	-	-	60	62	72.5	80	84.5
Inflow FDI (in US $ million)	484.7	798.0	949.4	1523.9	3521.0	5139.6	5409.8	3719.9	1012.3 July-Dec
Portfolio inflow (in US$ million)	-	-	-	-	-	-	-	-163.8	310.5
Interest rate %	-	-	-	-	9.5	10	15	14	12.5

Source: Economic Survey of Pakistan 2009-10

AN ECONOMIC OVERVIEW OF PAKISTAN

Pakistan's real GDP rose by 7.5% in 2003-04 and increased to 9% in 2004-05 that is highest in whole decade [Economic survey, 2009-10]. Growth in 2005-06 was 5.8% and inflation was 7.92% in 2005-06 while in previous year 2004-05 it was 9.28%, comparing to 2005-06 a decrease is shown of 0.15% and becomes 7.77% in 2006-07 (see Table 1). In order to control inflation interest rates hikes up to 15% this is the highest level of the decade in 2007-08. The purpose was to control the money supply inflation was 12% but in the following year it became 22.5% when the interest rate was 14% in 2008-09. Since 2001-02, economic performance of Pakistan started towards recovery and growth rate GDP was started to claim and in 2004-05 it was at 9% and till 2007 it was quit handsome. In 2008, with the start of financial crisis Pakistan's growth rate also squeeze down and in 2008-09 it was just 1.2% the contributor in this very low growth rate was energy crises too that is still running out. In 2009 -10, the sector wise contribution towards growth is as: services contributed 59% total growth of the year while industry 30% and agriculture 11%. Manufacturing sector contributed 23% of total growth for the year followed by Wholesale & Retail Trade (21%), and Social & Community Services (19%).

Table 2. GDP growth: Sectoral contribution (percent)
Tabela 2. Wzrost PKB – podział na sektory (procentowy)

Sector	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	AVG FY05-FY10
Agriculture	17%	24%	13%	6%	71%	11%	24%
Industry	34%	19%	34%	10%	-41%	30%	14%
Manufacturing	30%	28%	24%	24%	-58%	23%	12%
Services	49%	57%	53%	85%	70%	59%	62%
Real GDP (fc)	100%	100%	100%	100%	100%	100%	100%

Source: Federal Bureau of Statistics

Table 2 compares the structure of contribution to overall GDP growth for 2009-10, with the previous five years. Growth in Agriculture contributed 11% to the GDP growth for the year, while Industry accounting for 30%. What stands out from the Table is the consistently high contribution to recent growth, averaging 62% for the past six years, accounted for by the Services sector. In 2009-10, the share of services in headline growth was roughly in line with its average, at 59%.

DESCRIPTIVE ANALYSIS OF SECTOR WISE FOREIGN DIRECT INVESTMENT IN PAKISTAN

The table 3 shows the sector wise Mean, Minimum amount of foreign direct investment inflow in this decade, Maximum amount came in form of foreign direct investment in Pakistan and Standard Deviation. The average million of dollar came in form of foreign direct investment in Oil & Gas sector during the decade is 345.45 million dollars while minimum inflow in this sector was 80.7 million dollars and maximum is of 775 million dollars. In financial business that average inflow is 460.29

million dollars and minimum is (34.9) million dollars that is negative, maximum amount come in financial business is 1864.9 million dollars. Textile sector's average inflow is 30.97 million dollars, minimum in this sector is 4.6 million dollars and maximum million of dollars came in form of foreign direct investment is 59.4. In trade the average foreign direct investment inflow is 84.81 million dollars and the minimum million dollars came in this sector is 13.2 and the maximum inflow is 175.9 million dollars. In construction industry the mean inflow is 60.43 million dollars and the minimum foreign direct investment inflow in this sector is 12.5 million dollars while maximum inflow is 157.1 million dollars. Power sector is able to find out the average inflow of 97.44 million dollars, its minimum inflow is negative 14.2 million dollars and the maximum is 320.6 million dollars. Chemical industry's average inflow is of 51.38 million dollars and the minimum and maximum inflow in this sector is 10.6 and 86.1 million dollars respectively. Average foreign direct investment inflow in transport sector is 44.41 million dollars, while minimum and maximum is 8.8 and 93.2 million dollars respectively. In IT & communication the mean foreign direct investment inflow is 720.3 million dollars but foreign direct investment minimum inflow is zero; on the other hand the maximum inflow is 1937.7 million dollars. Other sectors able to attract 392.62 million dollars as mean foreign direct investment inflow; while minimum and maximum are 66.2 and 1107.2 million dollars respectively. The average total inflow of foreign direct investment towards Pakistan in this decade is 2288.1 million dollar and the minimum amount come is 322.4 million dollars while maximum is 5409.8 million dollars.

Table 3. Descriptive analysis of sector wise foreign direct investment in Pakistan
Tabela 3. Analiza opisowa sektora bezpośrednich inwestycji zagranicznych w Pakistanie

Sector	Mean	MIN	MAX	SD
Oil & Gas	345.45	80.7	775	244.0215
Financial Business	460.29	-34.9	1864.9	656.4017
Textiles	30.97	4.6	59.4	18.05758
Trade	84.81	13.2	175.9	65.99732
Construction	60.43	12.5	157.1	50.89486
Power	97.44	-14.2	320.6	110.4715
Chemical	51.38	10.6	86.1	28.49032
Transport	44.41	8.8	93.2	32.50234
Communication	720.3	0	1937.7	811.2532
Others	392.62	66.2	1107.2	381.3151
Total	2288.1	322.4	5409.8	2006.09

The Figure 1 shows the sector wise total foreign direct investment inflow, where Oil & Gas sector total foreign direct investment inflow of 3454.5 million dollars, in Financial Business that foreign direct investment inflow amount is 4602.9 million dollars. Total foreign direct investment inflow in Textile sector during this decade is 309.7 million dollars; on the other hand in Trade this foreign direct investment inflow is 848.1 million dollars, in Construction sector this foreign direct investment inflow is 604.3 million dollars. Foreign direct investment came in Power sector is 974.4 million dollars from 2000 to July 2009, while in Chemical sector total foreign direct investment inflow is 513.8 million dollars during the decade. Transport, IT & Telecom and in others sectors total foreign direct investment inflow from 2000 to July 2009 is 444.1, 7203 and 3926.2 million dollars respectively.
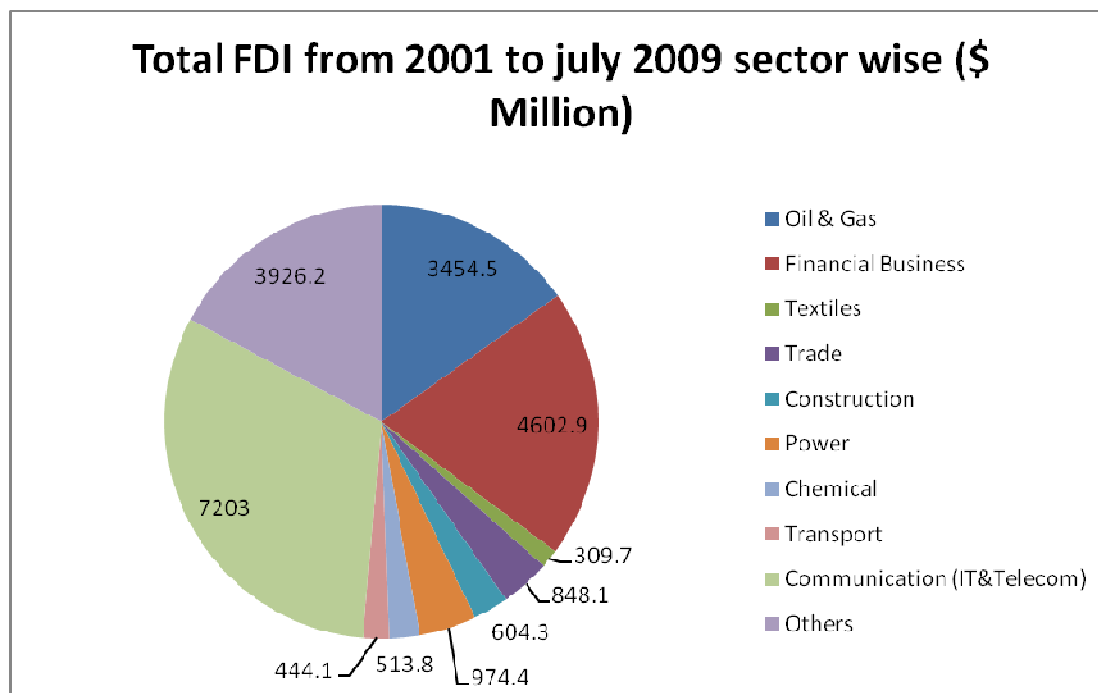
Fig. 1. Sector wise total foreign direct investment inflow
Rys. 1. Sektor inwestycji zagranicznych

REGRESSION RESULTS AND ANALYSIS

The present study analyzes the determinants of foreign investment through gravity model with the help of fixed effect and random effect model and indirectly check the causal relationship of foreign investment inflow due to gravity, in the process of measuring fixed effect and random effect on panel data, two type of methods have been applied, fixed effect model and random effect and among them four models have been developed cross section (country specific) and time effect (period specific) in both random and fixed effect models. It is an advantage to adopting these panel techniques, that we can measure the individual country inflow of foreign direct investment, it is called country specific, and foreign direct investment inflow over different time period, it is called time specific. In each method, four equations have been performed for to check the foreign direct investment inflow due to determinants and gravity. Panel data is used for analysis from 1999 to 2009. By pooling the data of 10 investing countries, the estimation of gravity model is done. For that purposes two different approaches are used fixed effect and random effect approach. In order to run regression eight explanatory variables are the part of the model: GDP, GDP Per Capita (PCGDP), GDP Growth Rate, Inflation Rate, Trade, total government expenditure (TOTGOVEXP), population growth (POPGR) and Distance. We have used gross domestic product after driving by multiplying the gross domestic product of host country and gross domestic product of investing partner. Per capita gross domestic product is also used after driving by multiplying PCGDP of host and PCGDP of investing partner. The level of significance is 1% of almost all the variables and coefficients are significant.

$$lnFDI_{it} = \alpha + \beta_1 \, (GDP_{it} \, X \, GDP) + \beta_2 \, (PCGDP_{it} \, X \, PCGDP_t) + \beta_3 \, (GDPGR_{it}) + \beta_4 \, DIS_{it}$$

$$+ \beta_5 TRADE_{it} + \beta_6 \, INFL_{it} + \beta_7 \, TOTGOVEXP_{it} + \beta_8 \, POPGR_{it} + \varepsilon_{it}$$

Table 4. Fixed Effect Dependent Variable: FDI
Tabela 4. Efekt stały zmiennej zależnej FDI

Variables	Model 1 Period Effect	Model 2 Country Specific
Intercept	--------	-473.5508 *** (-4.942229)
GDP	5.34E-35*** (8.874977)	2.99E-35 *** (2.549260)
PCGDP	9.28E-06*** (3.663355)	-2.03E-06** (-0.68213)
GDPG	12.22238*** (1.992472)	6.685504 (0.819762)
DIS	-0.021620** (-2.816098)	--------
TRADE	---------	0.118367 *** (10.68706)
INFL	---------	-24.09015 ** (2.316506)
TOTGOVEXP	--------	4.43E-10 *** (-3.013077)
POPGR	--------	32.22647** (1.949958)
R -square	0.449546	0.850364
F- Statistic	--------	32.20302
Durbin-Watson Stat	0.884482	1.458736

*** Significance at 1%, ** significance at 5%, * significance at 10%

In model 1of fixed effect we have estimated the coefficients of the basic Gravity Model which consists of the GDP, Per Capita GDP, and GDP Growth Rate and the Distance. So we skip the rest of the variable in model 1 by taking above mentioned variables. In our results of table 7.1 of first model the variable GDP is highly positively and statistically significant to the FDI which is dependent variable in our study at 1% significance level. Where as in second model variable GDP is showing the same result of having statistical positive but not highly significant as it was in first model at 1% significance level. The sign on GDP is significantly positive which shows that FDI inflow to Pakistan with a motive to occupy the market in Pakistan. Many researchers used the GDP as variable in their studies like, Tahir and Larimo, 2005 confirming the positive relationship between FDI and gross domestic product. The coefficient per capita GDP has positive and highly significant in first model while it is negative and statistically insignificant in second model at 1% level of significance. Bergstrand (1989) confirms the negative relationship between FDI and per capita GDP. This is due to the production that is labor intensive. The GDP growth rate coefficient has positive and significant when it is estimated at 1% level of significance in first model. Whereas, in second model the coefficient of GDP growth rate is statistically insignificant. GDP growth is one of the important out of other FDI determinants inflow in Pakistan. Wei, Liu, & Liu, [2005] research also confirms a positive relationship between GDP growth rate and FDI of both investing and investee countries. In our results of first fixed effect model the variable per capita gross domestic product (PCGDP) is highly positively and statistically significant to the FDI which is dependent variable in our study at 1% significance level. Where as in second model variable PCGDP is negative and statistically insignificant. The sign on PCGDP is significantly positive which shows that FDI inflow to Pakistan with a motive to occupy the market in Pakistan. Distance (DIS) coefficient has negative relationship when it is estimated in first model at 5% significance level and statistically significant. Distance is not a significant factor for the determination of FDI, results are showing this. Results are showing that DIS between Pakistan and the investing countries are in first model is negatively significant for the FDI inflow. This is because the pattern of FDI lies among U.S and U.A.E and Saudi Arabia. Portes and Rey [2005] study found out that for the FDI transaction flow distance plays a very important and significant role and confirm

the negative relationship. Trade (TRADE) coefficient has positive and highly significant in first model, when it is estimated at one % level of significance. Ismail and Yussof [2003] and Bevan and Estrin [2004] studies also verify the openness of the economies and they discuss that higher the degree of openness attracts higher FDI. As a result, the higher the intensity of openness of the Pakistani economy, it will lead to attract higher investment and degree of openness creates easiness for the investors to trade and invest in Pakistan. Results of fixed effect first model, the variable INFL is positive and statistically significant at 5% level of significance to the FDI which is dependent variable. This result is showing that if the inflation rate is high in home country that leads to increase in FDI to Pakistan. the variable Total Government Expenses (TOTGOVEXP) is statistically highly significant and negative relationship in second fixed effect model. And this showing that when government increases it expenses the foreign direct investment also increases. The government expenses could be on the development of the infrastructure like roads, financial and communication leads to add in growth part and this helps to attract foreign direct investment into Pakistan. While the independent variable, population growth (POPGR) has positive and insignificant in fixed effect second model at 5% level of significance. This is showing that the increase in population will inversely effect on foreign direct investment. POPGR variable deals the relationship with population growth rate and foreign direct investment, in lower income countries like Pakistan it is high significance and in period random model at one %, showing an inverse relationship by having negative coefficient value. However for the basic purpose of R square value is concerned to analyze the overall dissimilarity in growth rate due to our independent variable. Fixed effects, our first model the value is 0.449546, in second model value is 0.850364. These are considered significant. Durbon-Waston statistics showing that the problem of multi-Co linearity is not found in our model and also shows acceptable results in this context. The results also show the impact of determinants in different countries which are in our sample and in different time period. The impact of different determinants is not as powerful because major proportion of investment came from UAE in telecommunication sector and in financial sector. On the other hand time specific impact have no major fluctuation in the period on the study rely shows minor fluctuation due to the determinants influencing foreign direct investment.

Table 5. Random Effect Dependent Variable: FDI
Tabela 5. Efekt losowy zmiennej zależnej FDI

Variables	Model 1 Cross section Random Effect	Model 2 Period Random Effect
Intercept	-240.7175*** (-2.714741)	-188.3472 *** (-2.122474)
GDP	2.40E-35*** (2.699812)	2.51E-35 ** (2.354630)
PCGDP	1.33E-05*** (3.085656)	1.41E-05*** (3.1000)
GDPG	29.10063*** (2.504740)	27.84101 *** (2.392713)
DIS	-0.059028*** (-3.559706)	-2.617653 *** (-1.252573)
TRADE	0.055901*** (5.353344)	0.050515*** (5.327684)
INFL	59.58732** (3.059621)	71.22359 *** (3.999648)
TOTGOVEXP	3.47E-10*** (2.300026)	3.64E-10 *** (2.679628)
POPGR	-16.23978 (-0.737728)	-20.42360* (-0.975192)
R -square	0.729147	0.742319
F- Statistic	33.20189	35.52956
Durbin-Watson Stat	0.720731	0.720744

*** Significance at 1%, ** significance at 5%, * Significance at 10%

In our results of first and second model of table 7.2 showing that the variable GDP is statistically positive and significant at 1 % level of significance. The sign on GDP is significantly positive which shows that FDI inflow to Pakistan with a motive to occupy the market in Pakistan. Many researchers used the GDP as variable in their studies like, Aqeel and Nishat, [2005] also confirm the positive relationship between GDP and FDI in Pakistan. In first and second model, Coefficient PCGDP is positive and statistically significant at 1 % level of significance. Dascal, Mattas, & Tzouvelekas, [2002] study confirms the positive relationship. In first model and in second model, coefficients of GDPG are statistically significant and positive at 1 % level of significance. Cuevas, Messmacher, & Werner [2005] in their study are confirming a positive relationship. Results of first and second the variable Per Capita GDP (PCGDP) is highly positively and statistically significant to the FDI which is dependent variable in our study at 1 % significance level. In first model the coefficient of DIS is statistically significant and negative at 1 % level of significance while in second model coefficient DIS is negative and insignificant at 5% level of significance. Guerin [2006] research confirms inverse relationship among FDI and DIS. Different researchers use geographical distance in the Gravity Model as an explanatory variable like [Stone and Jeon, 1999; Portes and Rey, 2005]. Voyer & Beamish, [2004] study incorporates geographical distance that causes countries to invest outside rather than to export to those countries in order to reduce transportation and production costs. However, this low cost of production and transportation cost motivates the investing countries to invest directly to Pakistan rather than exporting. The coefficient of TRADE is statistically significant and positive at 5% level of significance in both first and second model. Research of A.M & A, [2003] confirms this. First model coefficients INFL is highly statistically significant and positive at 5% level of significance but in second model it is statistically highly significant and positive at one % level of significance. In first and second model coefficient of TOTGOVEXP is statistically significant and positive at 1% level of significance. In first and second model, coefficient POPGR is negative and statistically insignificant. Zahra, Azim, & Mahmood, [2008] uses the population growth variable to its effect on the economic development and they found the supporting result that the POPGR has a negative relationship among them. in first model value of R- square is 0.729147 and in second model R- square value is 0.742319, and these are considered significant. Durbon-Waston statistics showing that the problem of multi-Co linearity is not found in our model and also shows acceptable results in this context. The results also show the impact of determinants in different countries which are in our sample and in different time period. The impact of different determinants is not as powerful because major proportion of investment came from UAE in telecommunication sector and in financial sector. On the other hand time specific impact have no major fluctuation in the period on the study rely shows minor fluctuation due to the determinants influencing foreign direct investment. The random period specific results shows no influence on determinants of foreign direct investment, may be the reason of having no impact of these determinants is trade openness which may decrease the intensity of impact of these determinants on foreign direct investment inflow.

MODEL SELECTION CRITERIA

There are many of criteria which help to choose the best model in several alternatives models. In general likelihood ratio test considered useful for choosing between two models, where one model is a subset of other.

S.E REGRESSION

For the selection of appropriate model, S.E of regression is also recommended. In this study we included this criterion. Minimum S.E of Regressions recommended so the model which has minimum S.E regression is the most appropriate and the best model for the study.

THE BEST MODEL FOR THE STUDY

The above discussed criterion for the selection of the best model is referring the dynamic fixed cross section model appropriate for this study. The S.E Regression criterion shows the minimum value of about 225 for this model; on the other hand S.E Regression value is higher in rest of the models. So from above discussion, conclusion is that the dynamic fixed effect model in country specific case considered the most suitable and bet0ter model for concluding result and make policy implication.

CONCLUSION

This study tries to demonstrate the determinants of foreign investment in Pakistan and see the intensity of their impact on investment decision of investing country. For that purpose, 10 years data is taken, that represents top eleven countries of the world that have the highest investment in Pakistan. Two type of test is used i.e fixed and random effect to check the relationship among foreign direct investment and independent variables. In our both models distance shows a negative impact on the decision to make an investment by investing partner while GDP and GDP growth have a positive and significant impact. Gravity in this regards does not effect that much for foreign direct investment attraction because results are negative significant in this case that shows higher distance is a hurdle for the inflow of foreign investment but rest of the variables are significantly positive and related to the inflow of foreign investment except population growth which is negatively correlated.

Pakistan heavily rely on the foreign investment and one of the important country who receive about 23 billion dollars of foreign investment in this current decade and become one of the significant receiver of foreign investment comparing to the other developing countries of south Asia. In Pakistan inflation rate remain on high side and due to this higher inflation ultimately leads to lower foreign investment because foreign investors are risk averse; they never risk their expected profits from investment. Foreign investors demands high prices to cover uncertainty due to higher inflation. Inflation benefits the foreign investor in a way that country has higher inflation, the investor charge higher prices in host country and when the investor transfers its profit to its home country the conversion of host to home currency will provide them higher money that results higher profit. This could only be possible if exchange rates are appreciated. But during the current decade exchange rate in Pakistan depreciated approximately to 90% so due to this foreign direct investment decreased. Pakistan's growth was consistent in the field of oil, communication and in financial sector. This is one the reason that foreign investment in these three sectors is about 70% of the total investment comparing to the other sectors in this current decade. Change of policies for the foreign investment was also one of the reasons for higher inflow and the purpose was to cut of imports and to put the influence on the exports. Pakistan was one of the fastest growing economies with highest GDP growth of 9% of this current decade before the energy crisis and law and order situation. In Pakistani economy foreign direct investment features a very important role. Pakistan's policies are modified and amended according to the objective set by the Government for the development and for the economic situation and requirement of foreign direct investment in specific sector in the country. Therefore, to considerate the determinants of foreign direct investment are a vital element for encouraging and attracting more foreign direct investment towards Pakistan. For the supplement actions, it is necessary and important for the Pakistani government to prepare and endorse those programs that will ultimately be helpful for the import of foreign direct investment into Pakistan. This study includes the important part of its findings is to provide the suggestion to the policy makers in Pakistan, for the domestic investors and finally for the foreign investors. Foreign exchange was taken as an important determinant of foreign direct investment but it did not shows significant impact therefore it was skipped from the analysis at the same time political instability law and order situation was also ignored as the unavailability of authentic data of these sectors. In future when the data became mature of the sectors then it can be used for analysis purpose there is still a need to explore new dimension by

employing gravity model and identifying factors influencing foreign direct investment inflow the door are open for further research.

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WYZNACZNIKI INWESTYCJI ZAGRANICZNYCH W PAKISTANIE: ANALIZA MODELU GRAVITY

STRESZCZENIE. **Wstęp**: W ciągu ostatnich dwóch dekad Pakistan był jednym z najbardziej atrakcyjnych krajów wśród krajów rozwijających się, które otrzymały bezpośrednie inwestycje zagraniczne. Szczególnie w pierwszej połowie ostatniej dekady wzrost był szybki i zrównoważony w różnych gałęziach przemysłu, jak również w rolnictwie. W pakistańskiej gospodarki bezpośrednie inwestycje zagraniczne odgrywają bardzo ważną rolę. Ich zasady są jasne, jednak pewne zmiany i poprawki są dokonywane w zależności od czasu, celu, potrzeb i uwarunkowań gospodarczych w kraju.
Metody: Celem pracy było zbadanie uwarunkowań inwestycji zagranicznych w Pakistanie za pomocą modelu grawitacyjnego. Dane dotyczące inwestycji zagranicznych zostały potraktowane jako zmienna zależna natomiast zmiennymi niezależnymi były produkt krajowy brutto, produkt krajowy brutto na mieszkańca, wskaźnik wzrostu produktu krajowego brutto, stopa inflacji, handel, łączne wydatki rządu, wzrost liczby ludności oraz odległość za lata od 1999 do 2009. Na tej podstawie zbudowano panel służący do określenia przepływu inwestycji zagranicznych z różnych krajów oraz ich odległości geograficznej od Pakistanu.
Wyniki: Zastosowano dwa typy testów ze stałym i losowym wpływem w celu sprawdzenia zależności pomiędzy bezpośrednimi inwestycjami zagranicznymi a zmiennymi niezależnymi. W obu modelach otrzymano następujące zależności: odległość ma ujemny wpływ na decyzję o inwestycji przez partnera, podczas gdy wielkość produktu narodowego brutto jak i jego wzrost mają pozytywny i istotny wpływ. Grawitacja nie miała wpływu na atrakcyjność dla zagranicznych inwestycji, gdyż wyniki są ujemnie istotne w tym przypadku i wskazują, że większa odległość jest ogranicznikiem inwestycji zagranicznych, jednak pozostałe zmienne są istotnie dodatnio skorelowane z napływem inwestycji zagranicznych, z wyjątkiem wzrostu populacji, który jest skorelowany ujemnie.
Wnioski: Przeprowadzone badania potwierdziły, że istotnie silna zależność istnienia grawitacji pomiędzy Pakistanem a jego partnerami inwestującymi. Stwierdzono, że kraje leżące bliżej Pakistanu wykazują się większymi inwestycjami w Pakistanie, w związku z czym pozyskanie tych krajów w obszarze inwestycji w Pakistanie może zwiększyć szansę wzrostu ekonomicznego w Pakistanie.

Słowa kluczowe: model grawitacyjny, inwestycje zagraniczne, Pakistan.

DETERMINANTEN FÜR AUSLÄNDISCHE INVESTITIONEN IN PAKISTAN: ANALYSE EINES GRAVITY-MODELLS

ZUSAMMENFASSUNG. Einleitung: In den zwei letzten Jahrzehnten war Pakistan eines der attraktivsten Entwicklungsländer, welche direkte ausländische Investitionen in Angriff nahmen. Insbesondere verzeichnete man Mitte des letzten Jahrzehntes dort in verschiedenen Industriezweigen sowie in der Landwirtschaft einen schnellen und ausgewogenen Anstieg . Die ausländischen Investitionen spielen in der pakistanischen Wirtschaft eine sehr wichtige Rolle. Die Prinzipien der Betätigung von ausländischen Investitionen sind klar, allerdings werden gewisse Veränderungen und Korrekturen in Abhängigkeit von Zeit, Ziel, Bedarf und wirtschaftlichen Bedingungen im Inland vorgenommen.
Methoden: Das Ziel der Arbeit war es, Voraussetzungen für ausländischen Investitionen in Pakistan anhand eines Gravitationsmodell zu prüfen. Die betreffenden Daten wurden als dependente Variable behandelt, dagegen Bruttoinlandsprodukt, Bruttoinlandsprodukt pro Einwohner, Kennziffer des Anstiegs des Bruttoinlandsproduktes, Inflationsrate, Handel, Gesamtausgaben der Regierung, Anstieg der Einwohnerzahl und Bevölkerungsdichte in den Jahren 1999-2009 als indepedente Variablen aufgefasst. Auf Grund dessen wurde ein Panel aufgebaut, welches zur Darstellung der ausländischen, aus unterschiedlichen Ländern fließenden Investitionsströme und zum Aufzeigen der geographischen Entfernungen dieser Länder von Pakistan dienen kann.
Ergebnisse: Es wurden zwei Typen Tests mit festem und losmäßigem Einfluss zwecks Überprüfung der gegenseitigen Abhängigkeiten zwischen den ausländischen Direktinvestitionen und den independenten Variablen in Anspruch genommen. Bei den beiden Modellen hat man folgende Abhängigkeiten festgestellt: die Entfernung übt einen negativen Einfluss auf die Entscheidung bezügl. Investition aus, während die Größe des Bruttoinlandsproduktes sowie dessen Anstieg den jeweiligen Entschluss wesentlich positiv beeinflussen können. Die Gravitation hat die Attraktivität für ausländische Investitionen kaum

beeinflusst, denn in diesem Falle sind die Ergebnisse negativ relevant und bezeigen, dass die größere Entfernungen ausländische Investitionen einschränken. Die weiteren Variablen sind mit dem Zufluss von ausländischen Investitionen wesentlich positiv verbunden, ausgenommen den Populationsanstieg, welcher in dieser Hinsicht negativ relevant ist.

Fazit: Die durchgeführten Forschungen haben ein Vorhandensein der Gravitation zwischen Pakistan und dessen investierenden Partnern als eine wesentlich starke gegenseitige Abhängigkeit bestätigt. Es wurde dabei festgestellt, dass die Pakistan näher liegenden Länder größere Investitionen vor Ort betreiben. Im Zusammenhang damit kann die weitere Gewinnung dieser Länder für die Investitionen in Pakistan zum wirtschaftlichen Wachstum Pakistans beitragen.

Codewörter: Gravitationsmodell, ausländische Investitionen, Pakistan

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