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African Journal of Business Management

Full Length Research Paper

Empirical analysis of foreign direct investment and economic growth in Pakistan using VECM model

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Theoretically Foreign Direct Investment (FDI) is considered as a growth accelerating component that has attained significant heed in the development of the country in the past decade. Pakistan has been selected due to its geostrategic location, which is a major attraction for developed economies to invest in for lucrative returns. This study objective is to trace the long as well short run analysis among FDI, Gross Domestic Product (GDP), Gross National Income (GNI) and Imports (IMP) of Pakistan from year 1987 to 2017 by using the ADF Unit Root Test, Johansan co-integration approach, VECM and Granger causality methods. The results reveal that the two-way causality between FDI and growth in Pakistan is not highly significant. Pakistan's economic growth indeed attracts FDI influx, which supports the market-size hypothesis; while the FDI influx stimulates the economic growth of Pakistan to some degree, the result is not significant. In light of the results achieved, this study suggests future recommendations to policy makers for an effective strategic plan to welcome foreign investments in Pakistan.

Key words: Foreign direct investment (FDI), economic growth, vector error correction model (VECM), unit root test, co-integration analysis.

INTRODUCTION

FDI is an investment made by a firm or individual in one country in to business interests located in another country. Generally, FDI takes place when an investor establishes foreign business operations or acquires foreign business assets, including establishing ownership or controlling interests in a foreign company (Bagchi-Sen and Saletore, 2001). FDI constitutes a resource flow which is particularly useful for the economic development of developing countries, especially for their industrial development. It provides a unique combination of long-

term finance, technology, training, know-how, managerial expertise and marketing experience (Nwaogu and Ryan, 2015; Pegkas, 2015; Bende-Nabende, 2018). FDI is considered as an economic growth accelerating component that has received a strong attention not only in developed countries but also in developing and less develop countries during the past decade (Ghazali, 2010; Agrawal, 2015; Iqbal et al., 2010). As, Pakistan lies in a region which has great political, economic and military importance (Sial, 2014; Ahmar, 2014), however still failed to attract the FDI inflow in the country since last two decades which has significant impact on trade, economic growth and national income of the country. Being in the same vicinity as two major powers, China and Russia, adds to its position. Pakistan's geostrategic location is a key to unlock central Asian states and can provide access between the Gulf States as well as African and European countries, so it is a major attraction for emerging economies to invest in for lucrative returns (Markey and West, 2016; Rahman and Shurong, 2017).

The GDP value of Pakistan represents 0.49% of the world economy (TE, 2018a; WBG, 2018). Figure 1 shows Pakistan's last ten years GDP in USD Billion. GDP in Pakistan averaged 71.19 USD Billion from 1960 until 2017, reaching an all-time high of 304.95 USD Billion in 2017 and a record low of 3.71 USD Billion in 1960.

In South Asia, FDI inflows increased by 6% to 54 billion USD (UNCTAD, 2018). As per yearly figures published by the United Nations Conference on Trade and Development (UNCTAD), shows that Pakistan has been receiving the second highest net FDI inflows in South Asia after India (Table 1). Pakistan has maintained its position as the second largest recipient of FDI in the region while India got the first position in the FDI inflow table followed by India Bangladesh, Sri Lanka, Maldives and Afghanistan.

Pakistan's FDI inflows increased by 56% due to significant investment in infrastructure from China in support of the One Belt One Road Initiative. Flows to India were stagnant at 44 billion USD. Cross-border mergers and acquisitions deals have become increasingly important for foreign multinational enterprises to enter the rapidly-growing Indian market. In 2016, there were a number of significant deals, including the 13 billion USD acquisition of Essar Oil by Rosneft (Russian Federation). According to annual State Bank of Pakistan Report (SBP, 2018; UNCD, 2018), FDI in Pakistan increased by 3434.90 Million USD in 2017. Foreign Direct Investment in Pakistan averaged 2807.85 Million USD from 2010 until 2017.

As Pakistan, is benefiting from a number of projects being implemented along the China-Pakistan Economic Corridor (CPEC). This has resulted US$46 billion of projects contained in the CPEC, which offers Pakistan an exceptional opportunity of increased FDI and for tackling some of the main barriers hindering its economic development: energy shortage, poor connectivity and limited attraction for foreign investors (Esteban, 2016). The completion of these projects will definitely have significant effect on trade and GNI of Pakistan.

Does FDI play evidential role in boosting economic growth of Pakistan? This is our major question in the current work. The correlation between FDI and GDP in host countries, together with location determinants of FDI, has been the subject of considerable research for decades. There have been a lot of empirical studies devoted to the impact of FDI on the host economies. However, findings from these studies have been inconclusive so far. Some researchers have observed a positive relationship between FDI and growth (Gupta, 1983; Bende-Nabende and Ford, 1998; Ghazali, 2010; Iqbal et al., 2010; Haider et al., 2017). Others have found negative FDI-growth links (Caves and Caves, 1996; Zhang, 2001; Falki, 2009). Studies on Pakistan to analyze the long and short run relationship among FDI, GDP, GNI and IMP are limited. This article attempts to close the gap in the literature by conducting some regressions with time-series data to investigate the causality relationship between FDI, GDP, IMP and GNI in Pakistan by using the ADF Unit Root Test, Johansan co-integration approach, VECM and Granger causality methods.

LITERATURE REVIEW

The relevance of FDI as a source of economic activity has increased rapidly over the last decade (Aqeel et al., 2004; Ahmad et al., 2012; Almfraji and Almsafir, 2014; Haider et al., 2017). Between 2000 and 2016, the share of FDI stock in global GDP increased from 22 to 35%. Following a decline during the Great Recession, mergers and acquisitions (M&As), the most dynamic component of FDI, have recovered, reaching a record value of $1.2 trillion in the first quarter of 2018 (Federico and Elena, 2018). Based on CEIC 2018 Annual Report (Romer, 1986), Pakistan's FDI registered a growth equal to 0.99% of the country's GDP in June 2018, compared with a growth equal to 0.9% in the year 2017. The FDI reached an all-time high of 3.4% of GDP in June 2007 and a record low 0.0% in June 1977 (June 1977 - June 2018). According to State Bank of Pakistan report (SBP, 2018), the GDP in Pakistan was worth 304.95 billion US dollars in 2017. The GDP value of Pakistan represents 0.49% of the world economy. GDP in Pakistan averaged $71.19 Billion from 1960 until 2017, reaching an all-time high of $304.95 Billion in 2017 and a record low of $3.71 Billion in 1960 (WBG, 2018).

Pakistan is an imports dependent country which enormously depends on foreign imports (Shahbaz and Rahman, 2012). Pakistan's imports are finishing goods while exports are initial goods, that are the reason of negative trade balance, as a result this trend affects the net behavior of FDI and GNI. Imports have significant

Table 1. FDI inflow in South Asia, USD Million.

Country	2011	2012	2013	2014	2015	2016
Afghanistan	83	94	69	54	58	-
Bangladesh	1136	1293	1599	1551	2235	2003
Bhutan	29	49	14	32	12	-
India	36190	24196	28199	34582	44208	46400
Maldives	424	228	361	333	324	-
Nepal	95	92	71	30	51	52
Pakistan	1162	859	1333	1865	865	2761
Sri Lanka	959	941	933	894	970	636

Source: UNCTAD (2018).
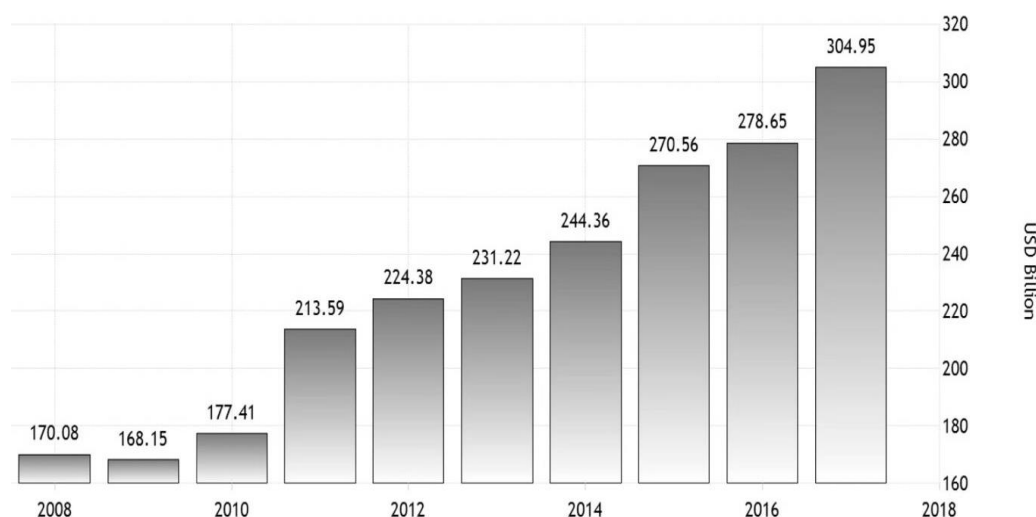
Figure 1. Pakistan Gross Domestic Product.
Source: TE (2018a).

negative impact on economic growth of a country (Atique et al., 2004). According to the United Nations COMTRADE database on international trade and Trading Economics historical database (TE, 2018b; UNCD, 2018), during year 2017, Pakistan bought $57.4 Billion worth of imported products up by 31.2% since 2013 and up by 22.2% from 2016 to 2017. In year 2017, the top three Pakistani imports from all over the world include mineral fuels including oil ($13.7 Billion which was 23.9% of total imports), machinery (6.9 billion USD that was 11.9% of imports) and electronic equipment ($4.7 Billion with 8.3% of imports). If we talk about exports, Pakistan had shipped $21.9 Billion worth of goods around the globe in year 2017, down by -12.9% since year 2013 but up by 6.5% from 2016 to 2017. The top three Pakistani exports include (i) worn and other clothes, (ii) cotton, and (iii) knit or crochet clothing with total worth of $10 Billion which makes 45.6% of total exports (TE, 2018b; WRC, 2018).

On the other hand, Shahbaz and Rahman (2012) concluded in a study that imports play a crucial role between exports and economic growth, and ignoring imports from the analysis can yield misleading results (Mohey-ud-Din, 2007). A large share of imports of developing countries consists of capital and intermediate goods which enter into domestic production; so imports expand the country's production possibilities. This suggests that imports facilitate the export sector to use more advanced and sophisticated technologies which ultimately lead to higher export activities and growth. A decline in imports of factors of production causes a decline in output (Hentschel, 1992; Lee, 2010). So the relationship between economic growth and imports in case of Pakistan is inconclusive and need more empirical analysis.

FDI may be tricky for developing and developed countries in terms of adverse effect on competition, negative effect on balance of payments, inequality in

wages, jeopardizing national sovereignty as a result it will surely influence economic growth, trade activity and GNI of the country (Lipsey, 2001; Smarzynska, 2004; Johnson, 2006; Cuervo-Cazurra and Genc, 2008; Figini and Gorg, 2011; Saqib et al., 2013). Moreover, FDI can impose negative impact for the country if gains of FDI are captured by powerful elites and due to volatile nature of FDI flows and small spillover for local content suppliers. As it is expected that, economic activity will be enhanced in Pakistan in coming years due to China-Pakistan Economic Corridor (CPEC), which has great potential of increased FDI inflow. Pakistan has continued to attract Chinese investment related to the Belt and Road Initiative, with FDI inflows rising from $2.5 Billion in 2016 to $2.8 Billion in 2017 (UNCTAD, 2018). So, it is right time to evaluate the relationship between macroeconomic variables using appropriate statistical tools, in the present study, we have selected FDI, GDP, IMP and GNI to develop a better understanding and interpret the results in meaningful information.

THEORETICAL BACKGROUND

FDI theories were classified under macroeconomic and microeconomic perspectives (Denisia, 2010; Makoni, 2015). Macroeconomic FDI theories emphasize country-specific factors, and are more aligned to trade and international economics, whereas microeconomic FDI theories are firm-specific, relate to ownership and internalization benefits and lean towards an industrial economics, market imperfections bias. FDI theories are fairly complex to explain and apply. The relationship between FDI and economic growth has been extensively investigated by the researchers, practitioners as well as policy-makers. The opinions range from an unreserved optimistic view to a systematic pessimism (Caves, 1971). The neoclassical and endogenous growth models are considered as theoretical foundation for FDI led economic growth hypothesis of a country. The neoclassical growth theories suppose that FDI can channel the required funds to the productive sectors of a capital shortage economy which, as a result, favors increase the economic growth rate by increasing the marginal productivity of capital. The neoclassical economists view FDI as more reliable and less volatile sources of capital for the developing economies that can augment economic growth (Blomstrom et al., 1994; Balasubramanyam et al., 1996; Borensztein et al., 1998; Lipsey, 1999; Moosa and Cardak, 2006).

The causality between FDI and GDP growth could happen in either direction. FDI could promote GDP growth in the spirit of the Solow growth model (Chenery, 1967). It argues that through capital accumulation in the recipient economies, FDI may have growth effects on host economies because FDI is similar to domestic investment, and FDI is expected to generate non-convex

growth by encouraging the incorporation of new inputs and foreign technologies in the production function of the recipient economy. McKinnon (1964) states that in developing countries, lack of technology is the main obstacle to economic growth. The endogenous growth theories also reveal that the long-run growth of a country depends on the efficiency of utilizing investment and not only effected by the volume of physical investment. Hence, the endogenous growth model focuses on incorporating organizational, managerial, technical and human skills, innovation and technological progress, and accumulation of knowledge endogenously in the growth theories that are often brought by FDI (Romer, 1986; Lucas, 1988; Mankiw et al., 1992; Adhikary, 2011). Precisely, in the endogenous growth model, the long-run economic growth is viewed as a function of technological progress deriving from technology transfers and knowledge spillovers (Grossman and Helpman, 1991; Romer, 1994; Nair-Reichert and Weinhold, 2001).

The causal correlation between FDI and economic growth may possibly have a strong association either growth-driven FDI or FDI-led growth and it is quite likely that the two variables move together through feedback (Caves and Caves, 1996). Countries with rapid economic growth not only generate more demand for FDI, which is similar to domestic investment, but also provide better opportunities that lead to increased income for foreign investors and then attract a greater volume of FDI. On the other hand, FDI inflows may promote economic growth of the host country through positive direct effects and spillover effects. Both FDI and economic growth are positively interdependent and could lead to a two-way causality (Zhang, 2001; Zhao and Du, 2007).

Despite this positive link between FDI and economic growth, empirical evidence also reveals negative association between them. This view goes to the dependency theorists who argue that dependence on foreign investment tends to create a negative impact on economic growth and income distribution. The underlying assumption behind the dependency theory is that an economy controlled by foreigners does not develop organically rather grows in a disarticulated manner (Amin, 1974). The dependency theories also argue that foreign gigantic players may create negative effect on the growth and development of domestic firms' of a host country in the long-run as they have large volume of capital, superior technologies, higher market access, advanced marketing networks and better managerial and human relation skills (Markusen and Venables, 1999; Agosin and Mayer, 2005; Kumar and Pradhan, 2002). This situation could be even dismal for the limited capital young growing firms as they may be unable to compete with the Multinational Corporations (MNCs). In this tune, FDI tends to create a monopoly industrial structure which may lead to underutilization of productive forces (Bornschier and Chase-Dunn, 1985). The dependency theories further argue that FDI can have an adverse impact on

employment, income distribution, national sovereignty and autonomy of a country (Musila and Sigué, 2006). FDI can also influence negatively the balance-of-payment position of a country if the inputs of production need to be imported (Musila and Sigué, 2006). Moreover, financial stability of a country may reduce by shrinking foreign exchange reserves when profits and capitals are repatriated. Thus, dependency theories argue that FDI is not an aid to the development rather it undermines the process of development (Razin et al., 1999).

In summary, this confounding theoretical and empirical evidence on FDI and economic growth relationship leads us to a discussion that FDI is country specific, and can be positive, negative or insignificant, depending on the economic, technological and institutional conditions of a host country as many authors document positive relationship between them while others do not trace it, or at best, report very weak relationship. These wide differences basically result from authors perspectives, sample selection, methodologies and analytical tools applied in their study (Chakrabarti, 2001; Adhikary, 2011). The present study thus extends Pakistan specific analysis to add knowledge in our empirical literature.

METHODOLOGY

Data description

Two types of research approaches widely used are quantitative and qualitative approaches. We have used quantitative research method to perform this research study for forecasting and predicting future behavior of FDI in case of Pakistan. Several research studies (de Mello, 1999; Ramirez, 2006; Qi, 2007; Har et al., 2008) practiced the time series method of forecasting. Time series data analysis tool measures historical data points to envisage future conditions and events. The goal of the time series method is to identify meaningful characteristics in the data that can be used in making statements about future outcomes. This is a useful tool to measure both financial and endogenous growth. The impact of policy variables can be evidenced through time series tests. The secondary time series data and valuable information for this study are gathered from following official departments of Pakistan and some international organizations, namely:

(1) International Monetary Fund (IMF) Reports
(2) The United Nations Conference on Trade and Development (UNCTAD)
(3) World Investment Reports (WIR)
(4) State Bank of Pakistan Annual Reports (SBP)
(5) World Development Indicators (WDI)
(6) International Financial Statistics (IFS)
(7) Handbook of Statistics on Pakistan Economy

Ordinary least square (OLS) regressions and the empirical analysis are conducted by using annual data on FDI, GDP, GNI and IMP of Pakistan from year 1987 to 2017. In this study, we have to examine the relationship of macroeconomic variables by using different tests in software Eviews 9. Variables of interest are FDI, GDP, GNI and IMP.

$$fdi = \beta_0 + \beta_1 GDP + \beta_2 GNI + \beta_3 IMP + \varepsilon \tag{1}$$

The respective natural log transformation Equation 1 is:

$$\ln fdi = \beta_0 + \beta_1 \ln GDP + \beta_2 \ln GNI + \beta_3 \ln IMP + \varepsilon \tag{2}$$

where

$$\ln fdi = log\ of\ foreign\ direct\ investment\,(inflow)$$
$$\ln GDP = log\ of\ gross\ domestic\ product$$
$$\ln GNI = log\ of\ gross\ national\ income$$
$$\ln IMP = log\ of\ import\,(good\ \&\ services)$$

Unit root test

In order to examine the long run relationship among variables, we have to test the stationary of the series, the article uses the Augmented Dickey Fuller (ADF) unit root testing procedure (Dickey and Fuller, 1979). We have tested stationary of all the variables in level 1 (0), if these variables are non-stationary at level to make them stationary, they are tested at order one I (1), and at order two I (2). Enders (1995) suggests that testing unit roots should be started from the most general model which includes trend and intercept. The model can be written as follows:

$$\Delta Y_t = a_0 + \gamma Y_{t-1} + a_2 t + \sum_{j=2}^{\rho} \beta_j \Delta Y_{t-j+1} + \varepsilon_t \tag{3}$$

where

$$Y = dependent\ variable$$
$$t = trend$$
$$a = \mathrm{int}\,ercept$$
$$\rho = lag\ level$$

Co-integration test

It was concluded that all variables are integrated of order one, I (1), so we proceed to Johansens cointegaration test. We have chosen optimal lag length by SC criteria. We examine Johansen-Juselius cointegration test to examine the long run equilibrium exists or not.

Johansen proposes two different likelihood ratio tests of the significance of these canonical correlations and this can be shown via the trace and maximum Eigen value tests, which are given in Equations 4 and 5, respectively.

$$J_{trace} = \sum_{i=r+1}^{n} \ln(1 - \lambda_i) \tag{4}$$

$$J_{max} = -T \ln(1 - \lambda_{r+1}) \tag{5}$$

where T is the sample size and λ_i is the ith largest canonical correlation. The trace test exams the null hypothesis of r cointegrating vectors against the alternative hypothesis of n cointegrating vectors. The maximum eigenvalue test, on the other hand, tests the null hypothesis of r cointegrating vectors against the alternative hypothesis of r + 1 cointegrating vectors. We reject the null hypothesis if the value of Trace and Max-Eigen statistics> 5%

critical value.

Vector error correction model (VECM)

After estimating the co-integration test, we found that there is cointegration in our model. In order to explain the changes in FDI, both short and long term relationships are estimated using the *Vector Error Correction Model (VECM)*, which explains the changes in terms of changes in GDP as well as deviations from the long term relationship between FDI and GDP. The cointegration equation and long run model is written as:

$$ECT_{t-1} = Y_{t-1} - \eta_j X_{t-1} - \varepsilon_m R_{t-1} - r_c Z_{t-1} - \mu_t \tag{6}$$

where

$$Y_{t-1} = FDI$$
$$\eta_j = coefficient\ of\ gdp$$
$$\varepsilon_m = coefficient\ of\ gni$$
$$r_c = coefficient\ of\ imp$$
$$\mu_t = error\ term$$

Granger causality test

In order to check the cause effect of two variables that either Zt granger Yt (Zxt → Yt) or yt causes Zt (Yt → Zt) or there is bi-directional causality between Zt and Yt (Zt <=> Yt) or both variables are independent of each other (Zt <≠> Yt). The direction of granger causality in this case can only be detected through the Error Correction Model derived from the long run equilibrium. Granger (1988) suggests the following causality model:

$$Z_t = \sum_{j=1}^{m} a_j Z_{t-j} + \sum_{j=1}^{m} b_j Y_{t-j} + \varepsilon_t \tag{7}$$

$$Y_t = \sum_{j=1}^{m} c_j Z_{t-j} + \sum_{j=1}^{m} d_j Y_{t-j} + \eta_t \tag{8}$$

where *m* is the maximum number of lagged observations included in the model (the model order), the matrix a_j contains the coefficients of the model. If the variance of ε_t (or η_t) is reduced by

the inclusion of the Z_t (or Y_t) terms in the first (or second) equation, then it is said that Y_t (or Z_t) Granger-(G)-causes Z_t (or Y_t). After estimating VECM, we estimated some diagnostic test, that is, hetero-scedaticity and LM test to check the serial correlation.

Impulse-response function

In order to identify structural shocks and their dynamic effects, the innovation-accounting techniques have therefore been adopted, which consist of impulse response functions (IRF). The IRFs inspect the relative effects of each variable on other variables and display the response of each concerned variable in the linear system to a shock from system variables. So analysis of interactive impact among foreign direct investment, economic growth, gross national income and import is done.

RESULTS AND DISCUSSION

Unit root test

Table 2 shows that at first difference series reject the H_0 of unit root as ADF statistics exceed the critical value at 5%. Hence, the result of ADF test for FDI, GDP, GNI and IMP is not stationary I(0), 'at level' but the same becomes stationary at the position I(1), 'at first difference'.

Johansen co-integration test

The optimal lag length for the model is 2 selected by SC: Schwarz information criterion. In our case, the results of Johansen cointegration test reported that there exists long run equilibrium between the variables (*fdi, gdp, gni & imp*) as reported by some other authors who found same trend in their research work (Asghar et al., 2011; Nosheen, 2013; Amit et al., 2016; Khan et al., 2018). The trace statistics indicate that there is one cointegration equation at the 5% level (Table 3).

Vector error correction model

The cointegrating relationship is given by Equation.

$$ECT_{t-1} = 1.000 lnfdi + 0.082 lngdp + 1.624 lngni - 5.267 lnimp + 10.47 \tag{9}$$

Equation 9 shows us results of long run relationship among variables. The coefficient value of GDP tell us that 1% change in GDP increases FDI by 0.08%, 1% change in GNI increases FDI by 1.62% and 1% change in IMP decreases FDI by 5.26% in the long run. Hence, the result indicates that both GDP and GNI positively affect FDI and IMP negatively affects FDI in long run.

Table 4 reports the Granger causality test statistics of FDI. The results suggest that there is no causality between GDP and FDI as p-value is greater than 0.05

and the null hypothesis cannot be rejected due to very low F-statistics and the corresponding higher p-value than that at 5% level of significance. The unidirectional causal relation, however, is documented from FDI to GNI in case of Pakistan, further, other pair wise null hypotheses cannot be rejected, suggesting there is no existence of causal effect from IMP to FDI and from FDI to IMP. More specifically, the null hypothesis of no Granger causality from IMP to FDI and FDI to IMP are not rejected with F-statistics of 0.29328 and 1.88870,

Table 2. Results of Unit Root Test.

Variable	ADF statistic at level		ADF statistic 1st difference	
	Critical value at 5%	T-statistic	Critical value at 5%	T-statistic
Ln(FDI)	2.963972	1.588704	2.986225	3.629634
Ln(GDP)	2.963972	0.212194	2.967767	5.069443
Ln(GNI)	2.963972	0.078205	2.967767	5.232166
Ln(IMP)	2.963972	0.288176	2.967767	5.058856

Source: Computed results based on secondary data for 30 observations from IMF and World Bank.

Table 3. Results of Johansen cointegration test.

Unrestricted	Cointegration	Rank	Test	(Trace)
Hypothesized No. of CE(s)	Eigen value	$\lambda trace$ Statistics	Critical value 5%	Probability
None	0.585406	54.23926	47.85613	0.0112
Atmost 1	0.555373	29.58651	29.79707	0.0529
Unrestricted	Cointegration	Rank	Test	(Maximum Eigen value)
Hypothesized No. of CE(s)	Eigen value	$\lambda trace$ Statistics	Critical value 5%	Probability
None	0.585406	24.65276	27.58434	0.1135
Atmost 1	0.555373	22.69455	21.13162	0.0299

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level. Max-eigenvalue test indicates no cointegration at the 0.05 level. *Denotes rejection of the hypothesis at the 0.05 level.

Table 4. Pair wise Granger causality test.

Null hypothesis	Obs	F-Statistic	Prob.
LNGDP does not Granger Cause LNFDI	30	1.13233	0.2967
LNFDI does not Granger Cause LNGDP		1.00068	0.3260
LNGNI does not Granger Cause LNFDI	30	0.09369	0.7619
LNFDI does not Granger Cause LNGNI		10.3275	0.0034
LNIMP does not Granger Cause LNFDI	30	0.29328	0.5926
LNFDI does not Granger Cause LNIMP		1.88870	0.1806

respectively. The unidirectional causality and spillovers of FDI may be attributed to the mobility of natural resources and skilled labor force along with availability of large market across the border in response to the policy innovations in Pakistan.

Impulse-response function

Under different degrees of economic time period there exist differences in the dynamic response path for both impulse and response of fictitious economy. So analysis of impact among FDI, GDP, GNI and IMP is done from the period of 1 to 8 years. As shown in the Figure 2, a one standard deviation shock of GDP increases from period 1 to period 2, and from period 2 to 3, there is not much changes in GDP, from 3 to period 6 it decreases

and later it become stable. The shock of FDI to GDP, GNI and IMP remain positive and FDI clearly benefits host economies. New technologies may arrive via international trade as well as by foreign investments. Such investments can enhance the growth process in the host economy and raise welfare in the home economy by providing an additional flow of income to an investment in knowledge. When the government requires the foreign firms to use inputs exclusively from the host country, FDI raises employment.

In Figure 3, a one standard deviation shock of FDI to GNI is below the zero line and it sharply declines from period 1 to period 3, and from period 4 to 8 it is increasing with the passage of time but remains in the negative zone, which means response of FDI to GNI is negative in current as well as future period. A one standard deviation shock of GDP to GNI is decreasing in
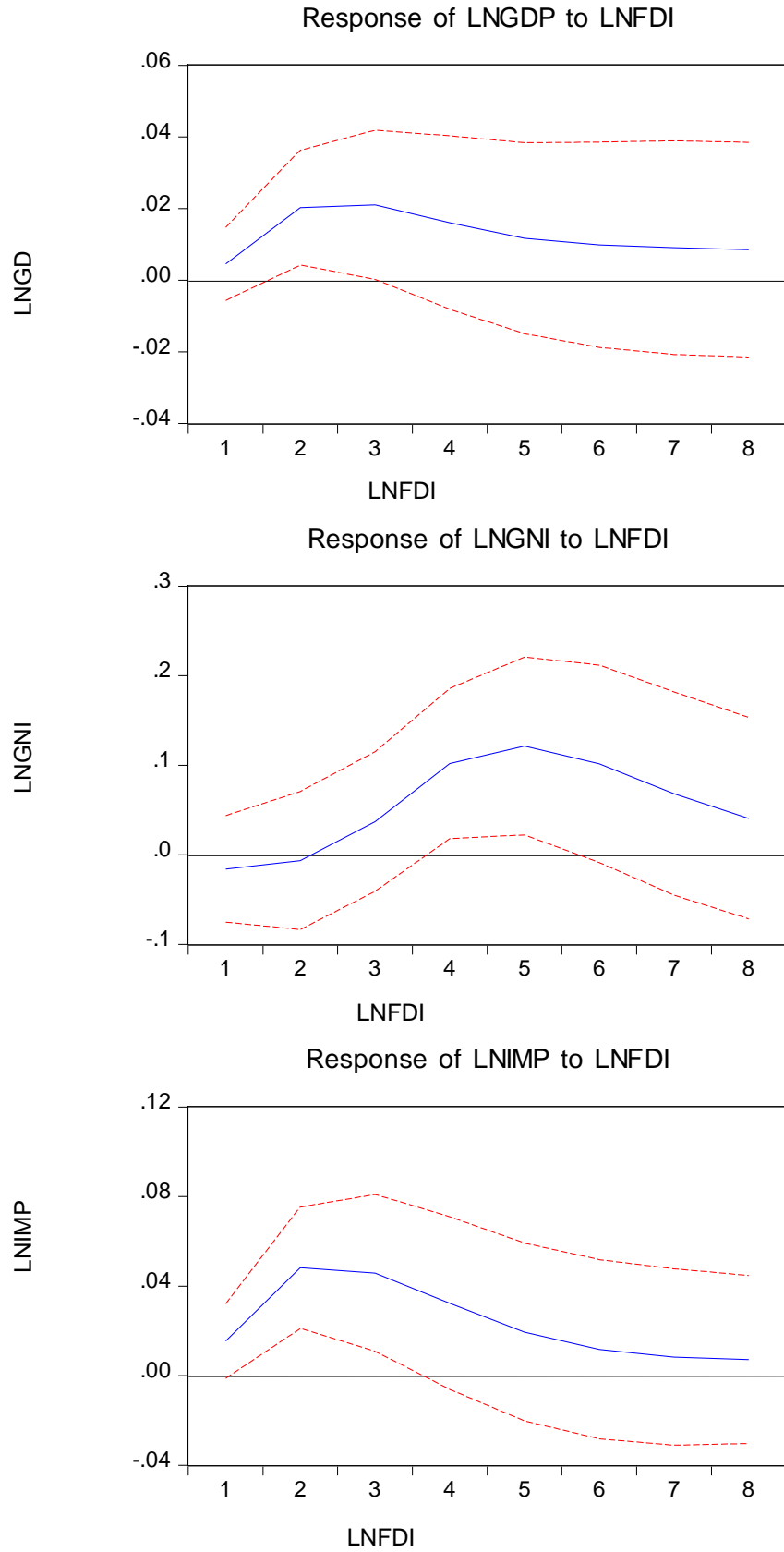
Figure 2. Response to Cholesky one SD innovations ±2 S.E Response of LnGDP to LnFDI, Response of LnGNI to LnFDI, and Response of LnIMP to LnFDI.

Response of LNFDI to LNGNI

LNGNI

Response of LNGDP to LNGNI

LNGNI

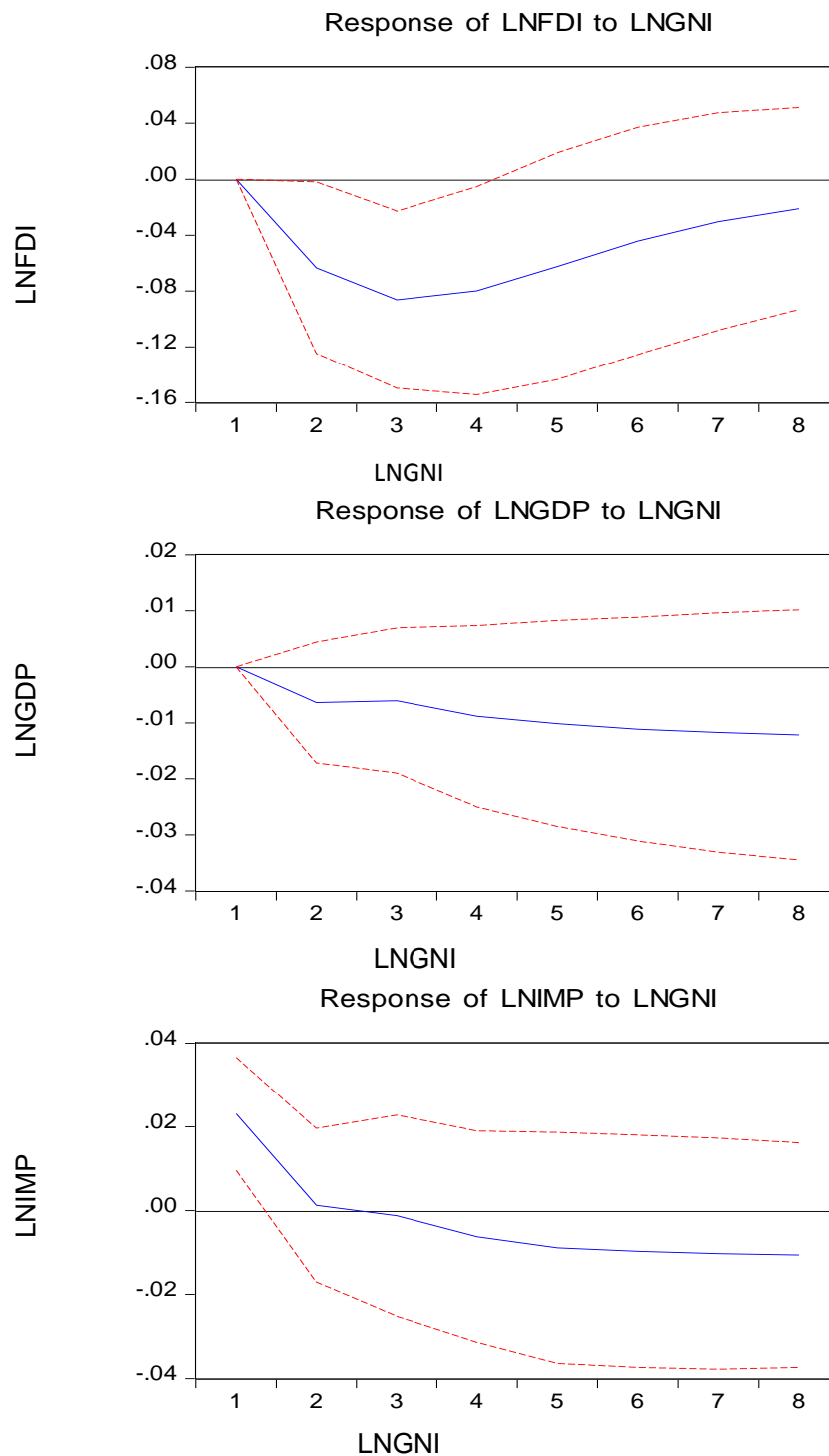## Response of LNIMP to LNGNI

LNGNI

Figure 3. Response to Cholesky one SD innovations ±2 S.E, Response of LnFDI
to LnGNI, Response of LnGDP to LnGNI, and Response of LnIMP to LnGNI.

the early period become stable and later it declines and remains in negative region. Response of IMP is sharply decline from 1 to 2 years and hit the steady state value and it gradually decreases from period 3 to onward.

In Figure 4, a one standard deviation shock of FDI to IMP is slightly increasing in first period it become stable from 2 to 3 period, later it continuously declines and cross the steady state value, from 6 to 8 period it increases but
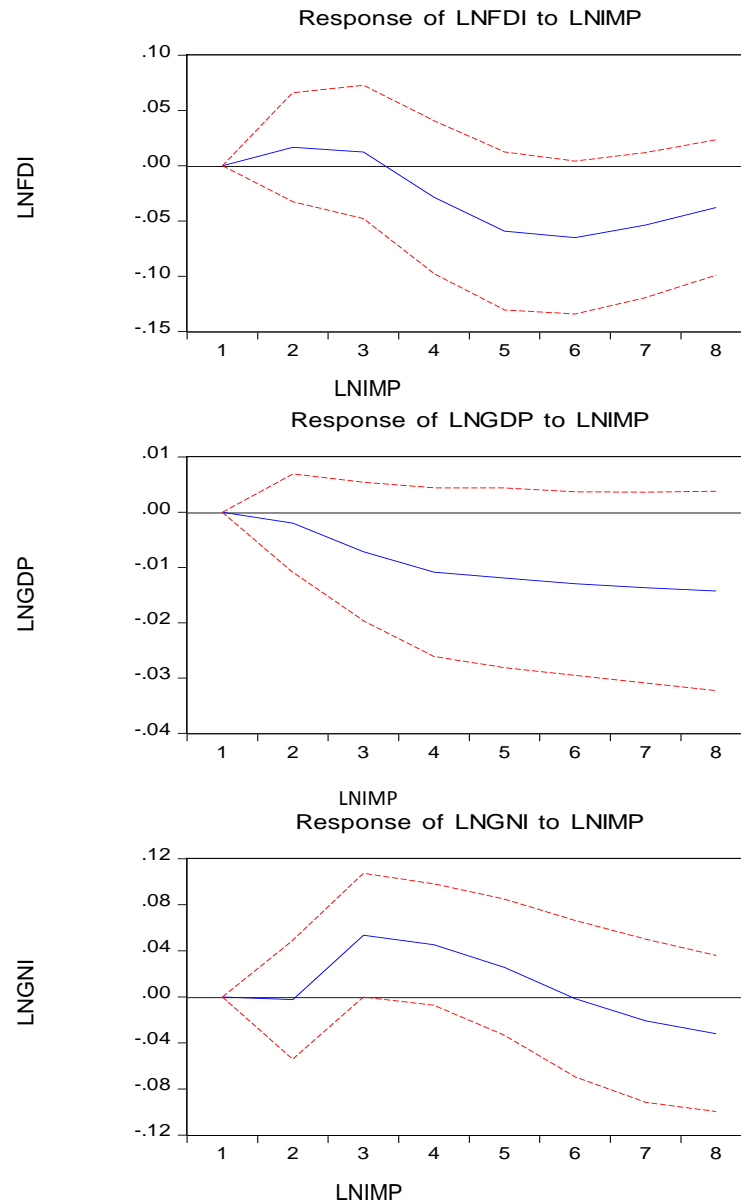
Response of LNFDI to LNIMP

Response of LNGDP to LNIMP

Response of LNGNI to LNIMP

Figure 4. Response to Cholesky one SD innovations ±2 S.E, Response of LnFDI to LnIMP, Response of LnGDP to LnIMP, and Response of LnGNI to LnIMP

remains in negative zone. In case of GDP, a one standard deviation shock of GDP remains at zero line and continuously decreasing from 2 to 8 period, which means response of GDP to IMP is negative. A one standard deviation shock of GNI to IMP initially remains at zero line, then sharply increases from 2 to 3 period, later it declines and goes to negative zone, it shows us asymmetric response of GNI to IMP.

FDI can encourage the adoption of new technology in the production process through capital spillovers. Second, FDI may stimulate knowledge transfers, both in terms of labor training and skill acquisition and by

introducing alternative management practices and better organizational arrangements. A survey by OECD (Hansen and Rand, 2006) underpins these observations and documents that 11 out of 14 studies have found FDI to contribute positively to income growth and factor productivity.

Stability check

To check the stability or robustness of the model, we had conducted "Residual tests" which comprises of LM test,

CUSUM test and Heteroskedasticity test. The LM test was carried out to analyze the serial correlation. Serial correlation is the relationship between a given variable and a lagged version of itself over various time intervals. Serial correlations are often found in repeating patterns, when the level of a variable affects its future level. The results obtained after conducting LM test were as P-value = 0.1412 and 0.0764 which were greater than 5% significant value, so we could not reject the Null Hypothesis of no serial correlation. Then, the second test was the CUSUM test which explains the stability of the model. The graphical trend fell between 5% significant boundary which confirmed that our model is stable. The last test was the Heteroskedasticity test which was conducted to see the Heteroskedasticity in our model. The P-value = 0.1996, obtained as result of this test which was greater than 5% significant value, so there is no Heteroskedasticity in our model.

Conclusion

This work aims to trace the long and short run analysis among FDI, GDP, GNI and IMP of Pakistan by using the ADF Unit Root Test, Johansan co-integration approach, VECM and Granger causality. All the four estimated variables are found to be stationary at the first difference level; the Johansen co-integration approach confirms that there exists one co-integrated equation in our model. The significant findings of long run relationship in our study includes 0.08% increase in FDI by 1% increase in GDP, 1.62% increase in FDI by 1% increase in GNI, while 5.26% decrease in FDI by 1% increase in IMP. Hence, the results indicate that, both GDP and GNI positively affect FDI but IMP has negative effect on FDI in long run. The results indicate that there is no significant Granger causality from FDI to economic growth, in case of Pakistan. The development of Pakistan's economy attracts FDI demonstrating the validity of "the market-size hypothesis" and indicating that output and its growth are determinants of FDI. That FDI does not have an obvious booster effect on the development of Pakistan's economy means that previous research has overestimated the positive effect of FDI on economic growth. However, government of Pakistan must cultivate an environment of economic liberalization and open market access to encourage multinational companies with high-technology capabilities and valuable intellectual property to come and invest in the country. The policy makers must overcome tariff and non-tariff barriers in the course of FDI which includes imposing price controls, demanding technological transfers, intellectual property expropriation, forced joined ventures and compulsory licensing. The policy makers should also pay attention to make strategies to reduce dependency on high interest foreign aids which has negative impact not only on the FDI and economic growth of the country but definitely on the independence and stability of the country. An additional result of Pakistan's currently unpredictable political situation, which creates uncertainty for potential foreign investors as major long term investments are not made instantly, nor are they undertaken without careful economic analysis. This study suggests that the government of Pakistan must offer equitable market access without requiring technological transfers, provide authentic protection for intellectual property without the threat of compulsory licensing, and offer a transparent, predictable, long-term regulatory regime.

RECOMMENDATIONS

From a recommendation standpoint, this study submits that government of Pakistan should strive for liberalizing the regulatory framework surrounding FDI with the hope that this will consequently results in fast growth for the Pakistan's economy as a whole. The other important fact is the political instability which restricts foreign investors to invest in the country. The effect of uncertainty, particularly uncertainty of outcomes, is a well-studied area of economics and this analysis will certainly incorporate an estimate of the potential effect of unexpected regulatory or political outcomes for the firm. It is what enables firms to invest heavily to create knowledge capital without fear of expropriation. Capital firms are then used in order to build and sustain a competitive advantage in markets around the world. Without further improvement in Pakistan's regulatory and political environment, foreign investors will experience a reduced incentive to continue investing, and making, in Pakistan. It is strongly recommended to deeply investigate and seek solutions for the tariff and non-tariff barriers which restrict the foreign investors to invest in Pakistan. It is also recommended to analyze that how foreign investors can effectively access Pakistani markets, recover costs and make profits associated with innovation and maintenance of intellectual property.

ABBREVIATIONS

FDI, Foreign direct investment; **GDP,** gross domestic product; **GNI,** gross national product; **IMP,** imports; **ADF,** Augmented Dickey Fuller Test; **VECM,** vector error correction model; **SBP,** State Bank of Pakistan; **USD,** United States Dollar; **TE,** trading economics; **UNCD,** United Nations COMTRADE database; **WRC,** World's Richest Countries; **CPEC,** China-Pakistan Economic Corridor; EU, Europe; **TNC,** Transnational corporations; **OECD,** Organization for Economic Co-operation and Development; **MNE,** multinational enterprise; **UNIDO,** The United Nations Industrial Development Organization; **EME,** emerging market economies; **SAARC,** South Asian Association for Regional Cooperation; **FMOLS,** fully

modified ordinary least squares; **WBG,** The World Bank Group; **IMF,** International Monetary Fund; **UNCTAD,** The United Nations Conference on Trade and Development; **WIR,** world investment reports; **WDI,** world development indicators, **IFS,** International Financial Statistics; **SC,** Schwarz information criterion; **LM,** Lagrange Multiplier; **IRF,** impulse response functions; **WRC,** world's richest countries.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

ACKNOWLEDGEMENT

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