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A causal relationship between trade, FDI, exchange rates and economic growth of Pakistan

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This study aims to do an empirical investigation of the causal relationship among FDI (foreign direct investment), trade, real effective exchange rates and economic growth. Economic growth attracts FDI and enhances trade as explained in some literatures. The present study focuses on Pakistan during the period 1980 to 2012. The Johansson co-integration analysis shows the long term relationship between the Trade, FDI, real effective exchange rate and economic growth of Pakistan. The results of ECM suggest that there is a significant relationship between the variables. The findings of this study suggest that foreign income, foreign direct investment, GDP, trade and real effective exchange rate significantly affect trade. The Granger causality test shows that export causes increase in economic growth and economic growth attracts the inflow of FDI.

Key word: Investigation, enhancement, significance, economic growth, inflows.

INTRODUCTION

In developing countries, FDI is a key factor that enhances exports as well as economic growth. FDI plays a pivotal role in enhancing employment levels, increases productivity of host countries, improves exports and ultimately enhances transfer of technology. The exports of developing countries like Pakistan have received substantial foreign direct investment in the past (Arshad, 2008 cited in Falki (2009)). The World Development Indicator shows that in Pakistan, the amount of FDI inflow increased from $ 0.24 billion in 1990 to $ 55 billion in 2011.

In FY04-06, Pakistan cumulatively attracted $8 billion FDI. Of this amount, 26.5% was from proceeds generated from sales of public assets and 49.2% from FDI, with the remaining coming from foreign portfolio investment. These foreign inflows were ploughed into banking, telecom and oil and gas sectors primarily. Prospects are that Pakistan will attract about US$6.0 billion in FY07 – an all time high annual flow since the advent of de-regulation, privatization and liberalization policies initiated at the end of the 1980s.

The host country receiving FDI has as advantage the creation of employment opportunities, use of modern technology and increase in productivity. Previous inflows of FDI into Pakistan were meager, accounting for only 0.2% of its overall economic growth and less than one percent of Asian's subtotal each year in the 90s. Among the major challenges that led to this situation were urban violence, inconsistent economic policies and government bureaucracy. Corrective measures were therefore essential.

The economic growth of Pakistan however improved significantly from 2.8% in 1986 to 6% in 1988. But due to the collapse of the Soviet Union and European countries, Pakistan's economic growth rate lowered again to an average of 4.4 % in the late 80s. The country's economic growth rate was again recorded in 1995 and 1996 as 9% which is a significant improvement. As the economic crisis hit the Asian continent however, it affected Pakistan's growth rate by 5.8% in 1998. The country's economic growth rate was 4.8% in1990, which is the lowest ever recorded in the 90s. Pakistan's economy has

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however recovered from the economic crisis of Asia and it maintains an average economic growth of 7.48% from 2001 – 2005.

During the period 1980 to 2008, the average annual growth rate of Pakistan's exports was nearly 20%. The exports value index increased 41 times from $0.80 billions to almost $32 billions in 2005. Pakistan's exports contribution to total trade increased from 32% in 1980 to 46% during the period 2001 to 2005.

Results obtained from previous studies suggest that the causal relationship among FDI trades; growth and exchange rates are mixed. Some reviewed studies indicate a positive relationship while others indicate otherwise. However the degree of relationship among these variables is not clear. This ambiguity is due to the fact that trade stimulates growth and, to some degree, growth in turn leads to trade. Every country has its level of technology, labor and similar endowments. And so, the rate of economic growth will vary from country to country depending on the availability of these factors. However, fiscal and monetary policies can have negative side effects on a country's economic growth_(Melina et al., 2004).

LITERATURE REVIEW

The economic growth of India has been affected by FDI and exports. However, Indian's high or low economic growth has no effect in the presence of FDI and exports of India. The economic growth, FDI and trade have no reciprocal causality relationship among them.

Wai et al. (2008) used an annual data (1970-2005) of the Malaysian economy by employing simple ordinary least square (OLS) regression method to reveal the relationship between foreign direct investment and economic growth. They concluded that a positive relationship exists between foreign direct investment and economic growth.

Zhang (2005) discovered the relationship between FDI and exports of china. The results show that there is a great influence of FDI at the industry level in china.

By using the data of 126 developing countries from 1985-2002 to find the effect of foreign direct investment and portfolio investment on economic growth, Vita and Kyaw (2009) concluded that the effect of foreign direct investment on economic growth is positive in developing countries with lower-middle and upper-middle income but negative in low income countries. On the whole, the findings suggest that to achieve positive results, developing countries have to reach a minimum level of development and absorption capacity.

Pacheco-Lopez (2005) used the granger causality test to discover the causal relationship between FDI and export. They discovered that there is bi-directional relationship between FDI and export performance of Mexico.

Using the Moroccan data, Baliamoune and Lutz (2004) analyzed that there is two causal relationships among FDI, economic growth and exports by the aid of the Granger causality test.

Melina et al. (2004) analyzed that there is long term relationship among FDI, economic growth and exports in Greece by using the co integration test. Their study period for the country spanned the years 1960-2002. Based on their results, they concluded that there was a causal relationship among these variables as the Granger causality test employed pointed out.

Alici and Ucal (2003) investigated the causal relationship among FDI, exports and economic growth of turkey by using the Granger causality test. They found out that there was no link between FDI–led exports growth during the period 1987 to 2002.

Liu et al. (2002) used the Granger causality test and found a two way causal relationships among internal foreign direct investment, trade and the economic growth of China. For this purpose, the country's data at aggregate level was used from 1981-1997.

Khan and Leng (1997) examined the economic growth, FDI and exports of three countries, viz Singapore, South Korea and Taiwan. The data was examined at aggregate levels from the period 1965 to 1995. By using the Granger causality test, they discovered that no causal relationship exist among FDI, exports and economic growth of the observed countries.

Duttaray et al. (2008) used the data of 66 developing countries to find the causal relationship between foreign direct investment (FDI) and economic growth. Their findings show that FDI affects growth in 29 countries; while growth does not affect FDI at all. A reverse causal relationship from FDI, exports, productivity or growth is present in 30 of the 66 countries. This suggests that a close correlation between growth and FDI does not in any way imply that FDI causes growth, exports or productivity change.

Chakraborty and Basu (2002) used the method developed by Johansen and Juselius to find out the co integration among FDI, real GDP and the other variable unit cost of labor. They found out that there is a long term relationship among these variables. They equally found the relationship among FDI, real GDP and import duties of India, in addition to the relationship between GDP and unit cost of labor in India.

More so, by using the Granger causality test, they found a unidirectional relationship between FDI and ral GDP of India.

Liu et al. (2001) examined data from China and other 19 economies that traded with China during the period 1984-1998. They applied the Granger causality test to find the relationship between FDI and foreign trade. An increase in internal FDI was discovered to be due to increase in the imports of China.

Chowdhury and Mavrotas (2006) analyzed data from three countries – Chile, Malaysia and Thailand from 1969

to 2000. They employed an innovative methodology for testing the causal direction between FDI and growth. They concluded that GDP causes FDI in Chile and not vice versa. And a bi-directional causal relationship between GDP and FDI exist in Malaysia and Thailand.

Ericsson and Irandoust (2001) investigated the relationship between the real GDP per capita and the inflows of FDI for the four countries - Sweden, Denmark, Norway and Finland. They found out that there is no causal relationship between the variables of FDI and GDP per capita in Denmark and Finland. However, they discovered that there is a bi-directional causal link between FDI and GDP per capita in Sweden. The causal link between the FDI and GDP per capita in Norway was found to be present.

By using the data of five Asian countries namely, Malaysia, Indonesia, Singapore, Thailand and Philippines, from 1970-2007, Pradhan (2009) concluded that there exists a long term relationship between foreign direct investment (FDI) and economic growth. The variables are co-integrated at panel levels. Except for Malaysia, they discovered that a bi-directional causal relationship exist between the variables both at individual and panel level.

METHODOLOGY

$$LEX = \beta o + \beta 1\ LGDP + \beta 2\ \ LFDI + \beta 3\ LREER + Є t$$

LEX = log of value of export
LGDP = log of Gross Domestic Product
LFDI = log of Foreign Direct Investment
LREER = Log of real effective exchange rate.
Є t = Error Term

Definition of the variables

Gross domestic product (GDP)

GDP of purchaser's prices is the sum of gross value added by all resident producers in the economy, plus any product taxes; and minus any subsidies not included in the value of the products. It is calculated without making deductions from depreciated fabricated assets or from depleted and degraded natural resources. Data are in current U.S. dollars. Dollar figures for GDP are converted from domestic currencies using single year official exchange rates. For a few countries where the official exchange rate does not reflect, the rate is effectively applied to actual foreign exchange transactions and an alternative conversion factor is used.

Real effective exchange rate (REER)

Real effective exchange rate is the nominal effective exchange rate (a measure of the value of a currency against a weighted average of several foreign currencies) divided by a price deflator or index of costs.

Foreign direct investment (FDI)

Foreign direct investment is the net inflows of investment to acquire a lasting management interest (10% or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows net inflows in the reporting economy. Data is in current U.S. dollars.

Value of exports

Export values are from UNCTAD's value indexes or from current values of merchandise exports of Pakistan.

Econometric methodology

Unit root tests

Unit root test has been conducted to check the stationary and non stationary of the variables. If the macroeconomic variables are not stationary, they can exhibit a stochastic or deterministic trend. In order to check the order of integration of the selected variables, the Augmented Dickey Fuller (ADF) test is conducted.

Lag order selection

The distribution of lag order selection can be sensitive in the selection of lag order. Appropriate selection of lag order gives the reliable results of the analysis. On the other hand, if the selection of the lag order is not appropriate, then the results of ant study will be biased and the residual can serially be correlated. In this paper, the Schwartz test was used to overcome the problem of the lag order. This procedure removes arbitrariness in choosing the lag length in test of causality.

Co integration test

After the selection of the lag orders and stationary of the variables, the co integration of the variables is checked. Johansen co integration test is conducted in order to check whether the selected variables are co integrated. The following VAR model is formulated for the Johansen co integration test.:

$$Y t = \Gamma 1\ (L)\ Y t\text{-}1 + \Gamma 2\ (L)\ Yt\text{-}1 + \ldots\ldots\ldots\ldots\ldots \Gamma p\ (L)\ Y t\text{-}1 + Є t\text{-}p$$

Where,
Yt =[LEX, LGDP, LGDI, LREER] is a column vector and $\Gamma i\ (L)$ with I =1 ……..p is lag operator. Є is white noise residual of zero mean and constant variance. The order of the model p must be determined in advance using the SIC (Schwartz Information Criterion) The null hypothesis that there is r or fewer co integration vectors can be tested using the following two test statistics.

A causality test

The Granger causality test is conducted for determining whether one time series is useful in forecasting another. The causality of the selected variables under study are value of exports (EX), Gross Domestic Product (GDP), FDI and Real effective exchange rates is checked in this study.

Collection of data

Annual data from world development bank (WDI 2012) have been collected for the selected variables, Value of trade, FDI, GDP and

Table 1. ADF unit root test: level series.

Variables	ADF	C.V.(5%)
LEX	0.041585	-2.971853
LFDI	-0.155049	-2.971853
LGDP	1.211986	-2.971853
LREER	-1.574096	-3.580623

Note: ADF shows that there is unit root in the series.

Table 2. ADF unit root test: 1st difference series.

Variables	ADF	C.V.(5%)
∆LEX	-6.001442	-3.587527
∆LFDI	-4.949822	-3.587527
∆LGDP	-5.345549	-3.587527
∆REER	-5.649235	-3.587527

Note: ADF shows that the series are stationary.

the real rate of exchange. The data is collected in US dollars of these variables.

RESULT

Testing for stationary

The first step is to check whether the variables under consideration are stationary or not. A univariate analysis is carried out to check the stationary of the data. Table 1 represents the results of Augmented Dickey Fuller Test (ADF) for the log levels and first difference of the logs of all the variables. According to the results shown in Table 1, augmented dickey fuller test indicates that the level of the series contains unit root. In order to make the data stationary, unit root test is run again by taking first differences of all the series. Table 2 shows that first difference series are stationary.

Null hypothesis is not rejected at 5% level of significance.

Testing for co integration

After identifying that all the variables in the study are integrated in order of one, that is, I (1), the second step is to test whether the variables are co integrated or not. For this purpose Johansen and Juselius' (1990) co integration tests are employed.

The results of Johansen co integration test are reported in Table 3. Both the tests (Trace tests and Maximum Eigen Value) show the existence of unique co integration among the variables at 5% level of significance. This indicates that the variables under consideration are driven by at least one common trend. This implies that the relationship between the variables is not spurious and that they move together.

Error correction model

The results of error correction model are presented in Table 4. The error correction term is negative and signify-cant, which is an indication that there exists a relationship between the variables. The sign of the error term is negative, which means that it is convergent towards equilibrium and its magnitude shows that 25% adjustment are done in first period. The probability is less than 5%, which means that the relationship is significant. The value of Durbin-Watson statistics is 2.176915, which indicates that there is no autocorrelation between the variables.

Granger causality test

The results in Table 4 show that there is co integration between the selected variables. The next step is to check the causality direction by applying the Granger Causality Test. Table 5 shows the causality between the LEX, LFDI, LGDP and LREER. . There is no causal relation-ship present except among the LEX and LGDP, LGDP and LFDI variables in the Granger Causality Test. However, there is causality effect present between the value of exports (LEX) and the foreign direct investment LFDI and this causality is unidirectional in nature. Value of exports (LEX) also causes (LGDP) Gross Domestic Product and this causality is also unidirectional with only exports causing the GDP. It suggest that the exports have been playing a key role in the development of Pakistan as it was clear in the literature There is also a causal relationship between the LGDP and LFDI. It suggests therefore that economic growth has attracted foreign direct investment for Pakistan.

Conclusion

The objective of this study is to investigate empirically the short term and long term causal relationship between trade, FDI growth and real effective exchange rate of Pakistan during the period 1980 to 2012.

By applying the Johansen's co integration test, it was discovered that the selected variables for the study are integrated in I (1) co integrated, implying a long term relationship among these variables. According to the results of the study, there is no reciprocal causal relation-ship among these variables in Pakistan. The direction of the short term and long term relationship is determined by using the Granger Causality relationship. The results indicate that the direction of causality from export to FDI causality exists between GDP and FDI. It can therefore be concluded that exports of Pakistan help in increasing

Table 3. Johansen co integration test variable/series: LGDP, LFDI, LCF, LFCE.

Variable	Hypothesized No. of CE(s)	Eigen value	Trace statistic	5% critical value	Max-Eigen statistics	5% critical value
LEX	None*	0.672667	51.0336	47.85613	30.15297	27.58434
LFDI	At Most 1	0.440842	20.8807	29.79707	15.69574	21.13162
LGDP	At Most 2	0.161638	5.18492	15.49471	4.760231	14.26460
LREER	At Most 3	0.015606	0.42469	3.841466	0.424687	3.841466

Table 4. Dependent variable ∆lex.

Variables	Coefficient	Std. error	t-Statistic	Prob.
∆FDI	0.123677	0.060112	2.057437	0.0529
∆GDP	0.463915	0.208227	2.227930	0.0375
∆REER	-0.697905	0.231822	-3.010518	0.0069
EC(-1)	-0.928933	0.254732	-3.646708	0.0016

Table 5. Granger causality test.

Null hypothesis	F –Statistic	Probability
LFDI does not Granger Cause LEX	0.70109	0.50679
LEX does not Granger Cause LFDI	8.25651	0.00211
LGDP does not Granger Cause LEX	0.83138	0.44867
LEX does not Granger Cause LGDP	5.12724	0.01486
LREER does not Granger Cause LEX	0.37806	0.68956
LEX does not Granger Cause LREER	1.20165	0.31968
LGDP does not Granger Cause LFDI	5.86895	0.00906
LFDI does not Granger Cause LGDP	0.73260	0.49202
LREER does not Granger Cause LFDI	1.50160	0.24474
LFDI does not Granger Cause LREER	0.36750	0.69664
LREER does not Granger Cause LGDP	0.33630	0.71802
LGDP does not Granger Cause LREER	0.23004	0.79639

economic growth, and economic growth will in turn lead to the ultimate survival of the economy. If the costs of production and export incentives are given to the various manufacturing industries, there can be increase in exports. Moreover, FDI and trade are two important factors that enhance the effect of economic growth in Pakistan.

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