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The Causal Relationship between Foreign Direct Investment, Imports and Exports in Pakistan

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Abstract
This study evaluates the causal relationship between Foreign Direct Investment (FDI), imports and exports in Pakistan by using the time series data from 1972to 2009. Ng. Parren Unit Root Test, Johansen Cointegration Test and Granger Causality are used for empirical analysis. The results indicate that there is long run equilibrium relationship among FDI, imports and exports. The estimates of causality test indicate that there is feedback relationship between FDI and export performance in the country. Furthermore, the results are in favor of bidirectional causality between imports and FDI. The inferences drawn from the study have stronger policy implication for FDI.

Keywords: Foreign Trade, FDI, Imports, Exports, Trade Balance, Trade Liberalization
JEL Codes: F10, F13, F20

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I. Introduction

The concept of globalization has focused the considerable role of trade liberalization (which includes both imports and exports) as well as financial capital liberalization from developed to developing countries that ultimately enhance the scope of FDI. FDI brings an efficient technology in host country that may enhance productivity level (Gruben, Mcleod, 1998, Lipsey, 2002). FDI is argued as efficient mechanism for enhancing business activities in developing countries of the world. FDI has now become a major source for generating job opportunities, promoting the efficient technology utilization and exports spillovers though the channel of capital investment in host country. The developing countries like Pakistan are now facing the challenges of low level of economic growth because of the problems of insufficient job opportunities and less efficient technology due to lack of capital investment resources. Pakistan has to heavily rely on more imports and less exports because of less FDI inflows comparative to neighboring countries like India and china.

The attraction of FDI always remained at main priority to fill up the difference between desired investment level and the savings in Pakistan. Pakistan has adopted most of liberalization as well as fiscal incentives strategies to attract the foreign capital investment. The country has focused on market oriented policies by relaxing restrictive policies in 1990s. The tax relaxation as well as credit incentives were given to foreign investors in the era of1990s (Khan, 2007). During the starting period of 1990s, Pakistan has introduced regulatory framework for friendly business environment and new investment policy was introduces in 1994 that enhanced FDI inflows in Pakistan. In the decade of 2000s, Pakistan has further provided relaxation for attracting FDI. The stream of this relaxation include provision of100 percent equity shares permission, double taxation system was avoided and tax relief was given50 to 90 percent to foreign investors. Similarly, government of Pakistan has provided 5 to 10 percent relaxation in import duties to foreign investors on the import of machinery.

Despite above mentioned background, Pakistan has not made considerable level of progress in attracting FDI that also deter the economic development in a country. In this context, the present study focuses on the empirical relationship between FDI and imports as well as between FDI and exports in Pakistan. The rest of the study is designed as follows. Section 2 reviews the literature; Section 3 illustrates the model specification, research methodology and data. The Results are discussed in section 4and concluding remarks are given in section 5.

II. Literature review

The economic literature has highlighted the role of export promotion and import substitution strategies along with FDI for better economic development (Agosin, Mayer, 2000, Ayanwale, 2007, Sylwester, 2005, Khan, 2008). The bidirectional causality is found between FDI and export because of comparative cost advantage in host country production and marketing product at international level (Pugel, Lindert, 2000). Thus FDI enhances the exports of host country and vice versa. Furthmore, FDI may enhance the inputs imports in host country and thus causality exists between FDI inflows and imports vice versa.

FDI is widely discussed and debated in context of international trade (Grubert, Mutti, 2000, Clausing, 2000, Head, Ries, 2001, Mekki, 2005, Helpman et al., 2004). FDI is crucial for economic development because imports and exports of the country are linked with FDI (Ahmad et al, 2003). The more FDI mean more economic growth (Mottaleb, 2007). FDI and exports have been widely discussed in context of globalization (Vernon, 1966; Sahoo, 2006). Multinational companies (MNCs) want to market their products at international level that promote exports of host country. Similarly in the context of more cost efficient technology requirement (Kobrin, 2005; Le, Ataullah, 2006) and more inputs requirements for MNCs, FDI is linked to more imports in host country through demand pull channel (Hailu, 2010). Most of economic literature is also based on positive association among FDI, imports and exports (Dunning, 1988) but still some studies have also argued about negative association between FDI and imports (Blind and Junmittag, 2004; Bertschek, 1995) that make it inconclusive about predicting the relationship. Furthermore, the empirical investigation becomes quite sensitive because of selection choice variables in model specifications. Most of empirical studies in Pakistan are in context of FDI and growth (Yousafet al., 2008; Iqbal et al., 2010; Zhao, Dou, 2007; Khan, 2007, 2008; Shabaz and Amir, 2008). Some of the studies that discussed FDI in context of trade in Pakistan argue that no unidirectional or bidirectional causality exist in Pakistan (Tabassum et al., 2012) while other are in favor of that. So, it still makes causality issue inconclusive in Pakistan (Shabaz, Aamir, 2008; Khan, 2008). Siddiqi et al., (2014) examine the relationship among trade liberalization, economic development and import demand over the

period of 1972 to 2009. They find the cointegration among the variables of the model but they do not find the causal relationship between among variables. Moreover, the results of above mention studies are still sensitive in predicting the causal relationship between FDI and trade because of time period selected as well as model estimation techniques. No individual study has solely discussed FDI and trade (imports and exports) ignoring the growth for some time. Therefore, this study is all about to investigate the causal relationship between FDI, imports, and exports in Pakistan.

III. Theoretical framework

The main objective of this study is to evaluate the causal relationship among FDI, imports and exports. The economic theory focuses on the model construction for better evaluation of the rational economic attitude at individual, national or international level. The main objective of model specification is to highlight original situation but in accordance to some reality and furthermore it is based on some assumptions for getting some required outputs. The model is used for predictions that are used for validation of specified model and the information's of model are useful for policy makers (Nagel, 1961). The model adopted for studying the relationship of FDI, imports and exports has the following form:

$$FDI = F(X, M) \quad (1)$$

and for getting empirical insights of responsiveness of FDI to imports and exports, the uses the following regression equation by using logarithmic transformation of the variables:

$$LFDI_t = \alpha_0 + \alpha_1 LX_t + \alpha_2 LM_t + \alpha_3 t + u_t \quad (3)$$

Where,

$LFDI$ = Natural logarithm of Foreign Direct investment of Pakistan

LX = Natural logarithm of Aggregate exports of Pakistan

LM = Natural logarithm of Aggregate imports ofPakistan

and 't' in subscript represents the time dimension of the variables which ranges from 1972 t0 2009.

A. Data sources

For empirical evaluation, the time series data of Pakistan is taken into consideration that starts from 1972and ends at 2009. The Data for FDI, imports, and exports is taken from International Financial Statistics (IFS) online database by International Monetary Fund (2011).

B. Econometric methodology

The time series data normally face non stationary issues because of time trend. Thus regression findings may be spurious and become misleading for policy prescription point of view (Granger and Newbold, 1974). Phillips (1986) argued that Ordinary Least Square (OLS) are not reliable in absence of cointegration. To make econometric results more reliable stationarity checking and cointegrating relationship is preliminary step.

B.1. Ng-Perron Unit Root test

Before application of unit root tests, the most common problem is its power and size aspect of the test. The most commonly used tests for unit root checking include Phillips-Perron (PP) and Augmented Dickey-Fuller (ADF). But, these tests are unreliable in case of small sample size. The econometric literature then introduced the Dickey-Fuller Generalized Least Square (DFGLS) test and Ng-Perron test that compensate the problem. DFGLS testis criticized due to the size distortion problem. Ng and Perron (2001) test used for unit root testing is more powerful in its size properties. This test is developed on the bases of Generalized Least Square (GLS) and it is based upon four statistics given below

MZ_{α}^{GLS}

MSB^{GLS}

MZ_{t}^{GLS}

MP_T^{GLS}.

Test is based upon Modified Information Criteria (MIC). MIC test contain properties like simplicity, dependence upon penalty factor and focus on bias sum in shape of autoregressive coefficients that are based on number of lags and deterministic components type. The composition of null hypothesis concerned to unit root testing is similar to all other test that is rejection of null if estimated test value is comparatively smaller than critical value. The Ng-Perron test is more preferable for small sample size comparative to DFGLS test (Harris and Sollis, 2003). Thus, this study utilizes the Ng - Perron unit root test for further analysis.

B.2. Johansen co-integration test

Johansen and Juselius (1990) developed new technique concerning to co-integration associated to evaluate the long run relationship concerning to multivariate equation. Johansen and Juselius (1990) test is based upon maximum likelihood test for evaluating the number of co-integrating vectors inform of Vector Autoregressive (VAR) indication. The VAR representation is given as

$$z_t = \mu + \alpha_t z_{t-1} + ... + \alpha_k z_{t-k} + e_t .....(4)$$

where z show(n×1) vector that is composite of variables having order of integration that is equal to1, β is composite of (n×1) vector that indicate the constant terms, αshow the parameters of the VAR model and et is for error term that is identically distributed. Furthermore, Johansen test is based upon maximum Eigen values and trace statistics.

B.3. Causality test

The Granger Causality test proposed by Granger (1969, 1988) is used for examining the causal relationship among FDI, imports and exports. The casual relationship is shown between FDI and exports. It can be written as:

$$LFDI_t = \alpha_1 + \sum_{i=1}^{n} \beta_i LX_{t-i} + \varepsilon_t \quad (5)$$

$$Lx_t = \alpha_1 + \sum_{i=1}^{n} \theta_i LFDI_{t-i} + \mu_t \quad (6)$$

Schwarz Information Criteria (SIC) or Akaike's Final Prediction Error (FPE) is more appropriate for lag length selection. Equation (6) indicate that $LFDI$ Granger Causes LX and null hypothesis can be written as $H_0: \beta_i = o$ (no causal relationship exists) and alternate hypothesis can be written as $H_A: \beta_i \neq o$ (that causal relationship exists) and same for equation (6). Similar arguments can be built for casual relationship between FDI and imports in Pakistan.

IV. Estimation Results

The Ng-Perron unit root testis used for checking stationary of economic data. The results of Ng-Perron test have been reported in table 1.The results indicate that all economic variables including FDI, exports and imports are not stationary at I(0) or level. Thus the null of unit root is not rejected for these variables at level. Further, we check the stationarity at first difference and it indicates all variables are stationary. We can argue that all variables are integrated of order one or I(1).

The choice of optimal lag length selection is based upon certain factors that include number of observations, the number of economic variables taken in the model and complimentary lags requirement for cointegration analysis. Keeping these factors into consideration, we have used three lags for optimal lag length selection in VAR model. On the basis of Schwarz Information Criterion (SIC) the optimal lag length selected in our model is1. Thus further analysis is carried out on the bases of 1lag.

For testing co-integration among FDI, exports and imports of Pakistan Johansen co-integration methodology is used. Trace statistic λ_{trace} and Maximum Eigen statistic and their critical values are used for decision making. The rejection of null hypothesis (no co-integrating vector) is basically acceptance of alternative hypothesis (co-integration exists). The initial steps test the null hypothesis ($R = 0$) mean no co integration found in economic variables. The estimates of trace statistic are given in table 2 and the results of Maximum Eigen statistic are also reported in table 3.The trace-test value 45.90that is above critical value of 20.79and it is statistically significant at 5% level. Thus null hypothesis is rejected $R = 0$ and alternate hypothesis is accepted $R \geq 1$. Thus null of $R \leq 1$ can be rejected in against alternate hypothesis $R \geq 2$. Both test statistics reveal the similar results. Overall results indicate that there exist two co-integrating vectors in our model.

Table 1

Ng-Perron Unit Root Test

At Level				
Variable	**Ng-Perron Test Statistics**			
	MZa	MZt	MSB	MPT
LFDI	0.57818	0.40563	0.70156	34.8125
LX	0.97150	1.00480	1.03428	73.3994
LM	-0.03500	-0.01917	0.54774	21.3736
At 1st Difference				
Variable	**Ng-Perron Test Statistics**			
	MZa	MZt	MSB	MPT
ΔLFDI	-8.56269**	-2.06260	0.24088	2.88619
ΔLX	-17.9332***	-2.97232	0.16574	1.44626
ΔLM	-16.8010***	-2.86028	0.17024	1.59796

** and *** represent that we may reject the null hypothesis of unit root at 5% and 1% level of significance respectively.

Table2

Unrestricted Co-integration Rank Test (Trace)

H0	**H1**	**Trace Statistic**	**0.05 Critical Value**	**p-Value[a]**
R = 0*	R ≥1	45.9009	29.79707	0.0003
R ≤1*	R ≥2	16.82909	15.49471	0.0313
R ≤2	R ≥3	1.0626	3.841466	0.3026

a MacKinnon-Haug-Michelis (1999) p-values

*denotes rejection of the hypothesis at the 0.1level

Table 3

Unrestricted Co-integration Rank Test (Max-Eigen)

H0	**H1**	**Max-Eigen Statistic**	**0.05 Critical Value**	**p-Value[a]**
R = 0*	R ≥1	29.07181	21.13162	0.0031
R ≤1*	R ≥2	15.76646	14.26460	0.0287
R ≤2	R ≥3	1.062635	3.841466	0.3026

a MacKinnon-Haug-Michelis (1999) p-values

*denotes rejection of the hypothesis at the 0.1level

After confirming the existence of co integration, we estimate normalized coefficients based on Johansen methodology. The coefficients given in equation 7 represent the elasticities as all variable are used after logarithmic transformation. The empirics reveal that both imports and exports have positive effect on FDI in Pakistan and FDI is more elastic with exports as compared with its elasticity with imports. It indicates that FDI friendly policy can play an important role in overcoming the problem of persistent trade deficit in the country.

$$LFDI_t = Constant+4.563*LM_t+1.198LX_t \quad (7)$$

For testing causality, pair wise Granger (1969, 1988) methodology is used. The results are given in table 4.The results indicate bidirectional causality between FDI and imports in Pakistan. The results show that FDI may enhance the imported inputs due large level of inflows in service industry that is highly sensitive to high tech technology that is not manufactured within the country and ultimately the country has to heavily rely on imports (Ling, Yong, 1997). Similarly, investment inflows are attracted in input markets that were being imported from rest of the world that attract more FDI in long. The results indicate that exports and FDI have feedback relationship. FDI inflows in Pakistan may boost exports in a way that foreign investors can take advantage of low labor and utilization of domestic raw material. These advantage my lead the foreign investors to take cost advantage in international markets for their products. In the end, we test causality between exports to imports. The results indicate that there is uni-directional causality between the two and causality runs from export to import but not from imports to exports. As more than seventy percent of Pakistani imports are consisting of machinery, chemicals, industrial raw material and oil products, so expansion of exports may lead to enhancement in the volume of imports until Pakistan do not focus on heavy industry which can produce capital goods. But, the reverse causality from imports to exports is not proved in case of Pakistan.

Table4
Granger Causality Test

Null Hypothesis	**F-Statistic**	**p-Value**
LM does not Granger Cause LFDI*	7.57652	0.0094
LFDI does not Granger Cause LM*	7.37108	0.0103
LX does not Granger Cause LFDI*	9.83491	0.0035
LFDI does not Granger Cause LX*	5.83023	0.0213
LX does not Granger Cause LM*	8.60801	0.00596
LM does not Granger Cause LX	0.39378	0.53451

*denotes rejection of the hypothesis at 0. 05 level of significance.

V. Conclusion and policy implications

This study gives us new evidential detail concerning to causal relationship among FDI, imports and exports of Pakistan. The main evaluation of the study is that there is long-run causality among FDI, imports and exports in Pakistan. FDI inflows remain the main priority at national level in Pakistan and government has adopted trade liberalization strategy at some extent. This strategy is in favor of technological transfer from developed world to Pakistan. The causal relationship among FDI, imports and exports have several policy implications for Pakistan. The results from pair wise causality indicate that FDI has forward and backward linkages with imports and exports of the country. The policy makers should not only focus on FDI export oriented sectors but the incentives to foreign investors in to produce the substitute of the imports can also be beneficial for controlling persistent trade deficit in the country. This strategy will intrinsically become a major source for technology transfer from developed to developing country through multinational companies (MNCs) investment.

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