Do Imports and Foreign Capital Inflows Lead Economic Growth? Cointegration and Causality Analysis in Pakistan

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Abstract: The paper investigates the effects of imports and foreign capital inflows on economic growth in case of Pakistan over the period of 1990Q1-2008Q4. We have applied ARDL bounds testing approach to examine the long run relationship and investigated the direction of causality by using VECM multivariate framework.

Our analysis confirms the long run relationship between imports, foreign capital inflows and economic growth. The results show that imports and foreign capital inflows have positive and significant effect on the economic growth of Pakistan. Causality analysis reveals bidirectional causal association among the variables, but strong causality is found from imports and foreign capital inflows to real GDP.

Keywords: Imports, FDI, Growth, Pakistan
JEL Classifications: C22, F14, F21, O53.

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I. Introduction

A large body of trade and development literature generally considers exports as a vehicle to accelerate economic growth. Role of foreign direct investment (FDI) in a country's development efforts is also being discussed. However, a very little attention is paid on the role of imports in promoting productivity and growth (Lawrence and Weinstein, 1999; Kim et al., 2007). In fact, imports play a crucial role in the link between exports and economic growth, and ignoring imports from the analysis can yield misleading results (Uddin, 2004).

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 and Lee, 2010).

Inflow of foreign capital also plays a vital and budding role in worldwide business. A firm can approach new markets and marketing channels, cheaper production facilities, have access to new technology, products, skills and financing through foreign capital inflows and resources. Foreign capital inflows also provide a host country or firm with investment funds, capital, processes, organizational technologies and management skills. The main advantage of inflows of foreign capital and resources through its externalities is the adoption of new (foreign) technology, which can happen via licensing agreements, commencement, competition for resources, employee training, and knowledge, and export spillovers (Shahbaz and Rahman, 2010).

However, the effects of FDI are not always favourable for the recipient countries, and a simple policy with regard to FDI is unlikely to be optimal. It is confirmed by both firm-level and aggregate-level studies (Rahman and Shahbaz, 2010; Hien, 1992; Singh, 1988). FDI might have adverse effects on the recipient economy through the substantial reverse flow of profit transfer, remittance of resources via transfer pricing and grant of substantial concessions from the host country. Therefore, its real effect on economic growth of the recipient country still remains a controversial issue.

The individual case study on specific countries to examine the effects of imports and FDI on growth is crucial as the stage of development, the complexity of the financial environments and economic history are different for different countries. The results obtained from case studies can be used to better shape of the institutional structure and to better exploit the benefits of imports and FDI. However, to the best of our knowledge, such a country specific case study is limited. Hence this paper aims to consider Pakistan as a case study. The reason for selecting Pakistan is that it is the medium sized and the second largest economy in south Asia. Though India is the largest economy in South Asia, we do not focus on it just because India has drawn significant attention from researchers (Love and Chandra, 2005; Lee, 2010). Other countries in the region are relatively small. Also Pakistan's foreign trade regime is now much more liberalized.

Pakistan has a historical trade deficit. That means the country's imports are always greater than exports. For example, in 2008, the total imports of Pakistan were US$38.19 billion while this figure for exports was US$21.09 billion. In 2009, imports and exports data are US$28.31 billion and US$17.87 billion, respectively (SBP, 2010). So imports play a dominating role in Pakistan's external sector.

Pakistan energetically seeks overseas inflows of capital and resources. Three distinct government investment liberalization initiatives began in 1992, 1997 and 2000 have progressively opened Pakistan to foreign direct investment (FDI), offering broad arrays of incentives to attract new foreign capital inflows. The government also initiated a successful, broad-based macroeconomic reforms and structural adjustment programs

during 1999-2002. In spite of this pro-investment stance, foreign direct investment remains relatively modest. However, in 2007-08, situation about total foreign investment is encouraging. The FDI shows marginal increment; it has increased to $ 5.152 billion in 2007-08 as compared to $ 5.139 billion for fiscal year 2006-07 (Shahbaz and Rahman 2010).

The main objective of present study is to investigate the effects of imports and FDI on economic growth in a transition economy like Pakistan in the long and short runs. Causal relationship among the variables will also be examined. The contribution of the paper is that econometric findings of the project will enrich the existing literature. The research outcome will also help the policy makers of Pakistan to adopt the appropriate policies with regard to imports and FDI, and provide a scope for policy debate.

The paper is organized as follows. Section II provides an analytical framework and a review of literature on imports, FDI and economic growth; section III explains modeling, methodology, and data; section IV presents and discusses the research outcomes, and finally section V concludes the paper with policy implications.

II. Analytical Framework and Review of Literature

It is widely believed that the absorption of foreign technology through imports and FDI liberalization is a major component of the economic growth that a number of developing countries experienced. This paper, therefore, evaluates the effects of imports and foreign capital inflow on the economic growth of Pakistan.

From the theoretical point of view the relationship between imports and productivity is not an easy one. Increased imports of consumer products induce domestic import-substituting firms to innovate, update and restructure themselves in order to compete with foreign rivals. Hence domestic productive efficiency is increased by imports. Under perfect competition in the neoclassical model, when trade barriers are removed and the market is opened up to imports, factor used in an industry is reduced in the short run, but

in the long run, the industry becomes more competitive and efficient, and expands its investments in new technology, resulting in more outputs. Import of capital and intermediate goods enables domestic firms to diversify and specialize which further enhances domestic productivity. Under imperfect competition, an import-substituting domestic market shrinks with the increase of imports, causing investment and productivity to fall. Therefore, the effects of imports on productivity depend on both market structure and institutional factors (Kim et al., 2007).

Iscan (1998) argues that trade contributes to economic growth by increasing the variety of intermediate inputs and by increasing the size of the market. Exports earn valuable foreign exchange which is essential for importing the much needed capital and intermediate inputs (Damooei and Tavakoli, 2006 quoted from Asufa-Adjaya and Chakraborty, 1999). Therefore, the importance of imports, particularly when imports constitute capital and intermediate inputs, needs to draw more attention as a source of economic growth compared to exports.

Quoting from Iscan (1998), Damooei and Tavakoli (2006) notes that a positive correlation exists between the imported inputs and productivity growth. This was evidenced in a study of 47 sectors in the manufacturing industry in Mexico over the period from 1973 through 1990. Blomstrom and Wolf (1994) also find the similar results. They mention that productivity of domestic firms in Mexico increased more rapidly. However, a study conducted by Blomstrom, Lipsey and Zegen (1994) on 78 less developed countries for the period of 1960-1985 gives the opposite results. They find no evidence of the positive relationship between imports of machinery and transport equipment and economic growth.

Lawrence and Weinstein (1999) conducted a panel data study on Japanese manufacturing industries. They find that imports contributed to total factor productivity (TFP) growth mainly through competition effects. Lawrence (1999) also notes that import competition demonstrated TFP growth in US industries. Another study on the Brazilian manufacturing sector by Muendler (2004) reveals that the competitive effects of imports

on competition are large though the effect of intermediate imports on labour productivity is small (Kim et al., 2007).

Import-led growth effect is also observed in Thangavelu and Rajaguru (2004) for India, Indonesia, Malaysia, the Philippines, Singapore and Taiwan. Similar findings are also noted in Awokuse (2007) for Poland and in Awokuse (2008) for some South American countries. On the other hand, Awokuse (2007) finds the opposite results for the Czech Republic. These mixed results imply that the real effects of imports largely depend on country specific characteristics.

FDI has several positive effects which, together with the direct capital financing, may contribute to economic growth. Such effects are productivity gains, technology transfers, introduction of new process, managerial skills and know-how to the domestic market, employee training, international production networks and access to markets. Firms in host countries are benefited from accelerated diffusion of new technology by the foreign firms' introduction of new products or processes to the domestic market (Alfaro et al, 2004). Quoting Findlay (1978) and Wang (1990), Hsu and Wu (2009) argue that the increase of technical progress in the host country is proportional to the extent to which the domestic country opens up to FDI. The spillover effect of FDI is also empirically supported by some other studies such as Caves (1974), Globerman (1979), De Gregorio (1992) and Kokko et al (1996).

Economists accept that foreign capital inflows can serve to increase competition thereby making markets more proficient (Shahbaz and Rahman, 2010). Foreign capital inflows are said to promote economic growth because it can last promotion in technology transfer through enhanced production, efficiency, improvement in the quality of production factors, generate an inflow of investment funds to the balance of payment, all of which will lead to increase in exports, increases in savings and investments and ultimately faster growth of output and employment (Khor 2000). Finally, investment in new sectors in host country can spur the growth of new industry and new products [Ramachandran and Shah, (1999), Cotton and Ramachandran, (2001) and Naveed and Shabeer, (2006)].

Besides, as inflow of foreign capital and resource creates backward and forward linkages and multinationals corporations (MNCs) contribute technical help to promote the domestic firms, it is expected that the level of technology and productivity (through both labor and capital) of domestic producers will increase [Lim and Sidall (1997), Zhang (2001), Ahmad, Alam and Butt, (2004), Aqeel and Nishat (2004)].

A study on 11 sub-Saharan countries reveals that FDI has a significant and positive influence on economic growth in Ivory Coast, Niger, Kenya and Togo. A 1 percent change of FDI causes a change of GDP growth rate in a wide range from 1.1 percent in Togo to 5.7 percent in Niger (Most et al., 1996 cited in Damooei and Tavakoli, 2006). Sun (1998) notes that 1 percent increase in FDI induced to a 0.05 percent growth of GDP. Teboul and Mouslier (2001) and De Mello (1999) also find a positive effect of FDI on economic growth on two separate studies of 17 LDCs and 6 LDCs, respectively.

However, the effect of FDI is not always positive for the recipient countries. It is found true for both firm-level and aggregate-level studies. For example, applying panel data Haddad and Harrsion (1993) reject the growth enhancing-spillover hypothesis for Morocco. Looking at plant-level data in Venezuela over 4,000 plants from 1976 to 1989 Aitken and Harrsion (1999) use annual census data and find no evidence of a positive technology spillover effect from FDI. Borensztein, De Gregorio and Lee (1998) and Carkovic and Levine (2002, 2005) conduct national level studies and employ cross-country growth regressions. These studies also provide little support of exogenous positive effect of FDI on economic growth.

In the presence of such ambiguous effects of FDI on growth some have argued that actual contribution FDI can make truly depends on the circumstances of the recipient countries. Recipient countries must have absorption capacity to take advantages of FDI. The main circumstances or local conditions, among others, are: the domestic government policy, availability of productive assets, human capital, infrastructure and institutions (Alfaro et al., 2004, Hsu and Wu 2009). Although there exists substantial literature on FDI and

growth relationship, the empirical studies on the role played by the local conditions to exploit the positive spillover effects of FDI is not so much (Hermes and Lensink 2003).

Therefore, the above discussion indicates that import-growth and FDI-growth relationships are not uniform, and there is need for case-by- case study in view of each country's unique characteristics. To the best of our knowledge, this study seems to be a good contribution in literature with reference to Pakistan by employing ARDL bounds testing approach and Vector Error Correction Model (VECM). Additionally, robustness of causality is investigated through innovative accounting approach.

III. Modeling, Methodology and Data

Inflow of foreign capital affects enhances economic growth through capital formation, technology and know-how in host country. This transfer of knowledge through foreign capital inflows increases accessible stock of knowledge in recipient country by training her labour, shift of new managerial and organizational skills from developed world. This implies that inflow of foreign capital encourages local firms of host country to use advanced technology through capital formation to enhance productivity growth and hence economic growth. Similarly, imports may work as an important conduit to transfer of new technology, to enhance productivity growth of local firms and resultantly, economic growth is promoted.

Following above discussion, we formulate an estimable model to examine the impact of foreign capital inflows and imports on economic growth. All series are transformed into natural log-form. The log-linear transformation is superior to simple linear specification (Shahbaz, 2010, Shahbaz et al. 2010). The estimable equation for empirical purpose is being modeled as follows:

$$\ln GDP_t = \alpha_\circ + \alpha_{IMP} \ln IMP_t + \alpha_{FC} \ln FC_t + \varepsilon_i \qquad (1)$$

Where, economic growth is proxied by real GDP i.e. GDP_t, IMP_t is real imports, FC_t is foreign capital inflows and ε_i is residual term to be normally distributed.

This study employs the Augmented Dickey Fuller, Dickey Fuller Generalized Least Squared and Ng-Perron unit root tests to determine the order of integration of the variables of interest. For long run relationship, autoregressive distributed lag (ARDL) approach to cointegration is applied. The ARDL bounds testing approach to cointegration has numerous advantages over the other cointegration methods like E-G (Engle-Granger, 1987) cointegration, J-J (Johansen and Juselius, 1990) cointegration and FMOLS (Fully Modified Ordinary Least Square) by Philip and Hansen (1990). Firstly, ARDL is applicable irrespective whether the variables are integrated at I(1) or I(0) or I(1)/I(0) while conventional approaches to cointegration such as J-J cointegration and FMOLS require that variables must be integrated at I(1). Secondly, the long run and short-run parameters of the model are estimated simultaneously with simple modification. Lastly, ARDL approach is free from endogenity problem. The ARDL cointegration approach involves the investigation of long run relationship in the form of unrestricted error correction model as follows:

$$\Delta \ln GDP_t = \beta_1 + \beta_2 \ln GDP_{t-1} + \beta_3 \ln IMP_{t-1} + \beta_4 \ln FC_{t-1} + \sum_{i=0}^{n} \alpha_{GDP} \Delta \ln GDP_{t-i} + \sum_{j=0}^{p} \beta_{IMP} \Delta \ln IMP_{t-j} + \sum_{k=0}^{q} \beta_{FC} \Delta \ln FC_{t-k} + \mu_i \quad (2)$$

The next step is to compute the F-statistics by imposing zero-joint restriction on βs in error correction model following null hypothesis of no cointegration i.e. $H_0 : \beta_{GDP} = \beta_{IMP} = \beta_{FC} = 0$ against the hypothesis of cointegration i.e. $H_a : \beta_{GDP} \neq \beta_{IMP} \neq \beta_{FC} \neq 0$. The distribution of F-statistics generated by Pesaran et al. (2001) is non-standard. The reason is that F-statistics is based on the assumption that variables are integrated at I(0) or I(1). We have used critical bounds tabulated by Turner (2006) which are more suitable for small sample data. There is no cointegration if calculated F-statistic is less than lower critical bound (LCB). The hypothesis of no cointegration may be rejected if upper critical bound (UCB) is lower than calculated F-statistic. The decision about long run relationship is inconclusive if calculated F-statistic is between lower and upper critical bounds.

Once cointegration is found then there must be causality at least from one direction. Granger pointed out that existence of cointegration between the variables means that there is information about long and short run granger causality. VAR (vector autoregression) model can be applied to investigate the direction of casual relationship between imports, foreign capital inflows and economic growth for Pakistan. If imports, foreign capital inflows and economic growth are cointegrated, then we apply granger causality test using vector error correction model (VECM) framework. The empirical equations are modeled as follows:

Model: Economic growth, imports and foreign capital inflows:

$$\Delta \ln GDP_t = \vartheta_1 + \sum_{i=1}^{p} \vartheta_i \Delta \ln GDP_{t-i} + \sum_{j=1}^{q} \vartheta_j \Delta \ln IMP_{t-j} + \sum_{k=1}^{n} \vartheta_k \Delta \ln FC_{t-k} + \eta_1 ECM_{t-1} + \mu_i \qquad (3)$$

Model: Imports, foreign capital inflows and economic growth:

$$\Delta \ln IMP_t = \lambda_1 + \sum_{i=1}^{p} \lambda_i \Delta \ln IMP_{t-i} + \sum_{j=1}^{q} \lambda_j \Delta \ln FC_{t-j} + \sum_{k=1}^{n} \lambda_k \Delta \ln GDP_{t-k} + \eta_2 ECM_{t-1} + \mu_i \quad (4)$$

Model: Foreign capital inflows, imports and economic growth:

$$\Delta \ln FC_t = \delta_1 + \sum_{i=1}^{p} \delta_i \Delta \ln FC_{t-i} + \sum_{j=1}^{q} \delta_j \Delta \ln IMP_{t-j} + \sum_{k=1}^{n} \delta_k \Delta \ln GDP_{t-k} + \eta_3 ECM_{t-1} + \mu_i \quad (5)$$

Where, difference operator is indicated by Δ while ECM shows residual or error correction term resultant from long run cointegrating equation using ARDL model. The constant terms are denoted by ϑ_1, λ_1 and δ_1 in VECM equations and μ (i =1, 2, 3) residual term is assumed to be normally distributed. The selection of lag is based on Akaike Information Criterion (AIC) denoted by *p* and AIC is superior for small sample data set than Schwarz Information Criterion (SBC). The direction of granger causality is investigated by applying VECM which provides granger causality both for long-and-

short runs. The significance of lagged *ECM* terms using T-test confirms the existence of long run causality and short run granger causality is captured by significance of F-statistic or Wald test.

The data on real GDP, real imports and real foreign capital inflows has been collected from monthly statistical bulletins of State Bank of Pakistan (SBP, 2010). The study uses quarterly data for real GDP, real imports and real foreign capital inflows over the period of 1990-2008.

IV. Results and Discussion

The unit root properties of the variables are investigated by applying ADF, DF-GLS and Ng-Perron unit root tests. ARDL bounds testing approach to cointegration is flexible about integrating order of the variables. The variables of interest should be stationary at level or 1st differenced form or I(0) or (1) or I(0) / I(1). Unit root tests are just applied to ensure that no variable is integrated at I(2). If any variable is stationary at 2nd difference or integrated at I(2), then computation process for F-statistic is useless through ARDL bounds testing to examine cointegration between the variables. The results of ADF, DF-GLS and Ng-Perron unit root tests are reported in Table-1. Our empirical evidence reveals that variables have unit root problem at their level form and to be stationary at 1st difference. This leads us to conclude that all series are integrated at I(1). The unique order of integration supports to apply ARDL bounds testing approach to cointegration to examine long run relationship between economic growth ($\ln GDP_t$), imports ($\ln IMP_t$) and foreign capital inflows ($\ln FC_t$).

Table-1: Estimation of Unit Root Tests

Variables	ADF Test		DF-GLS Test
	T-calculated	Prob-value	T-calculated
$\ln GDP_t$	-2.1713 (4)	0.4975	-1.9038(4)
$\Delta\ln GDP_t$	-4.2129 (3)*	0.0072	-4.3750 (2)*
$\ln IMP_t$	-1.9287 (3)	0.6290	-1.9766 (3)
$\Delta \ln IMP_t$	-5.5518 (3)*	0.0001	-4.2720 (2)*
$\ln FC_t$	-2.1179 (2)	0.5270	-1.6776 (2)
$\Delta\ln FC_t$	-6.9291 (2)*	0.0000	-6.1767 (2)*
Variables	Ng-Perron Test		
	MZa	MZt	MSB
$\ln GDP_t$	-1.9541 (4)	-0.9470	0.4846
$\Delta\ln GDP_t$	-17.3258 (2)**	-2.9366	0.1694
$\ln IMP_t$	-1.6980 (3)	-0.8139	0.4793
$\Delta\ln IMP_t$	-35.4587 (1)*	-4.2072	0.1186
$\ln FC_t$	-5.7658 (1)	-1.6897	0.2930
$\Delta\ln FC_t$	-25.8995 (1)**	-3.5984	0.1389

Note: The asterisks * and **denote the significance at %1 and 5% levels, respectively. The figure in the parenthesis is the optimal lag structure for ADF and DF-GLS tests, bandwidth for the PP unit root test is determined by the Schwert (1989) formula

Before proceeding to ARDL, it is important to select appropriate lag length of the variables. The main reason is that F-statistic is very much sensitive with the lag order of the variables. There are different methods available of lag selection like sequential modified Likelihood Ratio (LR) test, Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Information Criterion (SBC) and Hannan-Quinn information (HQ) criterion. Our decision about lag order is based on AIC which is superior and more consistent compared to other criteria. The five optimum lag is selected. In such data set, we cannot take lag more than 5 to attain unbiased results of ARDL bounds testing. The lag order results are reported in Table-2.

Table-2: Lag Length Criteria

VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-3.7538	NA	0.0002	0.1957	0.2928	0.2343
1	89.0953	174.9333	2.15e-05	-2.2346	-1.8461	-2.0805
2	145.9378	102.1516	5.38e-06	-3.6213	-2.9414	-3.3516
3	156.8765	18.7066	5.11e-06	-3.6775	-2.7062	-3.2922
4	206.8294	81.0830	1.57e-06	-4.8646	-3.6018*	-4.3636
5	221.9361	23.2073*	1.33e-06*	-5.0416*	-3.4874	-4.4250*

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

The calculated F-statistic are reported in Table-3. This implies that calculated F-statistic (4.523) is greater than upper critical bound (4.258) at 10 percent level of significance. We have used critical bounds tabulated by Turner (2006). The critical values generated by Pesaran et al. (2001) and Narayan (2005) are inappropriate for small sample data. Our empirical evidence confirms the validation of cointegration for long run relationship between economic growth ($\ln GDP_t$), imports ($\ln IMP_t$) and foreign capital inflows ($\ln FC_t$) in the country. The ARDL model passes the classical assumptions regarding normality of error term, serial correlation, autoregressive conditional heteroscedisticity, white heteroscedisticity and function form of the model. The lower segment of Table-3 shows the results of diagnostic tests. The results indicate that error term is normally distributed and there is absence of serial correlation between the variables. There is no existence of autoregressive conditional heteroscedisticity and white heteroscedisticity in the model. The Ramsey RESET statistics show that model is well specified.

Table-3: The Results of Cointegration Test

Bounds testing to cointegration		
Estimated Equation	$\ln GDP_t = f(\ln IMP_t, \ln FC_t)$	
Optimal lag structure	(4, 4, 3)	
F-statistics (Wald-Statistics)	4.523***	
Significant level	Critical values ($T = 72$)[#]	
	Lower bounds, $I(0)$	Upper bounds, $I(1)$
1 per cent	4.922	6.328
5 per cent	3.920	4.904
10 per cent	3.182	4.258
Diagnostic tests	Statistics	
R^2	0.9596	
Adjusted- R^2	0.9448	
F-statistics (Prob-value)	64.7919*	
Durbin-Watson	1.8980	
Breusch-Godfrey LM test	1.2903 (0.2847)	
ARCH LM test	0.1305 (0.7190)	
White Heteroskedasticity Test	0.8514 (0.6344)	
Ramsey RESET	2.3475 (0.1067)	

Note: * and *** represent significance at 1% and 10% levels, respectively.

After finding the cointegration between the variables, the next step is to find out the long run impact of imports and foreign capital inflows on economic growth. Table-4 demonstrates the long run coefficients. The results indicate that real import has positive effect on economic growth and it is statistically significant at 1 percent level of significance. A 1 percent rise in real imports, other things remaining the same, will stimulate economic growth by 0.3996 percent. This finding supports the view by Blomstrom and Wolf (1994), Iscan (1998), Damooei and Tavakoli (2006) and Kim et al. (2007), who reported positive and significant impact of imports on economic growth. The effect of foreign capital inflows is positive with 1 percent significance level. It implies that a 0.0721 percent economic growth is linked with 1 percent increase in foreign capital inflows in the country, other things being constant. This finding supports the earlier work of Falki (2009) and Shahbaz and Rahman (2010) for Pakistan. The difference in coefficients may be due to different data pans used in both studies. So, it is

concluded that imports have dominant role to enhance economic growth as compared to foreign capital inflows.

Table-4: Long Run Elasticities

Dependent Variable = $\ln GDP_t$			
Variable	Coefficient	Std. Error	T-Statistic
Constant	10.2900	0.2927	35.1510*
$\ln IMP_t$	0.3996	0.0528	7.5565*
$\ln FC_t$	0.0721	0.0116	6.1889*
R-Squared = 0.8967			
Adjusted R-Squared = 0.8938			
S.E. of Regression = 0.0745			
Akaike info Criterion = -2.3162			
Schwarz Criterion = -2.2227			
F-Statistic = 308.2867*			
Prob(F-statistic) = 0.0000			
Durbin-Watson = 2.0320			
Diagnostic Tests	**Statistics**		
J-B Normality test	1.3576 [0.5072]		
ARCH LM test	0.4019 [0.5281]		
White Heteroscedisticity	0.9463 [0.4426]		
Ramsey RESET	0.8576 [0.3575]		
CUSUM	Stable**		
CUSUMsq	Stable**		

Note: * and ** denote significance at 1% and 5% levels, respectively.

The next issue is to examine the impacts of the variables in short run. The results are according to our expectations. The results show that differenced and lagged differenced terms of imports have positive and negative effect on economic growth and it is statically significant at 1 percent level of significance. The negative impact of lagged differenced term of imports implies that import of advance technology requires time for positive spillover effects on economic growth. The impact of differenced term of foreign capital inflows on economic growth is positive and significant at 1 percent level of significance. The lagged term of foreign capital inflows has inverse effect on economic growth but it converges into positive in future period.

Table-5: Short Run Elasticities

Dependent Variable = $\Delta \ln GDP_t$			
Variable	Coefficient	Std. Error	T-Statistic
Constant	0.0099	0.0073	1.3573
$\Delta \ln IMP_t$	0.2329	0.0602	3.8651*
$\Delta \ln IMP_{t-1}$	-0.3816	0.0584	-6.5266*
$\Delta \ln FC_t$	0.0495	0.0174	2.8441*
$\Delta \ln FC_{t-1}$	-0.0320	0.0172	-1.8558***
ECM_{t-1}	-0.8054	0.1012	-7.9586*

R-Squared = 0.8023
Adjusted R-Squared = 0.7873
S.E. of Regression = 0.0572
Akaike info Criterion = -2.8028
Schwarz Criterion = -2.6131
F-Statistic = 53.5765
Prob(F-statistic) = 0.0000
Durbin-Watson = 2.2368

Diagnostic Tests	**Statistics**
J-B Normality test	1.4728 [0.4788]
Breusch-Godfrey LM test	1.9550 [0.1298]
ARCH LM test	0.5547 [0.4589]
White Heteroscedisticity	0.5527 [0.7357]
Ramsey RESET	3.4402 [0.0682]
CUSUM	Stable**
CUSUMsq	Stable**

The sign of estimate of lagged error term, i.e. ECM_{t-1}, is negative and it is statistically significant at 1% significance level. This further confirms our established long run relationship between economic growth, imports and foreign capital inflows. It indicates the process of monotonic convergence to the equilibrium path. The value of estimate of ECM_{t-1} is -0.8054. Our results imply that changes from short run to long span of time run is corrected by 80.54 percent over each quarter with high significance.

After finding cointegration between economic growth, imports and foreign capital inflows, it is interesting to investigate direction of causality using VECM framework to

make clear picture for policy makers to design comprehensive policy to sustain economic growth by attracting FDI and import of necessary materials and advance technology. The results regarding VECM granger causality test are reported in Table-6. Since the variables are cointegrated then causality can be divided into long run and short run. The significance of coefficient of ECM_{t-1} indicates that long run granger causality using T-test from equations-3 to 5. The short run granger causality is indicated by significance of joint significance of LR test.

Table-6: The Results of Granger Causality

Dependent variable	Type of Granger Causality						
	Short-run			Long-run	Joint (short- and long-run)		
	$\Delta\ln GDP_t$	$\Delta\ln IMP_t$	$\Delta\ln FC_t$	ECT_{t-1}	$\Delta\ln GDP_t, ECT_{t-1}$	$\Delta\ln IMP_t, ECT_{t-1}$	$\Delta\ln FC_t, ECT_{t-1}$
	F-statistics [p-values]			[t-statistics]	F-statistics [p-values]		
$\Delta\ln GDP_t$	–	34.5494* [0.0000]	8.5300* [0.0001]	–0.1190* [-5.2373]	–	25.9368* [0.0000]	9.9690* [0.0000]
$\Delta\ln IMP_t$	12.8280* [0.0000]	–	1.0269 [0.3870]	-0.3728** [-2.4789]	14.7032* [0.0000]	–	2.7393** [0.0366]
$\Delta\ln FC_t$	3.6767** [0.0168]	1.3493 [0.2668]	–	-0.2519** [-2.5326]	3.8638* [0.0074]	2.4433** [0.0560]	–

Note: The asterisks * and ** denote the significance at 1% and 5% levels, respectively.

The results show that all *ECMs* have negative sign with significance. This confirms the existence of long run granger causality between the variables. In equation-3, imports and foreign capital inflows granger cause economic growth both for short and long runs. The granger causality runs from economic growth and foreign capital inflows to imports for the long run but in the short run, economic growth granger causes imports. It implies bidirectional causality between imports and economic growth that validates feedback hypothesis i.e. imports stimulates economic growth through spillover effects and in return, economic growth raises demand for imports to sustain production level that increases economic growth. These findings are consistent with evidence reported by Cetintas and Barisik (2009) for the case of transitional economies[1] and Lee (2010) for

[1] Armenia, Belarus, Bulgaria, Czech Republic, Estonia, Hungary, Kazakhstan, Latvia, Lithuania,

Pakistan. Foreign capital inflows and economic growth granger cause each other. This shows that relationship between foreign capital inflows and economic growth is complementary. The existence of bidirectional causality between foreign capital inflows and economic growth confirms findings evidenced by Iqbal and Shaikh (2010) for Pakistan. In the long run, bidirectional causal relationship exists between foreign capital inflows and imports. The significance of joint (short-run and long-run) analysis also supports our above explained findings.

Mostly, Granger causality tests do not seem to determine the relative strength of causality effects beyond the selected time span. In such circumstances, causality tests are inappropriate because these tests are unable to indicate how much feedback is existed from one variable to other. To examine the relative effectiveness of causality effects ahead of sample period, Shahbaz et al. (2008), Shahbaz and Khan (2010) have applied Innovative Accounting Technique (variance decomposition and impulse response function) following Shan (2005)[2]. Furthermore, it is noted that variance decomposition is also applied to investigate the response of the dependent variable to shocks stemming from independent variables. Variance decomposition method is an alternate of impulse response function (diagram of impulse response function is given in Figure-1). This process explains how much of the predicted error variance for any variable is described by innovations generated throughout each independent variable in a system over various time-horizons.

Poland, Russia, Slovak Republic and Slovenia.

[2] See Shahbaz et al (2008) for details

Table-7: Variance Decomposition Approach

Variance Decomposition of $\ln GDP_t$				
Period	S.E.	$\ln GDP_t$	$\ln IMP_t$	$\ln FC_t$
1	0.0607	100.0000	0.0000	0.0000
2	0.0622	95.1363	4.7653	0.0982
3	0.0745	74.4910	17.8973	7.6116
5	0.0907	72.1596	19.1060	8.7342
6	0.0911	72.4149	18.9339	8.6511
7	0.0971	69.7091	20.9170	9.3737
9	0.1062	67.5000	23.2732	9.2267
10	0.1075	67.5495	23.4045	9.0459
11	0.1117	66.8432	24.1633	8.9933
14	0.1202	64.9398	26.6311	8.4289
15	0.1234	64.6329	27.1119	8.2551
Variance Decomposition of $\ln IMP_t$				
Period	S.E.	$\ln GDP_t$	$\ln IMP_t$	$\ln FC_t$
1	0.0903	14.8660	85.1339	0.0000
2	0.0977	25.8253	74.1183	0.0563
3	0.1127	43.1274	56.4905	0.3820
5	0.1318	38.6548	59.7021	1.6430
6	0.1366	39.3094	59.1510	1.5395
7	0.1451	44.5686	53.8690	1.5623
9	0.1559	43.5389	54.7194	1.7416
10	0.1599	43.4302	54.8889	1.6808
11	0.1657	45.3976	52.9084	1.6938
14	0.1771	45.2410	53.0961	1.6627
15	0.1814	46.0558	52.2759	1.6681
Variance Decomposition of $\ln FC_t$				
Period	S.E.	$\ln GDP_t$	$\ln IMP_t$	$\ln FC_t$
1	0.3883	5.0356	6.8484	88.1159
2	0.4157	4.3942	10.7052	84.9004
3	0.4640	8.9168	10.6359	80.4472
5	0.5107	11.5999	9.1694	79.2305
6	0.5234	12.1827	8.7728	79.0444
7	0.5466	15.3336	8.0665	76.5998
9	0.5772	18.5573	7.9050	73.5375
10	0.5887	19.7685	8.0465	72.1849
11	0.6069	22.1961	8.2454	69.5584
14	0.6490	26.3919	10.1633	63.4447
15	0.6657	28.0850	10.8900	61.0249

The results show that economic growth is explained almost 65% by its own innovative shocks while imports and foreign capital inflows explain economic growth by 27.11% and 8.25% through their innovative shocks respectively. Economic growth explains imports by 46-05% through its innovative shocks. A 52.27% of imports is explained by its own shocks, and very minimal portion (1.67%) is explained by foreign capital inflows. The contribution of economic growth and imports to foreign capital inflows is 28.08% and 10.89% and the rest is explained by own innovative shocks of foreign capital inflows.

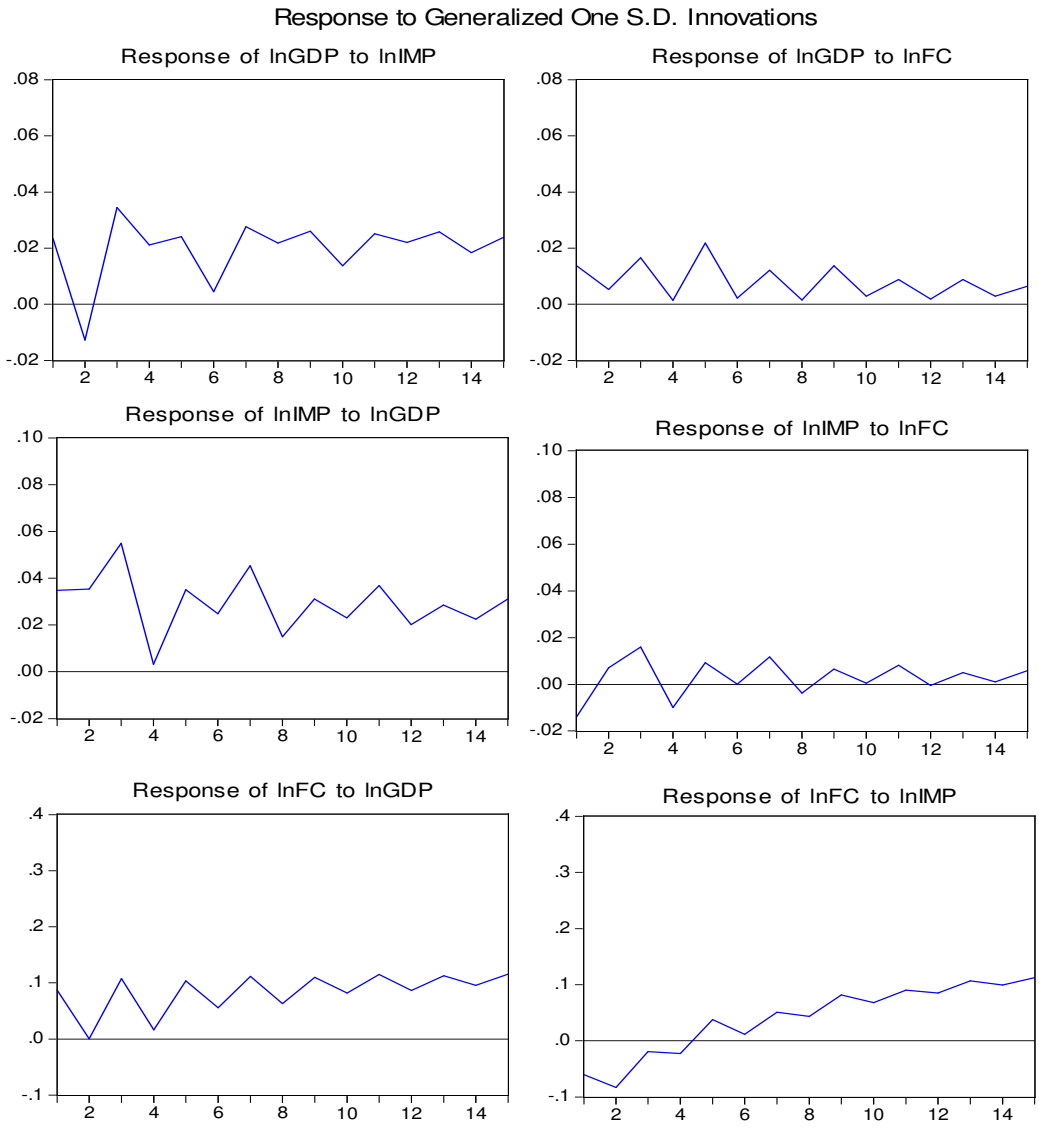
On the basis of the above analysis it may be concluded that there is bidirectional causality between economic growth and imports. Economic growth granger causes foreign capital inflows. No causal relation exists between imports and foreign capital inflows. These results are different with the findings by VECM granger approach due to difference in methodology[3].

Figure-1 indicates response of dependent variable due to shocks of other independent variables used in VAR approach. A variable is itself affected by its shock, and a variable affects the variable itself and passes on this effect to all other explanatory variables used in the system through the dynamic structure of VAR. We have used generalized approach which is superior to Choleskey orthogonalization approach. Impulse response function is sensitive with the variables order, but generalized approach is invariant of ordering of the variables.

It is observed from the analysis that one SD innovative shock in imports increases economic growth and same inference can be drawn from economic growth to imports. The response of economic growth from foreign capital inflows is minimal but positive and response of imports from foreign capital inflows is fluctuating. One SD shock/innovation in economic growth increases foreign capital inflows after 2nd quarter till 14th quarter. In one SD shock in imports decreases and increases foreign capital inflows before and after 5th quarter.

[3] Actually, VECM granger causality approach detects the causation exactly over the selected data period while innovative accounting approach shows the response of dependent variable due to innovative shocks of independent variables in future rather than selected period of data.

Figure-1: Impulse Response Function



V. Conclusion and Policy Implications

The existing literature on import-growth and FDI-growth relationships gives mixed results, and we have argued that there is a need for case-by-case study in view of each country's specific characteristics. From this realization we have chosen Pakistan, the second largest economy in South Asia, for this case study.

We have examined the impacts of imports and foreign capital inflows on economic growth using ARDL bounds testing approach to cointegration for long run and VECM granger causality approach to detect the nature of causal relationship between economic growth, imports and foreign capital inflows. The results indicate that imports and foreign capital inflows stimulate the economic growth. Granger causality analysis revealed bidirectional causal relationship between economic growth, imports and foreign capital inflows. A strong causality from imports and foreign capital inflows to economic growth was found.

In fact, contributions of imports and foreign capital inflows are linked with macroeconomic environment and availability of relevant infrastructure in the host country. The government policy also plays a vital rule to exploit the maximum benefit from imports and FDI. A country may sustain the rate of economic growth by importing advanced technology to increase domestic output, improve quality of local products, reduce average production cost and enhance international market share by increasing exports. Therefore, the government of Pakistan should direct its policy to import advanced technology, more capital and intermediate goods to enhance its production base and diversify exports. The government must create a good macroeconomic environment, develop infrastructure, and reduce/eliminate all sorts of barriers to attract more FDI as these will not only increase local production but also generate competition and efficiency in the economy. The absorption capacity of Pakistan's economy must increase to take full advantage of FDI. The government and non-government organizations should work together to achieve these objectives.

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