

A Note on Causal Relationship between FDI and Savings in Bangladesh

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Abstract. *This paper aims to investigate the causal relationship between foreign direct investment and gross domestic savings in Bangladesh over a period of 1985-2007. In doing so, Johansen cointegration technique and error correction methods are employed to examine the long run and short run relationship between foreign direct investment and gross domestic savings. To determine the direction of causality, we used innovation accounting approach. Results suggest that there exist bi-directional causal relationship between foreign direct investment and gross domestic savings but the movement is stronger from domestic savings to foreign direct investment. The result also implies complimentary relationship between them and as such, policy makers in Bangladesh need to focus on the determinants of both FDI and domestic savings in order to accelerate its growth.*

Keywords: FDI; Gross domestic savings; causal relationship.

JEL Codes: F21, E2.

REL Codes: 8E, 10F.

Introduction

The phenomenon of foreign direct investment as a manifestation of internationalization and integration of economic life constitutes the basic dictum of our age. FDI is conventionally defined as a form of international inter-firm co-operation that involves significant equity stake and effective management decision power or ownership control of foreign enterprises. FDI is also considered to encompass other broader, heterogeneous non-equity forms of cooperation that involve the supply of tangible and intangible assets by a foreign enterprise to a domestic firm. It serves as a strong mechanism for the promotion and spread of business opportunities throughout the developing and industrialized economies.

That FDI affects growth positively is a well established theoretical and empirical fact. Its impact on growth is expected to be two-fold. First, through capital accumulation in the recipient economy, FDI is expected to enhance growth by encouraging the incorporation of new inputs and foreign technologies in the production function of the recipient economy. Second, through knowledge transfers, FDI is expected to augment the existing stock of knowledge in the recipient economy through labor training and skill acquisition, on the one hand, and through the introduction of alternative management practices and organizational arrangement, on the other. Also it is expected to promote technological upgrading and hence diffusion even without significant physical capital accumulation; is the case of, for instance, start up, marketing and licensing agreements, management contracts and joint incentives in general (De Mello, Sinclair, 1995). As a result, foreign investors may increase productivity in the recipient economy and FDI can be deemed to be a catalyst for domestic investment and technological progress.

The current process of globalization has given considerable importance to trade and capital liberalization. Foreign direct investment (FDI) which is a strong source of exterior finance is also an outcome of capital account liberalization. It not only promotes capital formation but also helps in transferring the productive technology among countries (William, Meleod, 1998). Foreign direct investment can be better explained as an "Investment made in foreign countries by multinational business enterprises in order to control assets as well as to manage production activities in those countries" (Padma, Savant, 1999). Considering the perspective of developing countries, there is a vast literature which focuses on the negative consequences of FDI inflows on a number of macroeconomic variables like economic growth, investment through private sector, productivity of manufacturing, exports, and employment opportunities in the host countries. There are two main approaches

regarding the opposite views with respect to the impact of FDI on the level of economic growth. It has been empirically proved that FDI has a tendency to promote and increase efficiency while enhancing the level of economic growth for example (Shahbaz et al. 2007) in case of Pakistan. Therefore, it is considered that there is positive impact of FDI inflow on economic development. Whereas there is also a belief that FDI inflow might have negative effect on economic growth in developing countries by replacing savings (Chung et al. 1995). The linkage between savings and FDI has been highlighted by Chung et al. (1995) and supported the fact that FDI raises domestic savings. Similarly, Bashier and Bataineh (2007) investigated relationship between FDI & savings and found cointegration between both variables. Furthermore it is concluded that FDI is complementary for national savings in the case of Jordan. Recently, Shahbaz et al. (2008) also find that foreign direct investment and domestic savings are complementary in case of Pakistan.

FDI plays a positive developmental role as mentioned by Chen (1992). Especially in the host countries FDI creates a positive effect on economic growth like Pakistan because it comprises some very important factors like capital, technology management, and market access (Shahbaz, et al. 2007). Bangladesh is a developing country in South Asia. After gaining independence in 1971, achievements of the nation are mentionable in some of the human development fields. However, disappointments are notable in the economic front (Barakat, 2004). The per capita income is one of the lowest in the world (US\$480) and this is still one of the most densely populated countries (850 people per square kilometer) of the world. The Bangladesh Enterprise Institute (BEI)-World Bank Investment Climate report indicates that compared to China, India, and Pakistan, Bangladesh is falling behind in terms of FDI flow. Investment performance of Bangladesh is not satisfactory at all. It is in every respect an under-invested economy.

Furthermore, considering the aspect of comparative advantage it is very clear that FDI is directed towards manufacturing sector and also some of the infrastructure related projects. It can create economies of scale in these types of sectors; in fact a higher level of production can be achieved by means of the linkage effects. Again, it is obvious that when investors earn profit, they instead of remitting abroad reinvest which requires repayment. This situation demands a favorable economic environment in a country which is an underlying factor in building up investor's confidence. Thus this confidence building efforts may ensure the greatest benefit from FDI inflows. In the newly industrialized economies (NIEs), FDI had surged in their early stages in countries like Hong Kong, China, Korea, Singapore, and Taipei, China and then towards ASEAN

countries. In the present global economic situation, FDI played crucial role for the staggering growth of the world's two fastest growing economies. Therefore, overall pace of economic growth, degree of confidence building and FDI inflows together have a positive interrelation

The objective of this paper is to investigate the impact of foreign direct investment on domestic savings, whether FDI affects domestic savings positively or negatively in case of Bangladesh. Although Bangladesh has already undertaken a number of reform measures to attract FDI, it is yet to make any impact on its economy. Corruption, lack of good governance, limited economic opportunities and resources for relatively large population, lack of private-public partnership, inadequate private sector, improper implementation of economic policies with huge corruption are some of the major reasons for rising unemployment trends in the country. The rest of this paper is organized as follows: section II discusses methodological framework and collection of data. Empirical results of the study are explained in section III. Finally, conclusions are drawn in part IV.

II. Methodological framework and data

Vector Auto Regression (VAR) approach is widely used to investigate the dynamics of the relationship between two macroeconomic variables like gross domestic savings and foreign direct investment. The present study employs the Innovation Accounting Technique (Impulse Response Function and Variance Decomposition) that has not been used before to investigate causal relationship between FDI and domestic savings in case of Bangladesh. It attempts to estimate the forecast error variance decomposition that allows inferences to be concluded with the proportion of movements in particular time periods due to its own shocks and shocks arising from other variables in the VAR. By using VAR, one can check the impact of a "shock" in a particular variable to find out the impact on other variables and future values of shocked variables are also included (Methodological background is based on Shahbaz and Khan, 2010).

This advanced approach breaks down the variance of the forecast error for each variable following a "shock" to particular variable that makes possible to identify which variable affects strongly and vis-à-vis its impact. For example, a shock in foreign direct investment leads subsequently to a huge change in gross domestic savings in the estimated VAR approach, but shock in gross domestic savings has only minor or small effect on foreign direct investment, from this exercise, we can infer that foreign direct investment leads to gross domestic savings or uni-directional causality from foreign direct investment to gross domestic savings.

On the other hand, impulse response function investigates the time path of the effects of shocks of independent variables. This approach also determines how each actor responds over time to the first “shocks” in other variables. So these two methods are named as “Innovation Accounting” that allows an intuitive insight into the dynamic relationship between gross domestic savings and foreign direct investment. According to variance decomposition which breaks down the forecast error for gross domestic savings and foreign direct investment, if gross domestic savings explain more of the variance as compared to foreign direct investment, it would be concluded that gross domestic savings granger cause foreign direct investment and vice versa. In the light of the above discussion, one may establish a VAR system that takes following the form:

$$V_t = \sum_{i=1}^k \delta_i V_{t-i} + \eta_t \dots (1)$$

where,

$$V_t = (GDS, FDI),$$

$$\eta_t = \langle \eta_{GDS}, \eta_{FDI} \rangle,$$

$\delta_1 - \delta_k$ are two by two matrices of coefficients and η is a vector of error terms. FDI = foreign direct investment as share of GDP, GDS = gross domestic savings as share of GDP. Annual time series data covering the period (1985-2007) have been used in the study, obtained from various issues of Bangladesh Economic Review.

Table 1

Correlation matrix and descriptive statistics

Variables	Mean	Median	Maximum	Minimum	Skewness	Kurtosis	DS	FDI
DS	2.4631	2.5257	3.0587	1.2781	-0.6785	2.5577	1.0000	0.8573
FDI	-3.2854	-3.8581	0.7466	-6.9867	0.2474	1.6457	0.8573	1.0000

III. Results and discussion

We employed Ng-Perron (2001) test to find the order of integration for variables, foreign direct investment and gross domestic savings for Bangladesh. Table 2 reports that both variables are stationary at 1st difference with constant and trend.

Table 2

Unit root estimation				
Ng-Perron at level				
Variables	MZa	MZt	MSB	MPT
DS	-7.7802	-1.9713	0.2533	11.7148
FDI	-11.1528	-2.3504	0.2107	8.2244
Ng-Perron at 1 st difference				
DS	-28.3003 ^a	-3.7578	0.1327	3.2420
FDI	-25.2660 ^a	-3.5534	0.14064	3.6113

Note: a represents the significance at 1 percent level of significance.

Table 3 shows evidence of the existence of long run liaison between gross domestic savings and foreign direct investment. Johanson cointegration test reveals that there are two cointegrating vectors between the variables. This confirms the existence of long run association for both variables.

Table 3

Lag length selection criteria						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-47.6564	NA	0.214893	4.1380	4.2362	4.1640
1	-7.5228	70.2339*	0.0106*	1.1269*	1.4214*	1.2050*
2	-3.6631	6.1111	0.0108	1.1385	1.6294	1.2688
3	-1.9236	2.4642	0.0133	1.3269	2.0141	1.5092

Note: * shows selection of lag length.

Table 4

Johanson cointegration test			
Hypothesis	Trace Statistic	0.05 Critical Value	Prob.**
$R = 0$	20.70856	18.39771	0.0234
$R \leq 1$	5.795952	3.841466	0.0161

Note: Prob. Indicates probability value.

Next, the OLS estimates indicate that growth in gross domestic savings attracts more foreign direct investment to Bangladesh significantly. Increase in foreign direct investment also raises the level of gross domestic savings but with less magnitude. Empirical evidence shows that foreign direct investment and domestic saving are not substitutes but are complements in the long run in case Bangladesh.

Regression results:

$$FDI = -12.975 + 3.933DS$$

(-11.12) (8.49)

$$R\text{-Squared} = 0.7349 \text{ Adj-R-Squared} = 0.7247$$

$$DS = 3.076 + 0.187FDI$$

(34.52) (8.49)

$$R\text{-Squared} = 0.7349 \text{ Adj-R-Squared} = 0.7247$$

Table 5 shows how the variables in the forecast error variance can be broken into components that may be attributed to each of our variables in VAR. Through the innovative shocks, the above approach shows the exact explanation regarding their relationship whereas forecast error variance decomposition of unrestricted VAR (3) models are estimated over a 10-year forecast time horizon as shown by Table 5.

From above test, we see that foreign direct investment explains almost 79% of its forecast error variances or is explained through its own innovative shocks. Whereas gross domestic saving shows innovative impact through its own shocks over only 41 %. This shows that growth of gross domestic savings is predominately explained by foreign direct investment or innovative shocks and rest is through its innovative. It may be concluded that current levels of domestic saving influences future growth of savings. Gross domestic savings lead to FDI not more than 20% through its innovative shocks while FDI leads to gross domestic savings by more than 58% through their innovative shocks on each. This phenomenon confirms that there is bi-directional causal relationship between foreign direct investment and gross domestic savings.

Table 5

Variance decomposition percentages		
Percentage of forecast error variation in	Typical shock in	
	FDI	DS
FDI	79.167	20.832
GDS	58.928	41.071

Impulse response function

An impulse response function traces the effect of a one standard deviation shock to one of the innovations on current and future values of endogenous variables through the dynamic structure of vector error correction (VEC). A shock to the n-th variable directly affects the n-th variable itself, and is also transmitted to all of the endogenous variables through the dynamic structure of

VEC. Cholesky fractionalization approach is commonly used to conduct impulse response analysis. Impulse response function is also utilized to investigate the time paths of log of foreign direct investment (FDI) in response to one-unit shock to the log of gross domestic savings (GDS) and vice versa. Figure-1 is the graphical presentation of impulse response function showing how foreign direct investment responds over time to a shock in gross domestic savings and vice versa.

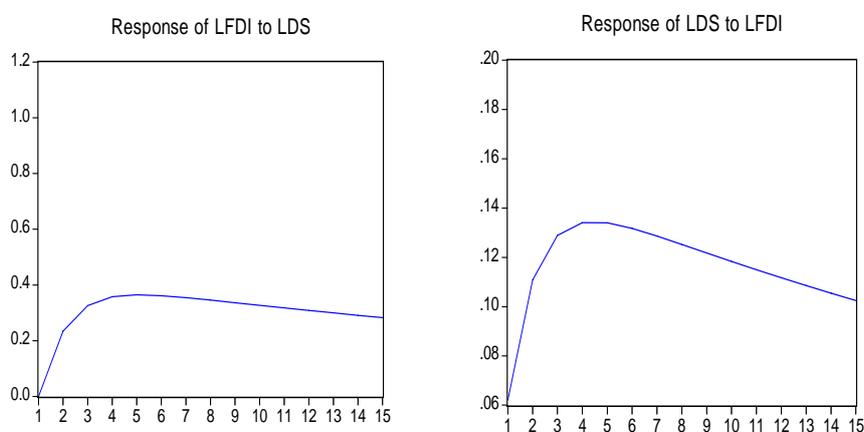


Figure 1. Response to Cholesky one SD Innovations

We now construct the error correction model to test for causal relationship in the short run. The significance of error term provides further confirmation about the long run rapport and their stability. Furthermore, error term shows the return to equilibrium in the case of a shock.

Table 6

Residual-based short run causality					
Dependent Variable	Co-efficient	Inst-values	R-Squared	D.W	F-Statistics
DS	-0.5171	0.0057	0.2677	1.349	9.143
FDI	-0.5635	0.0039	0.2876	1.519	10.094

Table 6 reports OLS estimation results that indicate the significance of both error terms. The coefficients of error terms reveal that there exists bi-variate causality between foreign direct investment and domestic savings for Bangladesh. It also shows that feed-back is stronger from domestic savings to foreign direct investment in the short run with high level of significance. This suggests that in case of Bangladesh, foreign direct investment and domestic savings do have complementary relation both in the short run and in the long run.

IV. Conclusions

This study attempts to investigate the long run relationship between foreign direct investment and gross domestic savings in case of Bangladesh. Johanson cointegration and error correction methods (ECM) are employed. The findings suggest that there exists both long run and short run relationship between foreign direct investment and gross domestic savings in Bangladesh. Innovation accounting approach is applied to determine causal relationship between foreign direct investment and gross domestic savings. Findings suggest that there is bi-directional causal relationship between foreign direct investment and gross domestic savings. The result is true for feedback as well. It may be finally concluded that foreign direct investment and domestic savings are complements. Although Bangladesh has undertaken a number of reform measures to attract FDI, it failed to make any significant progress to this end. Poor infrastructure, political instability, corruption, administrative complexities, poor law and order etc. are some of the key factors that are responsible for this failure.

Policy makers must address these issues to create favorable environment to attract foreign direct investment. Government must improve the growth rate of FDI, not only in its absolute magnitude but also in the relative term. Banking sector should not focus only on how to channel savings to productive projects but also improve growth rate of domestic savings. In order to achieve this, the factors that determine savings in an economy must receive considerable attention.

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