An Empirical Analysis of Economic Growth-FDI Nexus: The Role of FDI Volatility in Pakistan

by
Ms. Saba Ashiq
&
Dr. M. Tariq Majeed

1. Introduction

- FDI is an imperative source of capital, complement of domestic private investment, normally connected with new openings for work and improve technology exchange and spillover, upgrade human capital (learning and ability), and lifts general economic growth (Chowdhury and Mavrotas, 2005).

- Besides, FDI may encourage access to export markets, escalate competition, modifying the structure of defectively competitive firms.

- Moreover, FDI through managerial and labour training, enlarges the knowledge of the host nation which stimulate economic growth (De Mello, 1997).

- A large body of empirical literature has provided conflicting results of the impact of FDI on economic growth. However, the role of FDI volatility is less focused to explain growth-FDI nexus.

2. Economic Growth and FDI: Empirical Literature

Solow growth model	**Bornschier (1980), Beckford (1971), Mazenda, (2014), Trinh and Nguyen (2015)**
Endogenous growth model	(1978), Blomstrom et al. (1992), Borensztein et al. (1998), Aitken et al. (1997), Aghion et al. (1999), Habib and Zurawicki (2002), IMF (2003), Ozturk (2007), Alfaro et al. (2010), Adeniyi et al. (2012)
Absorptive capacity	Blomstrom et al. (2000), Durham (2004), Ekanayake and Ledgerwood (2010), Cuadros et al. (2004), Busse and Groizard (2008), Melnyk et al. (2014)
Negative impact	Menninger (2003), Omran and Bolbol (2003), Dimelis (2005), Nolan (1983), Chase-Dunn 1(975), Esso (2010), Kolstad and Wiig (2013)
Volatility of FDI	Lensink and Morrisey (2001), Van Staveren (2011), van Staveren (2011), Goldberg (1993), Aizenman and Marion (1996), Darby et al. (1999) Serven (1998), Serven (2002), Acoraoglu et al. (2011), Lensink and Morissey (2002), Lensink and Morissey (2006), Choong and Liew (2009), Guillaumont and Chauvet (2001), Edwards et al., (2015), Akcoraoglu, (2011).

2. FDI and Economic Growth in Pakistan

Positive Impact	Atique et al. (2004), Yousaf et al. (2008), Khan et al. (2011), Aurangzeb et al. (2012) and Ahmad et al. (2012) Iqbal et al. (2010), Zeb et al. (2014), Younus et al. (2014), Abdullah et al. (2015) Malik (2015).
Negative Impact	Falki (2009), Saqib et al. (2013).

3. Model specification

$$LrGDP_t = \alpha_0 + \alpha_1 FDIV_t + \alpha_2 FDI_t + \alpha_3 INV_t + \alpha_4 LF_t + \alpha_5 Trade_t + \alpha_6 CPI_t + \varepsilon_t$$

- log of real GDP is dependent variable.

- FDI and FDIV represent Foreign Direct Investment and Foreign Direct Investment Volatility.

- INV denotes total domestic investment by public and private sector.

- Trade represents sum of imports and exports as a percentage of GDP.

- Labor force is measured by population (15-60) % of total population and CPI is an indicator of macroeconomic instability.

4. Data Description

- The relationship between FDI volatility and economic growth is examined by using annually data from 1976 to 2014 for Pakistan.

- The data is extracted from Pakistan Economic Survey (2015) and World Development Indicators (WDI, 2016).

5. Results: Unit Root Tests with Structural Breaks

Variables	Zivot and Andrews test			LP unit root test		
	Intercept and Trend			Intercept and Trend		
	Lags	Break Year	t-statistic	Lags	Breaks Year	t-statistic
LrGDP	1	1996	-4.0698	1	1990 2002	-4.6684
FDI	1	2006	-5.9070*	1	2002 2008	-7.4344*
FDIV	0	2008	-4.1309	0	1986 2007	-5.6779
CPI	0	2008	-4.6466	0	1997 2007	-5.9682
INV	0	2005	-4.48012	0	1995 2004	-5.4860
PO	1	1986	-4.7405	1	1990 2008	-5.1620
Trade	0	1998	-4.6922	0	1994 2002	-5.2438

Note: Zivot-Andrews (ZA) critical values at 1 % (*), 5 % (**) and 10 % (***) level of Significance are -5.5700, -5.0800 and -4.8200 respectively. Lumsdaine-Papell (LP) critical values at 1 % (*), 5 % (**) and 10 % (***) level of Significance are -7.1900, -6.7500 and -6.4800. The optimal lag length is determined by SBC method.

5. Results: EGARCH Model

FDI	Coefficients				
Mean Equation					
C	0.7120 (0.0000)				
AR(1)	0.8676 (0.0000)				
Variance Equation					
Constant	0.4577 (0.0635)				
ARCH	-0.7804 (0.0187)				
EGARCH	0.6105 (0.0000)				
GARCH	0.9491 (0.0000)				
Diagnostic statistic					
ARCH (1)	0.8280 (0.3628)				
ARCH (16)	12.0748 (0.7388)				
Q-statistic (16)	1.3584 (0.244)	1.3594 (0.507	2.0156 (0.569)	4.6550 (0.325)	4.6959 (0.454)
Q-statistic Squared (16)	0.8606 (0.354)	1.0236 (0.599)	1.6707 (0.643)	2.7060 (0.608)	4.3309 (0.503)

5. Results: ARDL Bound Testing Approach

Model	Lags	F-calculated value	Level of Significance	F-tabulated values	
				Lower bound	Upper bound
F(LrGDP/FDIV,FDI,INV,LF,Trade,CPI)	2	6.9535*	10 %	2.5	3.6
			5 %	2.9	4.0
			1 %	3.6	4.9

Note: 1 % (*), 5 %(**) and 10 % (***) level of Significance.

5. Results: Short Run Results of ARDL

ARDL (2,0,0,1,0,1,0) SBC DLRGDP				
Variables	Coefficients	STD.Error	t-statistics	P-values
DLrGDP(-1)	0.3308 **	0.1298	2.5484	0.0173
DFDIV	-0.1872*	0.0572	-3.2748	0.0031
DFDI	0.0220	0.0221	0.9979	0.3279
DINV	0.0035	0.0088	0.3975	0.6944
DLF	0.0215*	0.0070	3.0817	0.0050
DTrade	0.0067	0.0047	1.4333	0.1642
DCPI	-0.00004	0.0030	-0.0136	0.9893
ECM(-1)	-0.5956*	0.1037	-5.7423	0.0000
R-Squared	0.9849	D-Watson Stat	2.1762	
Adj R-squared	0.9782	F-statistic	147.8444*	0.0000

Note: 1 % (*), 5 %(**) and 10 % (***) level of Significance

Long Run Results of ARDL Model

ARDL (2,0,0,1,0,1,0) SBC LRGDP				
Variables	Coefficients	STD.Error	t-statistics	P-values
FDIV	-0.3143*	0.1069	-2.9403	0.0070
FDI	0.0369	0.0388	0.9525	0.3500
INV	0.0389**	0.0183	2.1256	0.0436
LF	0.0361*	0.0106	3.3972	0.0023
Trade	0.0238*	0.0086	2.7681	0.0105
CPI	-0.0001	0.0051	-0.0136	0.9893

Note: 1 % (*), 5 %(**) and 10 % (***) level of Significance

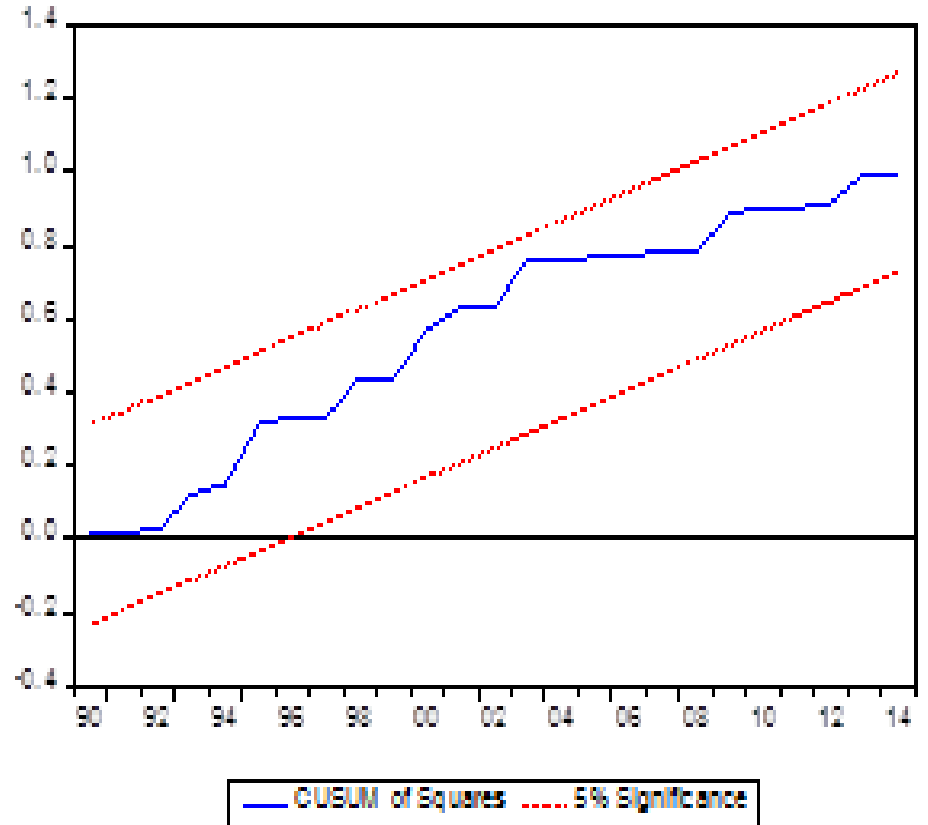# 5. Results of Diagnostic Tests

Tests		F-value	p-values
Serial-correlation	Breusch-Godfrey	1.1100	0.2921
Heteroskedasticity	ARCH(1)	0.0964	0.7562
Functional Form	Ramsey RESET	1.2820	0.2687
Normality	Jarque-Bera	0.9765	0.6137

5. Stability Tests

CUSUM

CUSUM —— 5% Significance

CUSUMQ

CUSUM of Squares ···· 5% Significance
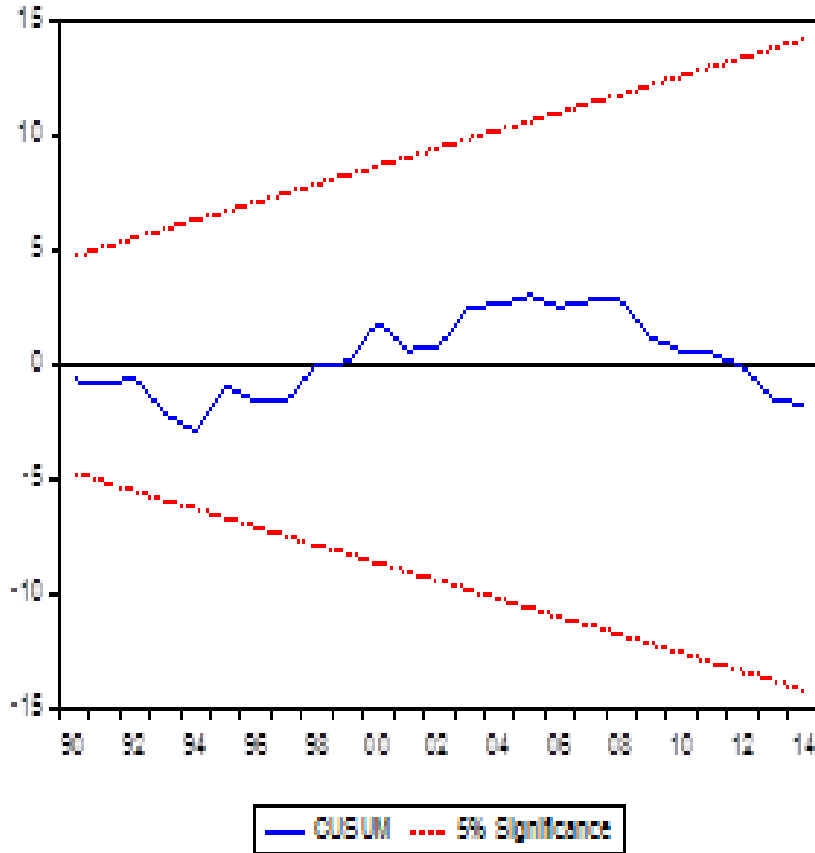
6. Conclusion and Policy Implications

- Our results show that growth impact of FDI is positive. However, this effect is not significant.

- In contrast, growth impact of FDI volatility is negative and statistically significant both in the short-run and in the long-run.

- This study recommends that rather than just attracting FDI inflows, government needs to adopt FDI policy which ensures sustained inflows of FDI.