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FDI inflows in Bangladesh: Identifying its major Determinants

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Abstract:*This study has traced the major determinants of FDI inflow in Bangladesh through establishing both the short run and long run equilibrium relationship between FDI and four selected determinants using ARDL approach. It has been found that GDP per capita, which has been taken as proxy of market size, and infrastructure do not have any significant impact on accelerating FDI in Bangladesh. On the other hand, trade openness has positively influenced FDI and among the four selected determinants trade openness has played the most important role in attracting FDI in Bangladesh. Low wage rate is also another driving force in attracting FDI in this country. The coefficient of error correction term suggests that the disequilibrium occurring due to a shock is totally corrected in about 2 years at the rate of 59 per cent a year. Finally this study has derived some policy implications.*

Keywords*:FDI, Trade Openness, Wage rate index, GDP, ARDL*
JEL: *CO1, C50, F10, F21, F40, O50, P45*

I. Introduction

As an important medium of gaining financial benefits and earningideas, skill, technology transfer etcForeign Direct Investment (FDI) is pivotal fordeveloping countriesto strengthen their economy by filling up their resource gaps. .Moreover, less volatility of FDI compare to other capital[1](in [2])and wide acknowledgment about the contribution of FDI in growth and development [2]and also the integration process of the world economy have ledto turnaround of FDI environment worldwide, so as indeveloping countries [3] and South Asian countries ([4] and [5]) including Bangladesh. Particularly, since the 1990s Bangladeshhas been able to gain momentum in FDI inflow through creating an environment conducive to investment. As a result, despite with inadequate volume compared to neighbouring country like India, Bangladesh stood as the third largest FDI recipient in 2012 and second largest recipient in 2013 in respect of South Asian countries [6].However, proximate reasons behind the low level are the unfavourable perceptions by foreign investors of the business climate,as elsewhere in South Asian countries [7], and unsatisfactorysituation of some of the determinants of FDIin this country.However, some of these determinants in particular, trade openness and related other deregulations are importantly supporting growth and poverty reduction process in Bangladesh as evidenced in researches e.g Ahmed and [8].It seemingly indicates that identifying major determinants of FDI will apparently help development of Bangladesh.Thusthere is a dire need to do further researchon determinants of FDIin Bangladesh.

It is worth mentioning that, there exist a limited number of country specific researches in the area of the major determinants of FDIin Bangladesh using appropriate econometric analysis. Considering this, my study aims to deal with the issue to fill the research gaps.Further, by focusing on only Bangladesh, it is possible to make a more comprehensible study on determinants that attract FDI. As the intermingled nexus among social, cultural, economic, and political factors is complex one and hard to delineate, I have only selected four factors (such as real GDP per capita, trade openness, labour cost (wage rate index) and infrastructure). Thus this study examines whether and to what extent these factors affect FDI inflow in Bangladesh.

In organizing ideas on FDI and its determinants, this paper examines the literatures that motivate to understand and analysis of factors affecting flow of FDI. Then briefly discussingthe situation of FDI inflow in Bangladeshit identifies variables and methodology anda commonlyused specification would be laid down uponwhich ARDL(Auto Regressive Distributive Lag) approach will be applied to estimate the long run as well as short run effects of selecteddeterminants of FDI. Finally there will have an effort to have sound empirical analysis of the results followed by some policy implications.

1.1 Objectives

In this study there will have an attempt to trace the major determinants of FDI inflow and the extent of their effect in Bangladesh through establishing both the short run and long run equilibrium relationship between FDI and four selecteddeterminants using ARDL approach and derive some policy implications.

1.2Literature Review

To understand comprehensivelythe issue of FDI and its determinants, it is necessary to make a systematic review of related literatures which shades light on the concept of FDI and focuses on determinants of FDI.

Concept of FDI is viewed closely by different authors. Initially the concept of FDI was considered as an important source of development financing which [9] and [10] (in [11]) relate the theory of capital movement. While informing the theory of Portfolio Investment and Direct Investment, [12] views FDI as the long-term private capital movements and means of transferring knowledge and other farm assets, both tangible and tacit, for establishing production abroad. On the other hand, FDI is viewed in the seminal paper of [5] in that it contributes to productivity gains through providing new investment, better technology, management expertise and export markets. [13] (in [4]) had the similar view for poor region.As mentioned by [14], kinds of FDI are: resource seeking, market seeking, efficiency seeking and strategic Asset seeking.In South, East and South-East Asia verticalefficiency seeking fdi investment is largely observed. Pertinently [15] opined, as "….in developed-developing country fdi, vertical efficiency seeking fdi in which foreign companies seek to produce intermediate and/or final products in the cheapest (real) cost locations primarily for exports to third markets.'' However, FDI inflow is influencedby an extensive set of factors which is evidencedin many literatures.

Among empirical researches on factorsthat affectFDI,study of [15] is said to be the foremost and key research. [15] introduced location advantage theory that provides a framework to identify three types of variables: 1) economic, 2) social or cultural factors and 3) the political environment. In the study of FDI determinants [16] Hossain and Kimuli (2012)find that market size is the most important determinant of FDI to developing countries while using macro panel data of 57 low and lower middle income countries. Similarly, [17] (in [18]), [19] use a set of variables and find significant and positive impact of the size of GDP, trade, aid and the growth rate on FDI to lower-middle income countries.Their study also provides some light on why Asian countries are more successful in attracting FDI than African and Latin American countries. While study of [20] shows the importance of openness, infrastructure availability and sound economic and political conditions in attracting FDI in South Asia, Africa and the Middle East.

While discussing the issue of labour cost, studiesof [21], [22], [23] (in [24])find significant and negative relationship of wage and FDI. Nevertheless, positive and significant association of labour cost with FDI is found in the study of [25](in[24] **),**[26] (in [15])**.**

Depending on surveys results and other evidences, [27]also examines different macroeconomic indicators and informs about the ample potentiality for South Asian countries to promote FDI despite having several barriers. Another study done by[28]appliedthe method of Ordinary Least Squares (OLS) andrevealed that market size, external debt, domestic investment, trade openness, and physical infrastructure are the important economic determinants of FDI for Pakistan, India and Indonesia. Study of[21], [29] and study of [30] (in [31]), [32], [33], [4], [34], [35] (in [36]) find positive impact of trade on FDI.

In the context of Bangladesh for the period of 1986-2008,consideringGDP as the dependent variable the studyof [37] applies Vector Error Correction Model (VECM)andconfirms a long-run equilibrium relationship of GDP with FDI, trade openness and capital formation. His sample contains insufficient number of observations which might not be able to capture the real feature.On the other hand**,** [38]study is based on a theoretical modelthat builds on a production function where FDI is appeared as one of its factor inputs andexplores a bi-directional causality between FDI and GDP in the panel of selected SAARC countries (Bangladesh, India, Pakistan & Sri Lanka).

ConsideringGDP as dependent variable and FDI as independent variable the paper of [39] runs OLS where it finds positive correlation between these two variables.Another study is the work of [40]. Describing theeconomic environment, political climate, institutional factors and government initiatives for attractive FDI,they surveyed on 17 foreign investors of Export Processing Zones (EPZs) and 10 high level officials of BOI, BEPZA, and concerned Ministries. Most of the respondents viewed infrastructure as one of the significant obstacles to FDI inflow andcheap labour cost as the most significant determinant of FDI inflow to Bangladesh.However, all these studies might be helpfulforanalysing my result.

II. FDI inflow in Bangladesh

2.1After the second half of the 1980s development of FDI inflows is observed with irregular trend.Particularly, following the restoration of democracy in 1991continued economic deregulation process and rapid liberalisation measures have contributed toward the growth of FDI inflow.

Until the mid-90s FDI inflow remains below 92 million US$ (Calendar year)dramatically reaching to 579 million US$ in 2000. With a little fluctuation it increased to 845 million US$ in 2005 [41] and dropped in 2007 due to political unrest, procedural complexity and infrastructural difficulties [42]. However, itcontinued to

grow toreach to 1136 million US $ in 2011 andrising by13.7% in 2012[43]. There is also evidence that the shares of FDI to GDP grew from0.10% in 1990 to 11% in 2010 indicating at least twofold growthin the last decade. Despite being in a disadvantaged position in terms of technology and infrastructure facilities, compare to most of the South Asian countries (Fig 1 and Fig 2, Annexure I) recent growth of FDI inflow in Bangladesh remains at satisfactory level.However,the volume is (1,292.6 million US$ in 2012)still far from fulfilling its potential as a destination for FDI likewise most of the South Asian countries.

III. Data Source, Measurement of variables, Time series Properties andModel Specification

3.1 Data Source and measurement of variables

3.1.1 Data Source

Analysis is based on time series data of FDI inflows into Bangladesh and some selected indicators that affect FDI of Bangladesh. Most of the data are collected from World Development Indicators of World Bank[44], Finance Division and Bangladesh Bank[41]. To keep the data set consistent and avoid the volatile data, I have restricted the series from 1978 to 2011.

3.1.2 Variables

Several numbers of independent variables are commonly used as determinants of FDI.However, I have narroweddown the number of independent variables and optedthose variables, which have also been considered inseveral researches with FDI in developing countries [45]and also in South Asia (e.g[20]). FDI as a share of nominal GDP, will be the dependent variable which hasalso been used in many empirical researches such as [2] in finding determinants of FDI.However, Real GDP per capita, Openness, growth of wage rate index as proxy of labour cost and infrastructure (number of phone per 1000 people as proxy of infrastructure) have been taken as independent variables. Selected variables can be defined as following:

fdi = FDI as a share of nominal GDP
rgdpp= Real GDP per capita as a proxy of market size.
Openness =Degree of Openness = Share of export and import in GDP $=\frac{\text{Export } + \text{Import}}{\text{GDP}}$
infra = growth of telephone lines per 1000 population
gr_pw = growth of wage rate index or labor cost.

3.2 Time Series Properties

Before proceeding with the ARDL approach, I have performed unit root tests using Augmented Dicky Fuller (ADF) and Phillips-Perron (PP) unit root test. Here, unit root tests consider existence of unit root (non-stationary) as null hypothesis. The null hypothesis of unit root has been rejected in all cases based on Akaiky Information Criteria (AIC) with lag 3.

3.2.1 Unit root tests:

Table 1: results using ADF (Augmented Dicky Fuller) and PP (Phillips-Perron) unit root test on variables

	Trend Assumption	Level/First Difference	Name of Variables				
			fdi(FDI_GDP)	rgdpp	openness	gr_pw	infra
ADF	Constant	Level	1.210693	16.81302	0.284700	-8.381597***	-3.334174
	Constant & trend	Level	--0.698289	4.894603	-1.705243	-8.343026***	-0.258890
	Constant	First difference	-2.941145**	1.087498	-5.840641***	-7.516663***	-3.708087***
	Constant & trend	First difference	-4.317507***	-4.063524***	-6.173578***	-7.372070***	-5.071023***
PP							
	Constant	Level	-0.999660	17.23583	2.057872	-8.381597***	3.211167
	Constant & trend	Level	-2.683593	6.939493	-1.159897	-8.343026***	-0.258890
	Constant	First difference	-7.164299**	0.624092	-5.846128***	-7.516663***	-3.721052***
	Constant & trend	First difference	-7.683850***	-4.254333***	-12.11143***	-7.372070***	-5.070688***

***1% level of significance, ** 5% level of significance *10% level of significance.

Table-1 shows the empirical and stationary tests results which indicate that 4 variables (fdi_gdp, rgdpp, openness, infra) are non-stationary andgr_pw is found stationary in level. However, all of the four variables are stationary with the fist difference. Hence, we consider that these four variables are integrated of order 1 i.eI(1). On the other hand, gr_pw is stationary at level, so it is I(0) variable.

3.3 Model specification

3.3.1ARDL (Auto Regressive Distributive Lag) Modelling Approach to Cointegration Analysis

To empirically analyse the long-run relationships and dynamic interactions among the selected variables, the model has been estimated by applying Auto Regressive Distributive Lag (ARDL) procedure, developed by [46]. The main reason behind of this is that the variables are of different order of integration (I(1) or I(0) or mutually cointegrated) and [47] in [48] and [49]) findsadvantageous characteristics of ARDL modelin such case.

Following [46], as also used by manyother researchers,the general ARDL model is as following:

$$Y_t = \alpha_0 + \alpha_1 t + \sum_{i=1}^{p} \phi_i y_{t-i} + \beta' X_t + \sum_{i=0}^{q-1} \eta_i \Delta X_{t-i} + u_t, \quad t=1,2,3,\ldots\ldots,T \qquad (1)$$

$$\Delta X_t = P_1 \Delta X_{t-1} + P_2 \Delta X_{t-2} + P_3 \Delta X_{t-3} + \text{- - - - - - - - -} + P_s \Delta X_{t-s} + \epsilon_t \qquad (2)$$

Where, $x_t$is the K-dimensional I(1) variables that are not cointegrated among themselves, u_t and$\epsilon_t$are serially uncorrelated disturbance with zero means and constant variances. P_i arekxk coefficient matrices such that the vector autoregressive process in $\Delta X_t$is stable.

Further, based on the above (1) the ARDL model can be specified as:

$$dy_t = c_0 + \varphi_{yy} y_{t-1} + \varphi_{xx} X_{t-1} + \sum_{i=1}^{p-1} \lambda_i \, dy_{t-i} \quad + \quad \sum_{i=0}^{q-1} \eta_i \, dx_{t-i} \quad + \quad u_{t,\, t=1,2,3,\ldots T} \qquad (3)$$

Thus the ARDL representation (also used by [48]) for my study is as follows:

$$dfdi = c_0 + \alpha'_1 fdi_{t-1} + \alpha'_2 rgdpp_{t-1} + \alpha'_3 \, openness_{t-1} + \alpha'_4 pw\_gr_{t-1} + \alpha'_5 \, infra_{t-1} + \sum_{i=1}^{p} \delta_i dfdi_{t-i} + \sum_{i=0}^{q} \theta_i drgdpp_{t-i} + \sum_{i=0}^{q} \omega_i dopenness_{t-i} + \sum_{i=0}^{q} \upsilon_i dpw\_gr_{t-i} + \sum_{i=0}^{q} \xi_i d\,infrat - 1 + u_t \qquad (4)$$

whereα'_i are the long-run multipliers, $c_0$is the drift and $u_t$are the white noise errors, p, q, are lag order .

In the above (4) the 1st part (terms with α'_is) corresponds to the long run relationship while the second term with the summation signs represents the short run model with error correction dynamics.

'Bound test' will be applied for the existence of long-run relationship. ARDL bounds testing approach is based on Wald-test (F-test) for testing the hypothesis of joint significance of the coefficients of the lagged levels of the variables. The hypothesis can be denoted as: H_0: $\alpha'_1 = \alpha'_2 = \alpha'_3 = \alpha'_4 = \alpha'_5$ i.e there is no cointegration among the variables, against the alternative H_a : $\alpha'_1 \neq \alpha'_2 \neq \alpha'_3 \neq \alpha'_4 \neq \alpha'_5$. Here it also denotes the test which normalise on fdi by F_{fdi}(rgdpp, openness, gr_pw, infra). Two critical values of F are given by [47]forthecointegration. The lower critical bound assumesall the variables are I(0). The upper bound assumes that all variables are I(1). When the computed F-statistic is greater than the upper bound critical value, H_0 is rejected but when it is below the lower bound critical value then H_0 cannot be rejected. If $F_{calculated}$ falls between upper and lower bound then the results are inconclusive.

In the second step, once cointegration is established, normalising the first part of (4) the ARDL long-run model for fdi (FDI/GDP) can be estimated as follows:

$$\mathbf{fdi} = \alpha_0 + \alpha_1 \, rgdpp + \alpha_2 \, openness + \alpha_3 pw\_gr + \alpha_4 \, infra \qquad (5)$$

(4) involves selecting the orders of the ARDL model in the five variables using Akaike information criteria (AIC). In the final stage, an error correction model associated with it will be estimated and short-run dynamic parameters will be obtained. The error correction model (ECM) is specified as follows:

$$dfdi_t = \Psi + \sum_{i=1}^{q} \delta_i dfdi_{t-i} + \sum_{i=0}^{q} \theta_i drgdpp_{t-i} + \sum_{i=0}^{q} \omega_i dopenness_{t-i} + \sum_{i=0}^{q} \upsilon_i dpw\_gr_{t-i} + \sum_{i=0}^{q} \xi_i dinfra_{t-1} + \text{ע} ECM_{t-1} \qquad (6)$$

Where ECM $_{t-1}$ is the error correction dynamics, $\delta, \theta, \omega, \upsilon, \xi$ are the short-rundynamic coefficients of the model and ע is the speed of adjustment.

IV. Analysis, Results and Discussion

4.1ARDL (Auto Regressive Distributive Lag) Modelling Approach

In the first step of the ARDL analysis, I tested for the existence of long-run relationships in (1) using (4) by applying general to specific modelling approach which is guided by the short data span and the selection criteria of Akaiki Information Criteria (AIC) to select maximum lag order of 3. Optimal lag is found to be three which many studies with ARDL estimates and with annual data chose the lag length of two or three [49], [50] and [51]. Further, asin Treasury model as mentioned by [52]differentlag orders for different variables have beenused, I have also chosen lag order (p) to be 3 for all the variables except infra for which lag is selected to be 1.

Following the procedurein [47](mentioned in [49]) an OLS regression has been estimated for the second term (that includes first difference) in (4). In doing this I have conducted F-test for the jointsignificance of the coefficients of the lagged levels of the variablesfollowing the specification. Table 2 reports the ARDL regression as follows:

Table 2: Autoregressive Distributive Lag Model

Dependent Variable: DFDI_GDP
Sample (adjusted): 1983 2011
Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.055931	0.102103	0.547788	0.6036
FDI_GDP(-1)	-1.992526	0.399889	-4.982693	0.0025
RGDPP(-1)	-0.000826	0.000543	-1.520686	0.1792
OPENNES(-1)	0.633864	0.187831	3.374649	0.0150
GR_PW3(-1)	-0.018806	0.005573	-3.374411	0.0150
PHONE1(-1)	0.025940	0.011958	2.169217	0.0731
DFDI_GDP(-1)	0.628188	0.298373	2.105378	0.0799
DFDI_GDP(-2)	0.530562	0.225164	2.356337	0.0566
DFDI_GDP(-3)	0.294452	0.201804	1.459098	0.1948
DRGDPP	0.005705	0.001558	3.661378	0.0106
DRGDPP(-1)	0.001110	0.001194	0.930378	0.3881
DRGDPP(-2)	-0.004579	0.001880	-2.436292	0.0507
DRGDPP(-3)	-0.002495	0.001915	-1.302654	0.2405
DOPENNES	-0.153082	0.092676	-1.651792	0.1497
DOPENNES(-1)	-0.551555	0.142054	-3.882708	0.0081
DOPENNES(-2)	-0.454661	0.105982	-4.289970	0.0051
DOPENNES(-3)	-0.243871	0.122826	-1.985499	0.0943
DGR_PW	-0.001707	0.000790	-2.160538	0.0740
DGR_PW3(-1)	0.014371	0.004202	3.420378	0.0141
DGR_PW3(-2)	0.009871	0.002956	3.339462	0.0156
DGR_PW3(-3)	0.003936	0.001368	2.877528	0.0281
DPHONE1	0.020434	0.013811	1.479567	0.1895
DPHONE1(-1)	0.008804	0.012530	0.702642	0.5086

R-squared	0.973919	Mean dependent var	0.002985
Adjusted R-squared	0.878288	S.D. dependent var	0.022413
S.E. of regression	0.007819	Akaike info criterion	-6.853772
Sum squared resid	0.000367	Schwarz criterion	-5.769365
Log likelihood	122.3797	Hannan-Quinn criter.	-6.514150
F-statistic	10.18413	Durbin-Watson stat	2.373674
Prob(F-statistic)	0.004169		

4.2Existence of Long- run relationship

The bound test (H_0: $\alpha'_1 = \alpha'_2 = \alpha'_3 = \alpha'_4 = \alpha'_5$) by performing a significance test on the lagged level variables. The Wald test result is given in table 3 from where I got Chi-squarevalue 54.067 and p value.0. Further, the computed F-statistic is 10.81355 whichis significant at 1% level suggesting that the null hypothesis of no cointegration can be rejected. This implies that there is a long-run relationship between fdi (FDI/GDP) and selected independent variables in this study.

Table 3: Wald Test

Equation: EQ_ARDL_PW3PH1LAG1_FINAL

Test Statistic	Value	df	Probability
F-statistic	10.81355	(5, 6)	0.0058
Chi-square	54.06777	5	0.0000

Null Hypothesis: C(2)=C(3)=C(4)=C(5)=C(6)=0

Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(2)	-1.992526	0.399889
C(3)	-0.000826	0.000543
C(4)	0.633864	0.187831
C(5)	-0.018806	0.005573
C(6)	0.025940	0.011958

Restrictions are linear in coefficients.

As the long-run relationship among variables is found, in the second step I estimated (5) using the ARDL specification. The results obtained by normalising on fdi (FDI/GDP) of table 2 in thelong-run are presented in table 4.

Table 4:Estimated Long-run coefficients using the ARDL approach(after normalisation)

Equation (7): ARDL (1, 0, 0,0,0)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.02807	0.011958	0.547788	0.6036
RGDPP	-0.000415	0.000543	-1.520686	0.1792
OPENNESS	0.31812	0.187831	3.374649	0.0150
GR_PW3	-0.009438	0.005573	-3.374411	0.0150
PHONE1	0.01302	0.011958	2.169217	0.0731

After normalisation the long run model is as follows:

Fdi=0.02807 -0.000415 RGDPP + 0.31812Openness***- 0.009438gr_pw***+0.01302infra
(0.102103) (0.000543) (0.187831) (0.005573) (0.011958)

(*** and ** indicating significance at 1% and 5% level respectively, Std. Errors are in parenthesis)

This model reveals that GDP percapita, which is proxy of market size, does not have any impact on accelerating FDI in Bangladesh, as the coefficient is insignificant.Despite most of the researches argue for significant and positive effect of GDPP,opposite theoretical expectation found by [33]and[53](in [24]) is that the GDP percapita on FDI is inversely related to FDI/GDP. Thus GDPP with negative sign in my study is not unusual one.

On the contrary,the coefficient of trade openness is positive and statistically significant at 1% levelwhich implies that openness has positively influenced FDI.Among the four selected variables trade openness plays the most important role in attracting FDI in Bangladesh. In this study the coefficient of openness

is 0.31812 which implies that a 1 percent increase in trade share (trade openness) will increase the FDI to GDP ratio by 0.32 percentage point in Bangladesh. While [19]find in their study that a 1 per cent increase in trade increases FDI inflow by 0.84 per cent point in developing countries.This differential is because of the way I have considered the dependent variable in terms of ratio of FDI to GDP rather than FDI.Study of [54] Jha at al. (2013) finds positive impact of trade openness and GDPon FDI in South Asian countries like, India, Sri Lanka, Pakistan, Bangladesh and Nepal. My result corresponds to all these suggestions and also in accord with the theories mentioned in literatures.

Another variable, the labour cost (wage rate index) responds negatively tofdi (FDI/GDP). The coefficient has negative sign and significant at 1% level which indicates that low wage rate is one of the driving forces in attracting FDI in Bangladesh. The result demonstrates that an increase in the growth of wage rate index by 1% decreases the inflows of fdi (FDI/GDP) by 0.94 percentage points per year assuming all things remained equal. This result is supported by wage theory that higher wages will discourage FDI, which is also acknowledged by [32], [55], and [56] (in [36]).

Whereas, infrastructure variable isinsignificantat 5% level,although is significant at 10% level. However my result follows the result of [19].In highlighting caveats of this proxy variable, it is important to point out that I have included only fixed phone lines per 1000 population as the proxy of infrastructure, but there are other element of infrastructures such as mobile phone, internet, rail and roads (transportation), rural infrastructure etc.

4.3Short Run model (Error Correction Model)

The short run model has been estimated using OLS as follows where all the variables are in 1st difference and their corresponding lags.

$$dfdi = \alpha_0 + \sum_{i=1}^{m} \alpha_{i1} dfdi(-i) + \sum_{i=0}^{m} \alpha_{i2} drgdpp(-i) + \sum_{i=0}^{m} \alpha_{i3} dopennes(-i) + \sum_{i=0}^{m} \alpha_{i4} dinfra(-i) + ECM(-1) \quad (7)$$

The Error Correction Representation for the selected ARDL is shown in the Table 5. More parsimonious error correction model is obtained by dropping lag changes with statistically insignificant coefficient (starting from larger 'p' value one by one).

Table 5: Error Correction Representation of ARDL model

Dependent Variable fdi (FDI/GDP) Sample (adjusted): 1983 2011 Included observations: 29 after adjustments	
Regressors	ARDL (3,3,3,3,3) (in parsimonious ecm), ARDL(2,3,1,3,3))
Constant	0.103614(0.018832)
DFDI_GDP1(-1)	0.317142(0.169582)
DFDI_GDP1(-2)	-0.382250(0.183228)
DRGDPP	0.005384(0.001296)
DRGDPP(-1)	0.003346(0.001445)
DRGDPP(-2)	-0.004359(0.001197)
DRGDPP(-3)	0.002348(0.001193)
DOPENNES	-0.603000(0.110200)
DOPENNES(-1)	0.086039(0.087590)
DGR_PW3	-0.001765(0.000522)
DGR_PW3(-1)	0.004512(0.001288)
DGR_PW3(-2)	0.005113(0.001315)
DGR_PW3(-3)	0.001786(0.000778)
DPHONE1	0.031854(0.008871)
DPHONE1(-2)	0.079780(0.018572)
DPHONE1(-3)	0.028358(0.012812)
ECM4(-1)	-0.590239(0.112246)
R^2	0.899580
AdjustedR^2	0.765687
Akaike info criterion	5.919418
F-statistic	6.718630 (p=0.000941)
DW-statistic	1.403618
Diagnostic test	
$X^2_{Auto(3)}$	4.673579(0.1973)
$X^2_{Norm(3)}$	0.576577 (0.7495)
$X^2_{White(16)}$	19.5822 (0.2395)

Notes:

1. The values of Standard Error (S.E) in parentheses, 2. The values in brackets are probabilities, 3. X2 Auto(3) is the Breusch-Godfrey L.M test for autocorrelation, 4. X2 Norm(3) is the Jarquue-Bera normality test, 3. X2 White(3) is the White test for hetaroscadasticity

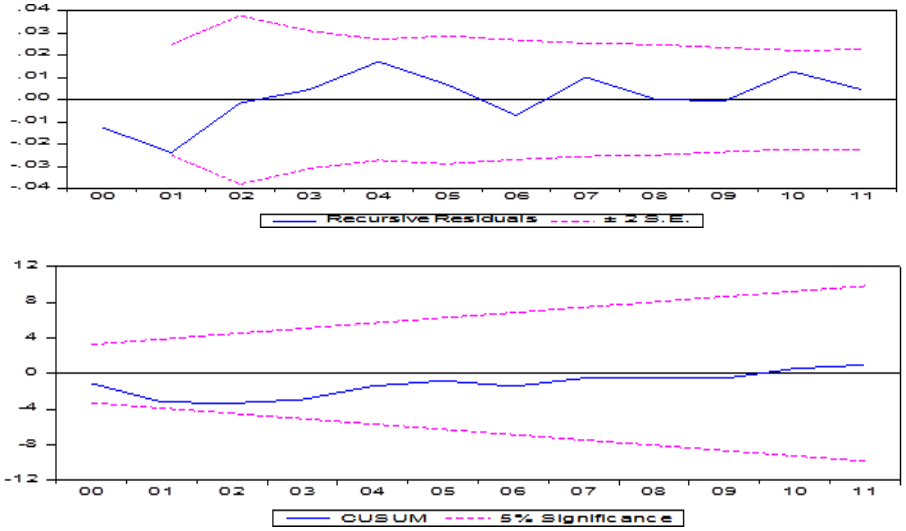
The error correction term has a coefficient of 0.590239, which has negative sign and is significant at 1% level of significance supporting thecointegration result. Thus the model is stable. The coefficient of 0.59suggests the disequilibrium occurring due to a shock is totally corrected about 2 years at the rate of 59 percent a year indicating a moderate speed of convergence.

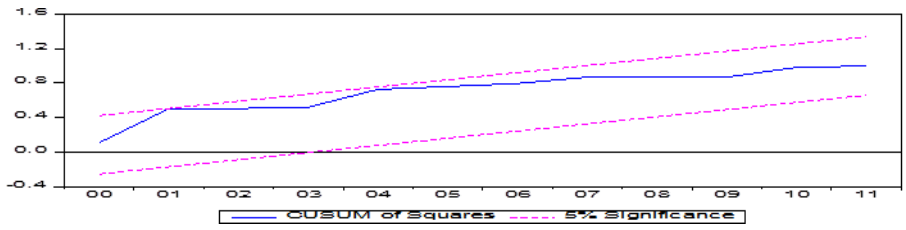
However, the ECM output also shows that, in the short run, FDI to GDP ratio is affected with one year lag of its own. GDP per capita withcurrent period, 1st period and third period lag has significant but very small coefficient indicating irresponsiveness of market size to attracting FDI in Bangladesh in the short-run. It is supported by the statement of [57]that some determinants of FDI location such as market size, are not amenable to short-run policy manipulation and so do not come into play in attracting FDI. Trade openness in the 1st lag has significant with very low value.Impact of labour cost is found very minimal in the short-run. Infrastructure has positive and significant impact in the current period, 2nd period and third period. No other lagged variables display any significant influence on FDI/GDP. One conceivable reason for this may be that, the number of observation is not adequate enough to absorb the lag impact appropriately.

4.3Diagnostic Test

The diagnostic tests presented in lower part of Table 5 show that there is no evidence of diagnostic problem with the short-run model. Measuring the explanatory power of the equation by their adjusted R^2,itshows that roughly 77% of the variation in FDI/GDP can be explained by the four selected independent variables. The Lagrange Multiplier (LM) test of autocorrelation suggests that residuals are not serially correlated. According to the Jarque-Berra-Normality test null hypothesis of normally distributed residuals cannot be rejected. White heteroskedasticity test revealed that the disturbance term in the equation is homoscedastic. Thus the model has all the desired econometric properties. R^2 & Adjusted R^2 are good enough.Durbin–Watson statistic is not a matter of consideration here. Therefore the quality of the model is justified by statistical methods. Furthermore, stability of parameters in the model has been tested using CUSUM test and CUSUM square test [58]. The information contained in the residual is used by plotting of Recursive Residual, Cumulative Sum (CUSUM) and Cumulative Sum of Squares (CUSUMSQ) of recursive residuals (Fig 3). The figure provide very clear image that the model is stable. It can be said that there is no major problem with the specifications used in the study and it has a correct functional form.

Figure3: Recursive Residual, Cumulative Sum (CUSUM) and Cumulative Sum of Squares (CUSUMSQ) of recursive residuals





V. Policy Implications and Suggestions

5.1 Policy Implications

Some important policy implications can be derived from the findings of my study. Firstly, the insignificance ofGDPP indicates that there is lesser effect of GDP per capita on FDI in Bangladesh which is not surprising. The plausible reason of the insignificance of the market size may be due to the uses of the variable in different manner,the composition of the equation which influences both the significance and direction of the relationship between fdi and some of its determinants, the lower value of GDP per capita,or it may be due to data constraints.However, we need to have prudent macroeconomic management to boost up economic growth and increase per capita GDP which will contribute toward attracting FDI.

Regarding significant and positive result of trade openness it can be said that over the last three decades, trade openness related initiatives have contributed towardscreatinginvestment and business friendly climate and thus capturing more FDI inflows in Bangladesh. Althoughthelevel of achievement is not worth mentioning as compared to India and China, anupward trend of FDI inflow to Bangladesh has been evinced since policy reforms being introduced in the 1990s. This also reflects the functionality of trade liberalization initiatives in Bangladesh.

In this study, the negative coefficient of growth ofwage rate index (proxy of labour cost) indicates negative relationship between labour cost and FDI in Bangladesh. In other words low labour cost has contributed in attracting FDI inflow in Bangladesh. But in the long run these unskilled low labourmay play negative role in continuing the export growth and thus in GDP growth, as the success in export,which plays an important role in growth performance, predominantly based on low-skill or unskilled, low wage base in garments. Thisinvolves the case of uncertainty as it can be influenced by uncertainty in global market along with forthcoming heightened global competition. Besides, in some studies such as [29], wage cost was found to be positively related with FDI. Thusfor sustainable growth potential we need to think beyond advantageous option of low wage base. To evade jeopardy of the prevailing reputation of labour issue particularly, in garments, and to see the rapid movement of the value chain in industries and thereby get utmost advantage from demographic dividend,emphasis needs to be given to labour related policy issues.

My result with insignificantcoefficient of infrastructure indicates thatinfrastructure has not been able to support significantly in attracting FDI. It affirms the fact that inefficient or lack of adequate infrastructure facilities in Bangladesh are further forms as an impediment of FDI friendly environment, even with abundant cheap labour.Although the significance of infrastructure at 10% level in thisstudy is observed, it might be because of not using only fixed telephone line as the proxy of infrastructure instead of using mobile and internet due to data unavailability.Other aspects of infrastructure ranging from physical assets (e.gcommunication sector)to institutional developmentcould be used but due to data unavailibity it has not been possible.However, the insignificant coefficient of infrastructure signals to lay utmost emphasis on developing quality infrastructure with a view to increase the productivity potential of investments.

Finally, the constant terms might include the effect of all the unidentified as well as other unspecified variables, which shows a negative sign but significant, such as procedural delays, ceilings in many industries, political instability, grips of internal conflict and governance, are still posing as obstacle in making Bangladesh an attractive destination for FDI.

5.2 Policy Suggestions

To attract more FDI into Bangladesh my results suggests that

1. Ensuring economic and political stability and equal importance may be given to prudent and sound macroeconomic management
2. Widening the scope for accessibility to foreign markets and providingpromising opportunities for foreign investors with great cautions.

3. Streamlining the trade policy; exploring new market where regional trading opportunity would be exploited in justifiable manner; and diversifying our products with a view to become more competitive in the nearby market.
4.Integration of import and export policy and adopting deliberate trade policy and a competition policy to attract more FDI.
5.Continuation of trade liberalisation process and making important reforms related to trade.
6. Emphasising on establishing more up to date investment friendly environment that includes lowering input costs, operation costs and hidden costs in doing business.
7. Encouraging and helping domestic investors to seek foreign partners by forming joint ventures which helps in the mobilisation of finance for their enterprises and allows acquire new skills especially in the form of: technology transfer, supply contracts, training for labour and skill upgrading.
8. Stimulating the linkage of foreign investment to manufacturing sector with a view to gaining robust growth in industry.
9. As a part of trade facilitation, custom system needs to be transparent, more dynamic and automated.
10. Strengthening policies related to PPP.
11. Emphasising on development of quality infrastructures. In particular, encourage private and foreign investments through public-private partnerships (PPP) and relaxation of FDI restrictions and increase investment in the case of improving infrastructure situation, especially transport and power sector.
12. With a view to assuage the conditionality of EU and other export destination countries, Government needs to expedite the actions on ensuring justifiable wage and work place safety measures in export oriented industries, in particular, garment industries.
13. There should have a wage law and it is needed to frame policies for better use of the abundant labour force and produce skilled manpower through heightening the vocational education and training in an international standard in collaboration with International institutions.
14. Introducing Foreign Investment law
15. Strengthening of BOI and establishing research and monitoring cell in BOI.

VI. Conclusion:

The main purpose of this study is to find out major determinants of FDI in Bangladesh using Econometric analysis and place some policy recommendations.Considering the order of integration among the variables and depending on the ARDL approach the econometric results show that there exists long run relationship among the selected variables. It is found that trade openness has positively influenced FDI and among the four selected variables trade openness plays the most important role in attracting FDI in Bangladesh. It indicates that trade related policies were encouraging for foreign investors in this country. This is also reflected by the increased volume of FDI flow to Bangladesh particularly since policy reforms being introduced in the 1990s. Another important factor for FDI inflow to Bangladesh is the low cost of labour in the country and it is also consistent with the previous literatures.On the contrary, GDP per capita which is proxy of market size andinfrastructure facilities do not have any impact on accelerating FDI in Bangladesh. In other words, it designatesinfrastructure as a barrier to FDI inflow in Bangladesh.The attractiveness of Bangladesh as an investment destination and the faster growth of FDIare beyond doubt due to its geographical location and abundance of cheap labour.Paucity of data for infrastructure induced to use the growth of telephone line which might be a constraint in reaching better result. However,findings of this study,whichshaded light on the extent at which selected determinants influence the inflow of FDI in Bangladesh, might be helpful in formulating policies and enhancing government interventions. Thereby, the country can be a favourable destination of foreign investment provided that there would have been firm commitments to implement aforesaid policy suggestions and other up to date policy issues.

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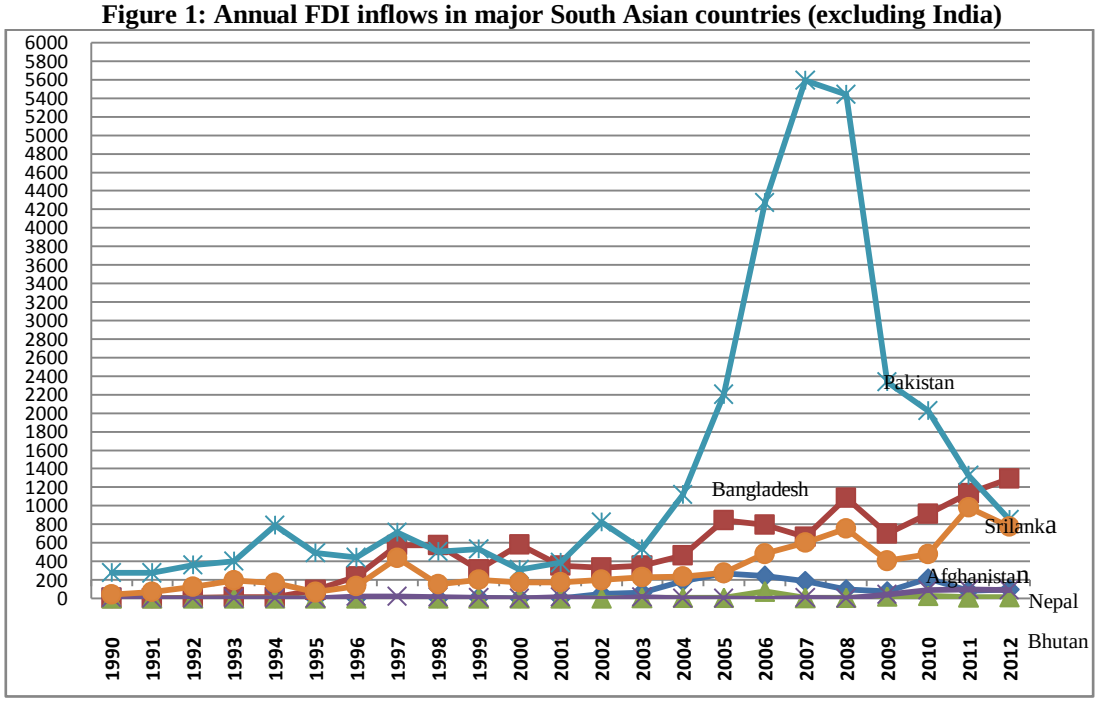
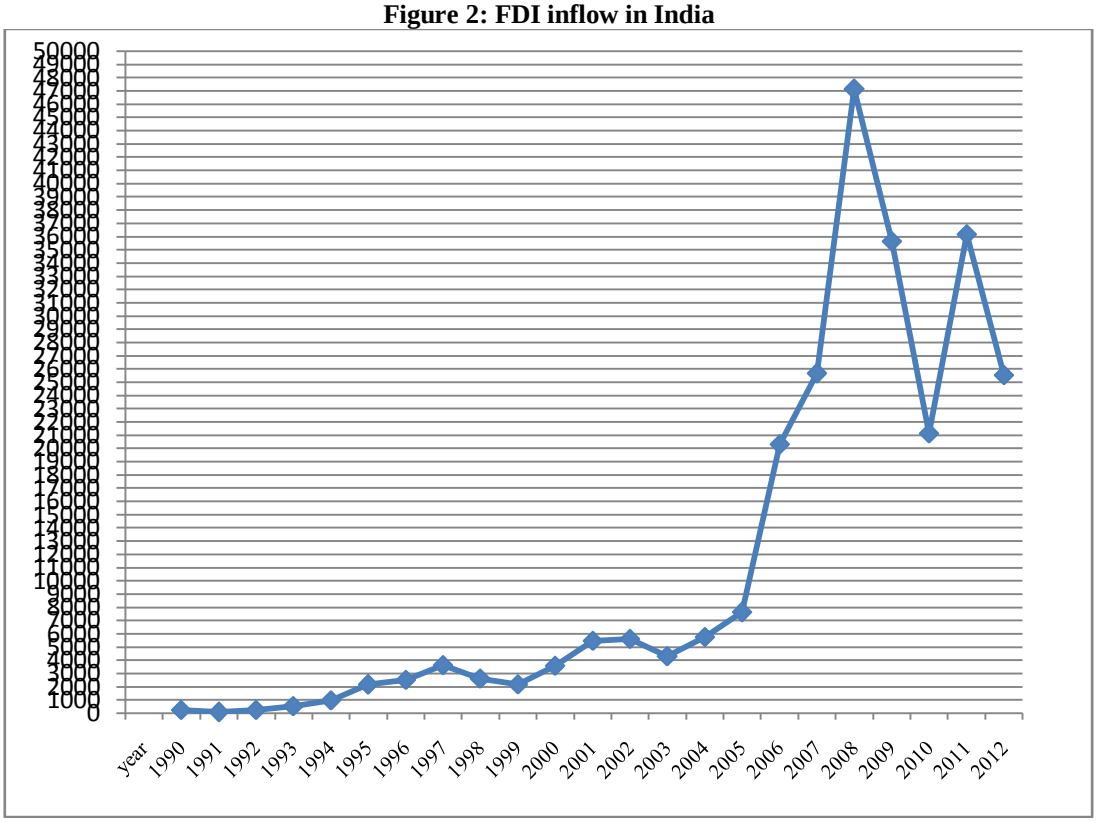
Annexure I

Figure 1: Annual FDI inflows in major South Asian countries (excluding India)



Source: UNCTADstat, Bangladesh Bank

Figure 2: FDI inflow in India



Source: UNCTADstat