Is the relationship between FDI and inflation nonlinear and asymmetric? new evidence from NARDL approach

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Is the relationship between FDI and inflation nonlinear and asymmetric? new evidence from NARDL approach

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Abstract

The relationship between an FDI and inflation has been addressed in the literature. But they were based on linear and symmetric assumptions and the results are conflicting. We apply both ARDL and nonlinear ARDL which can test nonlinearity and asymmetric relationship between them. We use Bangladesh as a case study. The findings tend to indicate that there is a nonlinear cointegration between the FDI and inflation and that the relationship is symmetric in the short run but asymmetric in the long run. This is a very important finding for policy purposes. Moreover, the causality analysis tends to indicate that the FDI is the most exogenous (independent) variable and inflation is the most endogenous (dependent) variable. That implies that the FDI is determined externally and then it drives other variables such as, the trade openness, GDP, exchange rate and finally inflation. Hence the Government can use this Granger-causal chain to affect inflation through the monetary, fiscal and exchange rate policies.

Keywords: Inflation, FDI, Asymmetry, ARDL, NARDL, VDC

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1. Issues and motivation

In the present times, there has been significant attention committed to the role that foreign direct investment could play owing to the general dearth of capital available for investment in most developing and development countries. The foreign direct investment makes a super bridge in the primary stage for mitigating the gap between the desire level of gross national investment and the initial amount of domestic savings and investment. Another things is its impact on the economic growth and development of the country by receiving the external money that is invested to the economy. The foreign direct investment is an inflow of money from the external sources that is known to yield indirect benefits, which is to help increase the employment opportunities, and the improvement of balance of payment (BOP) account through an increase in foreign exchange availability in an economy, on top of the transfer of technology, managerial skills and other intangible knowledge to the host country which allows the national firm to develop their profitability and accumulated performance (Elijah, 2006).

In this world, many developing countries have implemented a number of significant policies and incentives by using the attractive foreign investment and as usual enhancing the average level of foreign investor. A historical case in point of Bangladesh, at the time of liberation wars Bangladesh experienced economic sanctions and political isolation from the rest of the world. Consequently, the country faced a sustained period of relatively immaterial foreign investment, as well as dwindling economic growth, with high level of inflation and interest rates. In fact, in that time leading up to the end of wars periods in the early 1990s, Bangladesh observed an annual net outflow of invested capital. After that when the governmental democracy comes up to the Bangladesh then the foreign investment also inflow as direct and portfolio flows. Then Bangladesh started to serve the open market opportunities to an array of foreign goods, services and most important part is finance flows. And in the time of 1990s, Bangladesh achieved a high level of foreign direct investment because of good political movement and proper investment policies (Bangladesh economic review, 2018).

By taking advantage of newly founded good political stability and improvement structure of investor confidence, the newly elected government launched a series of economic development liberation and reforms for getting the future attractive direct investment from foreign to home

country. At the early stage of new government prime minister Begum Khaleda Zia acknowledged that foreign investment would contribute significantly to developing the economy.

On the historical inflow of foreign direct investment in Bangladesh in year 1980s the FDI was very irregular for the reason of political imbalance in the country. Then, after 1991 restoration of democracy the economic development and international trading started growth rapidly. Until the mid-90s FDI inflow remain below 90 million USD in every one year. In 2000 the FDI dramatically increasing by 579 million and with a small fluctuation it increase to 845 million USD in year 2005. But for the reason of political instability FDI level drop a small amount. However, after reduce all problem Bangladesh achieve 1138 million USD of FDI in 2011. It is also significant improve that FDI to GDP grew from 0.10% in 1990 to 11% in 2011. Bangladesh is a third world country during the era of cold war, but now its achieve their first goal as developing country all over the world where 160 million population we need to attract for foreign direct investment for create more employment sector for our huge number of unemployment graduate and also increase the level of income where the FDI can keep the crucial influence.

As capital poor country FDI can emerge as a significant way to create a physical capital, developed productive capacity and improving the skill of domestic's labor of the country by applying the more advance technique and new information technology.

FDI is considering as an important source of development financing which contributed on the theory of capital movement. On the basis the theory of portfolio investment and direct investment FDI consider as long term private capital movement by which not only the finance but also the technology, knowledge and tangible asset also inflow to the host country. As our theoretical framework we get some kinds of FDI that are resources seeking, market seeking, efficiency seeking and strategic asset seeking. As usually it viewed that in Asia the vertical efficiency seeking FDI is more than other kind of FDI. The vertically efficiency seeking FDI is where foreign companies seek to produce intermediate or finished product by using the cheapest cost which can be viewed on Bangladesh Garments product. However FDI inflow is more extensive factor for a developing country that are discuss by so many literature. Level of inflation has significant impact on the amount of FDI inflow into the country. Recent empirical study conducted that the determinant of FDI in developing country as like Bangladesh such as Moosa and Cardak (2006), Hsiao (2006) and Wijeweera and Mounter (2008) all of them find out the long run theoretical

relationship between the level of inflation and FDI inflow. And some of the researchers try to focus on the macroeconomic variable of the country which is influence the FDI inflow of the country such as Fedderke and Romm (2006), Moolman *et al* (2006) and Rusike (2007) they all are argue that level of inflation has no any significant impact on the FDI inflow. But the question still arises that is it really true that level of inflation has any impact or they have symmetry relationship.

On the base of our study area we try to found the existing literature we got so many contradiction opinion and theoretical result. Some papers prove that level of inflation has more impact on the FDI inflow, some literature give some empirical evidence for proving that issue. But we didn't get any proper answer on our focus area of relationship between the FDI and Inflation. Some empirical study represent time series technique and also ARDL method for prove the issue of FDI inflow and macroeconomic influence relationship which is also bias on the basis of their method.

Dilruba Shaheena (2014) used Johansen co-integration and ARDL in exploring the relationship between these variables which does not test for asymmetry, therefore this study relationship is inconclusive, the paper fill this gap by examine the relationship of asymmetry for Bangladesh. We will use NARDL method proposed by Shin et al (2014) for investigate the symmetry or asymmetry relationship between foreign direct investment and inflation rate using the annual data from 1973 to 2017 collected from World Bank open database.

The finding of this study might be help for policymaker and Bangladesh government in many ways. The study would be finds out sensitivity of foreign direct investment to inflation rate that policy makers could take an initiative to handle or attract to the foreign investor by design new method of FDI. And second finds of asymmetry relationship will help policymakers to know about the benefit and deprivation of foreign direct investment increase and decrease on inflation rate.

The motivation to doing this research is based on this area; foreign direct investment has a significant impact on inflation rate of Bangladesh in long run. The relationship between FDI and inflation is symmetric or asymmetric on their long run and short run for this reason we conduct with more advance technique of co-integration is NARDL which is test the long run and short run asymmetry and as usually the co-integration.

This research has following the sections: 2. Theoretical framework of the issue, sections: 3. Empirical framework of the issue, sections: 4. Data and methodology, sections: 5. Empirical result

and discussion, sections: 6. Conclusion, Policy implication, Limitation and suggestion for future research.

2. Theoretical framework of the issue

For foreign direct investment inflow we can see large number of theories already exist. These have been continuously grouped into macro and macroeconomics approach. One specific theory is "market imperfections" which is lead to influence the decision making of the firm and firm specific characteristics. On the other hand macroeconomics theory tries to analysis the internal factor of the country FDI inflow the part of these theories. Extensionally FDI also developed a set of theories to explain the allocation of FDI which is based on the aim of firm modeling such as investment decision, resource seeking, market seeking and efficiency seeking FDI is the example of them. "Market imperfections" theories was developed by Hymer (1976) which main goal is explaining the behavior of firm in no perfect competitive environment and the environment as like the monopolistic and oligopolistic.

Buckely and Casson (1976) internalization theory also support the theory of market imperfections by their idea that there is a trend in the real economic paradigm to invented sensitive information and to pushing this information internationally in the form of FDI Trevino and Daniels, (1995). The spread and generation of information absorbed the place and time which is useful to cost savings and it's also helped to transferring the information internally. Thus, on the point of views on this theory, the depth of intellectual ability and experience are the factor for received the amount of FDI from imperfect market.

Another very important existing theory is "eclectic theory" which is indicated that why the firm would want to produce in a foreign location instead of exploring or entering into a licensing arrangement with a local firm. On behalf of this theory, three major factors that must need to fulfill by the firm for attract to foreign investor to invest the firm that is ownership, internalization and location advantage Dunning (1988).

According to Majeed and Ahmad (2008) their investigation is that in developing country the cheap labor is the most significant cause to more FDI inflow. And they also demonstrate that urbanization are helps more to attract the foreign investor to invest in the developing countries firm and on their conclusion demand sided and supply sided factor which may increase the profitability and

performance of the firm which is very important role to attracting the foreign investor. Hsiao and Sen (2003) they explore on their study the GDP is affecting the FDI inflow into the country, and GDP is a significant and optimistic indicator of foreign direct investment into the host country.

Chowdhury and Mavrotas (2006) they conduct an innovative study on the basis of Malaysia and Thailand (1969-2000) period. On their research find the bidirectional causality relationship between the FDI and GDP. FDI increase the total amount of output of the host country which is helping to contribute on the economic development and infrastructure development of the host country, and they also achieve the industrial development and produce higher class product. A developing country like Bangladesh who is early stage of development has to rely on FDI as an important role to bring the technological development and the corporate development. Agiomirgianakis et al (2003).

Capital inflow theories developed by the salter-swan-Corden-Dornbush, this theory taking about the impact of capital inflow on the real exchange rate in developing country. By this model they displayed criteria to increase a massive amount of capital inflow from outside of the country and use it in the infrastructure development of developing country. According to Khoda (2003) FDI can increase the domestic capital inflow which is help to organizational formation as well as corporate and managerial standard of the host country. FDI also raise the technological power to enrich the internal and external marketing ability and international business network and also help to improve the government technical expertise.

Schneider and Frey (1985) on their study they identified that economic condition is the important factor to receive the foreign direct investment for a democratic country. On their empirical finding the found that income per capital and mandatory education has a positive impact on FDI on the other hand wage cost and inflation rate have negative effect on FDI. The high inflation rate and balance of payment deficit are the factors to receive the lesser foreign direct investment from the foreign country.

Thus, theoretically it proved that the amount of FDI inflow into the developing country has an influence on the inflation rate, which is helping or reducing the amount of FDI inflow. Even though the foreign direct investment and inflation have co-integrating relationship but it does not confirm

their definite causality relationship in long run. Now we can found that there are no existing literature on the basis of asymmetry and symmetry relationship on foreign direct investment and inflation. The personal intuition the relationship between the FDI and inflation can be symmetry or linear on the short run relationship but in real economy and long run relationship it not a symmetric and linear because we know that foreign investor influence by the domestics development, political stability and legal frame. And we know the relationship between the inflow of foreign direct investment and inflation rate movement is asymmetrical on their real characteristics. However, this relationship should be empirically analyzed which will be the proper contribution of our study.

3. Empirical framework of the issue

In recent, many existing literatures have been research on this area of FDI and inflation rate for identifying the relationship of economic growth of country and the influence of FDI. A widely accepted methodology though, has focused on identifying the countries specific factor which is influence the inflow of FDI and the country's internal factor which is affected by the external push Ahmed et al (2011). Most of the empirical study on the basis of FDI and inflation use cross country regressions to determinant country's specific factor that attract to receive the FDI.

According to Shah and Masood (2003) they investigate the FDI inflow reason into Pakistan, for their study they use co-integration technique on time period 1960 to 2000. In their study they consider the FDI as a real economic fundamental. And their result show the significant impact of cost of capital, tariff and government expenditure and some specific macroeconomic factor which is influence to inflow the FDI.

According to Haider Mahmood (2018) foreign direct investment is influence by the average income, internal interest rate and the inflation rate. And in his study trade openness influence negatively influence to FDI inflow of Bangladesh. They concluded the study by giving the result is GDP, democracy, and interest rate are positive influence on the FDI but the inflation has insignificant effect on the FDI inflow. On this study he conducts time series technique ARDL method. But this study result represent linear and symmetry relationship between all macroeconomic variable.

Aziz, Sarkar, Mahmud (2014) on their study they use the co-integration technique to determinant the foreign direct investment in Bangladesh by empirical analysis. They found that the market size is more influence and positive significant role on FDI inflow as like as the trade balance also the influencer on the other hand inflation and labor productivity has no any significant relationship. They use the FDI as a dependent variable to examine the various economic factors which is effect on foreign direct investment.

According to Shaheena (2014) on her study use the ARDL approach to examine the FDI inflow in Bangladesh, on her study she found the empirical result is market size, GDP and infrastructure don't have any impact on the FDI inflow on the other hand trade open ness and cheap labor is the significant fact to acquired more foreign direct investment. And on her VECM suggest that the disequilibrium occurring due to a shock.

In our empirical theory of this study we try to find out the specific gap between our selected areas. Most of the empirical study conduct or determinant the impact and influence factor of FDI inflow in a developing country. We try to address the study about FDI influence on macroeconomic factor of developing country but there have a not significant number of studies on empirical research. Though we get some empirical literature on this area but all research result is linear and symmetric. We know and face some problem on real economic situation which is macroeconomic factor as like FDI, inflation, GDP and trade openness are by nature asymmetry. And most of the literature uses the FDI as a dependent variable. Now our paper will applies the FDI as independent variable and try to showing the empirical impact of FDI on the macroeconomic variable in the country by using more advance technique of Non-linear ARDL, which is represent the real empirical result of asymmetry and symmetry relationship.

4. Data and methodology

The existing literature of (moolman et al, 2006; Rusike,2007; kiat, 2010) have previously applied the amount of FDI received as proxied by the ratio of net inflow of FDI to nominal GDP, this research focuses on five variables. In here main variables or focused variables are Inflation rate

and Foreign direct investment (FDI) and three control variables are gross domestic product, exchange rate and trade openness. This research is conducted with time series data of 1973 to 2017 of Bangladesh. This yearly data collected from the World Bank database. Following table summarizes the variable used in this research.

Variable name	Symbol	Proxy
Inflation rate	INF	Consumer price index
Foreign direct investment	FDI	Foreign direct investment, net inflows (% of GDP)
Gross domestic product	GDP	GDP per capital
Exchange rate	EXR	USD per national currency
Trade openness	TO	Ratio of sum of export and import to nominal GDP

This research used standard time series techniques which is consisting of (ARDL), 2001 autoregressive distributed lags model and the (NARDL), 2014 non-linear ARDL. As like as the OLS method time series technique never assume the causality of the variable, it allows the selected data to determinant the causality among those variables. Actually the time series technique tests the long run relationship between the variable. And this is the main advantage of this technique in comparison with to the standard regression analysis.

Variables	OBS	Mean	Std. Dev.	Min	Max
INF	45	29.14631	15.7556	.9995807	99.19976
FDI	45	1.452007	.5203897	.99954	2.786419
GDP	45	10.50445	2.27901	1.001786	14.68196
EXR	45	45.22439	23.0586	8.0894	81.8529
TO	45	31.87467	8.433768	1	53.44

Descriptive statistics of variables

This research to be continuing on the basis of some different step, unit root test is the first step of them. In unit root test examined the level and differenced forms of variables. The first step is very important for the standard times series technique because of co-integration tests required the variables to be non- stationary. Because the stationary variable are actually with constant mean, variance and covariance, and also important things is that stationary variable never carry the theoretical relationship where co-integration test cannot be performed. Hence the variable must need to be transformed in non- stationary for the co-integration test. The unit root test are conducted with three types of test that are Augmented Dickey-fuller (ADF), Phillips-Perron (PP) and KPSS. Within those test the ADF (Dickey and Fuller, 1979) correction the autocorrelation only but the PP (Phillips and Perron, 1988) test takes care the autocorrelation and heteroscedasticity. The null hypothesis of this ADF and PP test is that the variable is non-stationary on their level form. On the other hand KPSS fully opposite of the ADF and PP, its null hypothesis is all variable is stationary. Then, it is tested that the variable are non-stationary we can move for next step of VAR selection test.

On the VAR selection test are examining that the optimum number of lags for variable are used for the research. This test is very much important because the VAR is used for Johansen co-integration test. On this test we are see the highest AIC and the Lowest SBC where highest AIC indicated the maximum lag order. If the result shows conflicting then we use the lower lag order assuming no autocorrelation. After confirming the optimum lag order the research can move to next step of co-integration test.

In this step there are four types of co-integration test with different advantage and specific limitation. Engle-Granger co-integration test is the most old and foundation of co-integration, this test examine that the used variable of the research are theoretical relationship have or not (Engle & Granger, 1987). This test is important to know the relationship between the variable are not in fact spurious. However, Engle-Granger co-integration test actually determinant whether the variable are co-integrated or not but it cannot determinant the number of co-integration vector within the variable. That's why Johansen test is more advantage then the Engle-Granger test, because Johansen test can determinant the exact number of co-integration vectors and gives all possible co-integration vectors in the model (Johansen, 1991).

On the test of Engle-Granger and Johansen both method actually determinant that the variable are move together in their long run or not but the main requirement of the test is that the variable need to be non-stationary which is not realistic with real life data. And another thing is that the results of co-integration tests depend on choose of number of lag which gives us the different result on different number of lags. The very important aspect for the Johansen test is that this test towards accepting the null hypothesis of no co-integration. Since p-value of 10% is used, i.e. error that is acceptable if null hypothesis is rejected is only 10%, this means 90% of the time the null hypothesis will be accepted.

For removing the shortcoming of Johansen test this research will conduct with ARDL technique which is invented by Pesaran et al, 2001 the dynamic and more advantage technique for testing the co-integration of standard time series. The most advantage of this technique is that ARDL does not required the variable need to be stationary and this test also not as like as Johansen test result which is suffer on biasness. ARDL mainly the bound testing method that can be tested the small size of sample. ARDL test visualized with two main steps, the first stage is using F-test to examine that there is long run relationship between the variables. The founded F-statistics values will be compared against the upper and a lower critical value which is determine by Pesran (2001). The result show that if the determine f-test values fall above the upper boundary, the null hypothesis of no co-integration is rejected and the result is that the variable are move together with long run relationship. On the other hand if the determine f-test values fall below the lower boundary then the null hypothesis will be accepted and the result will be no co-integration between the variable. And another interesting result also determine by this test it that if the F-test value are fall within the lower bound and upper bound value then the result of the co-integration test will be inconclusive. The results hold regardless of the stationary of the variables. Once the result already confirmed that there has a long run relationship and movement between the variable, the second step in ARDL test the estimating of long run coefficients of the variables.

Now we are not only getting the advantage of ARDL method but also suffer some significant weakness. ARDL actually assume the linearity and symmetrical adjustment of the variable. For extend about the linearity is 1% change of independent variable will lead same change in the dependent variable at all time. And the symmetric shows that the constant speed of adjustment from equilibrium i.e. the variable are decrease and increase with same speed. These assumptions

are not realistic with real economic variable and global era. For this reason, this research is giving to relax both assumption of ARDL technique by moving into NARDL (non-liner ARDL), which is more advance and effective technique introduced by Shin et al, (2014). Which has more advantage its dose not assume linearity or symmetric adjustment. It has ability to testing linear and non-linear co-integration and as well as the difference between the short run and long run effect of the regressors to the dependent variable. If the result of the NARDL found that the focus variables are symmetry, that time ARDL technique is correct and can be continue for future discussion. Introducing the long-run and short-run asymmetries in the standard ARDL model lead to the following general form of the NARDL model is inspired by Shin et Al (2014).

$$\Delta INF_t = \alpha_0 + \alpha_1 INF_{t-1} + \alpha_2 FDI^{+}_{t-1} + \alpha_3 FDI^{-}_{t-1} + \sum_{i=1}^{p} \beta\, \Delta INF_{t-i} + \sum_{i=1}^{q} \beta\, \Delta FDI^{+}_{t-i} + \sum_{i=1}^{q} \beta\, \Delta FDI^{-}_{t-i} + \varepsilon_t$$

After completing the co-integration test we will do the LRSM test which is test the long run coefficient of variable against the theoretical expected value and we can understand about the significance of variable in our model. This test will use the exact identify and over identify for ensure that our restriction is correct.

After LRSM next level is VECM (Vector Error Correction Method) this text is for error correction term by which to determinant whether a variable is exogenous or endogenous. If the result of error correction term is significant its means the dependent variable really depend on the error correction term, and the variable is endogenous. On the other side if the error corrections test finds the insignificant result, then it can be estimated that dependent variable being a leader or exogenous. And the coefficient result of error correction term show the speed of adjustment to equilibrium. Where a negative coefficient means the variable will went back to the equilibrium on the other hand the positive coefficient show that the variable will going away from the equilibrium in the long run.

On the VECM test determinant that the variable are exogenous or endogenous but it does not tell about the strongest leader (exogenous) and weakest follower (endogenous) by using the rank, that's why our research will conduct with the variance decomposition (VDC) analysis to find out

the relative strength and another important information is this is very crucial for policy makers of corporation and government. The VDC tested by two ways these are orthogonalized or generalized. The specialty of orthogonalized is not unique and depend on the particular ordering of the selected VAR and additional information about that when the variable is shocked other variable in the system are fully switch off. On the other hand generalized is unique and its does not depend on the particular ordering of the VAR for generalized VDC the additional information is that it does not make such restrictive assumptions. After that the impulse response function (IRF) will show that the VDC result in graphically. Actually VDC and IRF both are show the impact of shocking one variable to others variable. And Persistence profile (PP) is the last step of our research, it need to show the impact of shocks from external source to the co-integration vectors and another important information is to knowing the time horizon required for variable to get back to equilibrium.

5. Empirical result and discussion

In our empirical result we are start with the stationary test of every variables of this study. We conduct the unit root test of all variable on log form and first difference form. On the time of this test we used ADF test, PP test and KPSS test. On the based on ADF test all variables are non-stationary on their log level from it imply that I(1). And in difference form that imply I(0) all variables are stationary. But in the PP test of Log level form three variables are stationary and two variables are non-stationary and on the first difference form all variables are stationary. We know the KPSS is fully opposite determinant of ADF and PP and in our KPSS test we get mixed result of stationary and non-stationary. This is not perfect for Engle-Granger and Johansen test of co-integration. But ARDL and NARDL will be test in their section because they does not required that all variable need to be non-stationary. Now this research use the ADF test for doing the Engle-Granger and Johansen test of co-integration.

Table no 1: ADF test result of Log form and difference form.

Variable	ADF	VALUE	T-statistics	Critical value	Result	Variable	ADF	VALUE	T-statistics	Critical value	Result
LINF	ADF(2) =AIC	23.3776	-3.1050	-3.4399	Non-stationary	DINF	ADF(1)= AIC	19.0637	-5.5003	-2.8607	stationary
	ADF(5) =SBC	14.4413	-2.5203	-3.6057	Non-stationary		ADF(5)= SBC	12.5668	-4.7814	-2.8450	stationary
LFDI	ADF(5) =AIC	26.7551	-2.0434	-3.6057	Non-stationary	DFDI	ADF(5)= AIC	25.8005	-3.2654	-2.8450	stationary
	ADF(3) =SBC	18.5855	-2.3606	-3.5918	Non-stationary		ADF(2)= SBC	18.4629	-4.1154	-2.7621	stationary
LGDP	ADF(5) =AIC	33.5455	-2.3691	-3.6057	Non-stationary	DGDP	ADF(5)= AIC	33.3849	-3.9313	-2.8450	stationary
	ADF(2) =SBC	22.5785	-2.7924	-3.4399	Non-stationary		ADF(1)= SBC	20.8157	-10.8224	-2.8607	stationary
LEXR	ADF(5) =AIC	63.9497	-2.4409	-3.6057	Non-stationary	DEXR	ADF(1)= AIC	54.4274	-4.1214	-2.8607	stationary
	ADF(3) =SBC	55.0084	-1.9126	-3.5918	Non-stationary		ADF(1)= SBC	51.9710	-4.1214	-2.8607	stationary
LTO	ADF(5) =AIC	-39.3971	-2.8897	-3.6057	Non-stationary	DTO	ADF(5)= AIC	-42.1162	-3.8651	-2.8450	stationary
	ADF(3) =SBC	-43.1630	-2.9901	-3.5918	Non-stationary		ADF(2)= SBC	-43.5181	-6.5271	-2.7621	stationary

Table no 2: PP test of level form and first difference form.

Variable	Value	C. value	Result	Variable	PP	C. value	Result
LINF	-8.0164	-3.4692	Stationary	DINF	-19.2434	-2.9248	Stationary
LFDI	-2.5876	-3.4692	Non-stationary	DFDI	-8.2209	-2.9248	Stationary
LGDP	-10.3841	-3.4692	Stationary	DGDP	-31.0056	-2.9248	Stationary
LEXR	-2.8308	-3.4692	Non-stationary	DEXR	-6.8266	-2.9248	Stationary
LTO	-6.8080	-3.4692	Stationary	DTO	-25.5609	-2.9248	Stationary

Table no 3: KPSS test of level form and difference form

Variable	Value	C. value	Result	Variable	KPSS	C. value	Result
LINF	.17925	.18961	Stationary	DINF	.25018	.37085	Non-stationary
LFDI	.13185	.18961	Stationary	DFDI	.15735	.37085	Non-stationary
LGDP	.16712	.18961	Stationary	DGDP	.15970	.37085	Non-stationary
LEXR	.11439	.18961	Stationary	DEXR	.43851	.37085	Non-stationary
LTO	.13007	.18961	Stationary	DTO	.17999	.37085	Non-stationary

We get our result of unit root test, and now we will do the VAR selection test for confirming the number of optimum lag for our co-integration test.

VAR order selection

Prior to proceeding of co-integration test of the study, we need to determinant the number of optimum lag by helping of Vector Auto Regression or VAR. The lag length usually determinant on the basis of AIC and SBC. Where AIC doesn't concern on over parameter and mostly select the higher order of VAR which is select number 3 lags. And the SBC is concern about the over parameter and tend to determinant the lower number of lags which is select number 1 lag. But we take number of 2 orders for our study because we take annual data and our data frequency is medium. So our next step in co-integration test will conduct with VAR order 2.

Table no 4: Order of Auto-regression (VAR)

Number of order	AIC	SBC
3	82.4656	13.9228
2	70.3962	23.2730
1	35.0424	9.3388
0	19.1420	14.8581

Co-integration test:

On this step the first co-integration test is Engle-Granger test which is the inventor test of the co-integration. We conduct with the test of Engle-Granger co-integration test but this test could not reject he null hypothesis of co-integration test (No co-integration). Its means that by the Engle-Granger co-integration test the variable has no co-integration. We know Engle-Granger test cannot found the co-integration of stationary variable but our variable is mixer of stationary and non-stationary on the basis of PP and KPSS test. Therefore we will proceeds with Johansen co-integration test because we know that Johansen test has relaxation of Engle-Granger test problem of maximum one co-integration.

Table no 5: Co-integration test based on maximal eigenvalue and trace of the Stochastic Matrix

Co-integration LR Test Based on Maximum Eigenvalue of the Stochastic Matrix					
Null	**Alternative**	**Statistic**	**95% Critical Value**	**90% Critical Value**	**Result**
r = 0	r = 1	84.2875	37.8600	35.0400	Co-integration
r<= 1	r = 2	43.2584	31.7900	29.1300	
r<= 2	r = 3	23.3682	25.4200	23.1000	2 Co-integration

Co-integration LR Test Based on Trace of the Stochastic Matrix					
Null	**Alternative**	**Statistic**	**95% Critical Value**	**90% Critical Value**	**Result**
r = 0	r = 1	175.7457	87.1700	82.8800	co-integration
r<= 1	r = 2	91.4582	63.0000	59.1600	
r<= 2	r = 3	48.1998	42.3400	39.3400	
r<= 3	r = 4	24.8316	25.7700	23.0800	3 Co-integration

On the performed of Johansen's con-integration test we see that the null hypothesis of no co-integration is rejected at 5% significant level based on Maximum Eigenvalue and Trace matrix. And then, the next null hypothesis of one co-integration against alternative hypothesis of two co-integration which also rejected at 5% significant level. And we found that there is two co-integration on the base of maximum Eigenvalue matrix and 3 co-integration on the based on trace. However, we will use just only one co-integration as we know that Johansen's test is not robust due to the assumption of same lag for all variables. On the other hand the new and more advance technique ARDL relaxes this assumption of Johansen's test. And this research actually gives more focus on the result of new and latest technique of co-integration which is ARDL (2001) and NARDL (2014).

Autoregressive Distributed Lags (ARDL)

Table no 6: F-Statistics for testing the existence of Long-Run relationship (Variable Addition Test)

Model	F-STATISTICS	P VALUE	Critical bound at 95%		Conclusion
			I(0)	I(1)	
INF(INF,FDI,GDP,EXR,TO)	2.5680	[.075]	2.649	3.805	No co-integration
FDI(INF,FDI,GDP,EXR,TO)	2.0636	[.131]	2.649	3.805	No co-integration
GDP(INF,FDI,GDP,EXR,TO)	2.4600	[.0085]	2.649	3.805	No co-integration
EXR(INF,FDI,GDP,EXR,TO)	1.9131	[.156]	2.649	3.805	No co-integration
TO(INF,FDI,GDP,EXR,TO)	6.5054	[.003]	2.649	3.805	Co-integration

On the behalf of bound test result of ARDL with null hypothesis of no co-integration, F-statistics result of inflation rate and foreign direct investment fall below the lower bound of 95% level of critical value. It's show that inflation and foreign direct investment has no long term relationship. GDP and exchange rate also fall below the lower bound they have also no long run relationship with any variable. But Trade openness result is fall above the upper bound which is show that the long run relationship between the variables. Now if we see the P value of all variables we can reject the null with 5% (GDP) and 10% (INF) basis. So we can conclude that there is one co-integration based on F-statistics and two co-integration based on p-value and all variable are related with long run.

Table 7: ARDL Bounds Test for the existence of a Level Relationship

EQUATION	F STATISTICS	95%		90%	
		I(0)	I(1)	I(0)	I(1)
INF(INF,FDI,GDP,EXR,TO)	49.3645	3.1778	4.4343	2.6505	3.7588
FDI(INF,FDI,GDP,EXR,TO)	1.0902	3.1778	4.4343	2.6505	3.7588
GDP(INF,FDI,GDP,EXR,TO)	27.4849	3.1778	4.4343	2.6505	3.7588
EXR(INF,FDI,GDP,EXR,TO)	4.8955	3.1778	4.4343	2.6505	3.7588

The table 6 is result of ARDL bound test for the existence of a level relationship. By this result we can find out any possibility of counterfeit relationship between the variables of the study. The F-statistics results show that at 10% and 5% significant level without FDI and TO all variable are above the Paresan et. Al (2001) critical values. And especially TO has no any result on the level relationship of the variable. So this empirical result support that the FDI can impact on the inflation rate of Bangladesh. If Bangladesh attracts to foreign country to achieve more FDI and as well as can increase the export and import then the good impact may be see on inflation rate. And also the FDI achieve can help to more improve the GDP by impacting total export and import of the country. Furthermore the government need to more conscious about the inflow of FDI continuously basis which is helping to impact on total economic condition of the country.

Table 8: Estimated Long-Run Coefficients using the ARDL Approach

Regressors	INF	FDI	GDP	EXR	TO
INF	1 (None)	-0.0011584 (0.27186)	2.2435 (0.43735)	-0.66333 (0.18080)	0.099748 (0.10740)
FDI	-0.036995 (0.18751)	1 (None)	0.024551 (0.29434)	0.45139 (0.18689)	0.031495 (0.18497)
GDP	0.11650*** (0.077819)	0.030499 (0.12411)	1 (None)	0.15954 (0.070996)	-0.011943 (0.067243)
EXR	4.3242 (9.1385)	2.3562** (3.3029)	-15.6075* (32.5482)	1 (None)	-1.7792 (4.0265)

TO	-0.025902 (0.16043)	-0.014004 (0.41445)	-0.51553 (0.37782)	0.15314 (0.22818)	1 (None)

On the basis of ARDL estimated long run coefficients results just only three variables are significant but our main focus variables foreign direct investment and inflation rate are not significant impact to each other. On the behalf of our result its showing that 1% increase of FDI inflow into Bangladesh Inflation rate will decrease by 0.1% and if the trade openness will decrease 1% that time inflation will increase by 9% on Bangladesh economy. And as like as if the inflation rate of Bangladesh increase by 1% then FDI inflow also fall by 3%.

We know about the limitation of ARDL technique is that the adjustment of the error correction term is both linear and symmetric. For this reason we will decided to examine the variables using more advantage technique by Shin et Al (2014) is non-linear ARDL (NARDL) which relaxes the limitation of ARDL.

NARDL test for long-run co-integration

In NARDL test we will keep focus on our two main focus variables of this study which is FDI (Independent variable) and INF (dependent variable). We want to identify that the focus variable have any asymmetric relationship or they are really symmetric relation on their real time. We tested that ARDL already give us the symmetric relationship result. Now we get more clear result of relationship mode of this focus variable by NARDL analysis.

In our NARDL analysis, the model will investigate of the long run and short run relationship when these linkages are non-linear and asymmetric. So NARDL model will disintegrate foreign direct investment into its positive ΔFDI_{t-1}^{+} and negative ΔFDI_{t-1}^{-} partials sums for increase and decreases.

Table no 9: NARDL co-integration and asymmetry test results

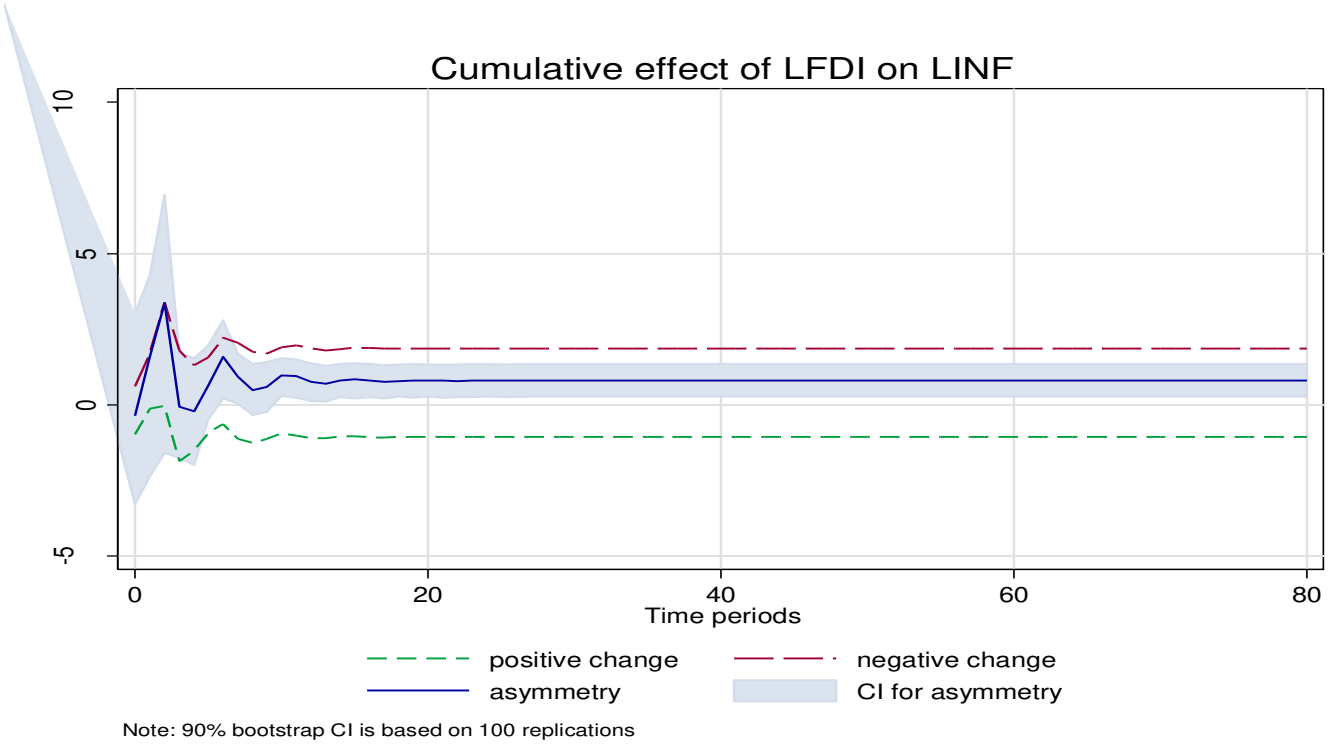
	F-statistics	Lower bound	Upper bound	Decision
Co-integration test	27.1916	4.903	5.872	Co-integration
	Coefficient	**F-statistics**	**p>F**	**Decision**
Long run asymmetry		4.805	0.036	Significant asymmetry
Long run effect (+)	-1.064	3.971	0.055	Significant negative
Long run effect (-)	1.861	4.393	0.045	Significant positive
Short run asymmetry		.2156	0.646	Insignificant and symmetry

***Note: Long-run effect [-] refers to a permanent change in exogenous variable by (-1).**

We know that NARDL is very advanced technique for test the co-integration and it's also can assume the asymmetry test of the variable which is more reliable for real economy. Now according to the asymmetry test results of our NARDL test, F-statistics measure the co-integration of variable. If F-statistics is bigger than the upper value of the Pesaran et al (2001) critical values its confirming the co-integration within the variables. On the other hand F-statistics fall in the lower bound critical values then the variables are not co-integrated. So our result shows that the F-statistics is greater than the upper bound values, so our variables are co-integrated. In our long run asymmetry result represent that the F-statistics value is 4.085 where p-value is 0.036. On the basis of this result we can reject our null hypothesis of long run symmetry. The result is that our variables are asymmetry on their long run exercise. And the economical conclude is Bangladesh economy in long run relationship on the basis of foreign direct investment and Inflation rate is full asymmetry. Additionally the short run asymmetry test is represented that the statistics value is 0.2156 and the p-value is 0.646 where we are failed to reject the null hypothesis of short run symmetry. It's means that the FDI and inflation rate are symmetry on their short run relationship. On the economical estimation is that in Bangladesh economy most of the foreign direct investments are invest in very short time basis and after few months they withdraw and go back which is effect on the long time period of the economic condition.

Now the results of long run effect of positive and negative is very interesting scenario that we saw, in this result inflation is our dependent variable and FDI is our independent variable by the represented result if Bangladesh foreign direct investment 1% increase in the economy lead to 1.064% decrease of inflation rate, its means on the positive shock by the FDI into Bangladesh is the negative effect on inflation rate which is showing that inflation rate is decrease, we know that lowest percentage of inflation is good for national economy as like as international trading which may be impact on the total economic development. Now if we see the negative long run effect that time is very similar if the 1% decrease of FDI lead to increase 1.861% inflation rate in the national economy which is really alarming for the financial growth. Actually this result is very general impact and scenario of Bangladesh economy because in real economic condition Bangladesh government has no significant control to inflow the foreign direct investment into their country. And it's also represent that most of the foreign direct investments are not longer time estimation in Bangladesh. Because of the political violence, instability and corruption. Our finding results is very similar with some exiting research result based on asymmetry and symmetry where the author also provides asymmetry and symmetry relationship Camara Kwasi Obeng (2018), This author discus the about the volatility of export diversification on exchange rate relation is asymmetry or symmetry based on Nigeria and on his result he got the result is asymmetrical relationship between them. And Philip Ifeakachukwu,(2017), conduct a non-linear study on financial development on foreign direct investment, he also find that in real economy all foreign inflow investment is asymmetrical impact on host country's macroeconomic condition. Apergis & cooray, (2017) on his study found the asymmetry relationship between exchange rate poverty which is represent that their relationship is asymmetrical.

The cumulative effect of foreign direct investment on inflation rate of Bangladesh is our main focus of the study and below the graph show the exact scenario of our focus study.



In our graph we can see that all variables of our study are co-integration it's showing us the long run relationship between the variables. And the positive effect of the focus variables is impact on the dependent variable is negatives its means the inflation rate going to decrease. And it's really very good for Bangladesh economy for getting more investment from outside of the country because by the decrease the inflation rate national exchange rate also get the impact which is more benefited for Bangladesh. After confirming the co-integration of our selected variable of the study we used LRSM exact and over identifying methods to normalize the coefficient by imposing restrictions on the focus variables and as usually to the insignificant variables.

Long run structural modeling (LRSM)

Table 10: LRSM Exact identification and over identification

Variable	PANEL A (A1=1)	PANEL B (A1=1; A3=0)
LINF	1.0000	1.0000
	(*NONE*)	(*NONE*)
LFDI	-.47798	-.44793
	(-0.31524)	(-0.28995)
LGDP	.14170	0.00
	(-0.44061)	(*NONE*)
LEXR	-.99388	-.90531
	(-0.4424)	(-0.33017)
LTO	.15206	.15274
	(-0.10062)	(-0.097245)
Trend	.053106	.050210
	(-0.023068)	(-0.020391)
CHSQ(1)	NONE	**.11099[.739]**

In our study the LRSM actually identifying the determinant co-integration relationship by normalizing INF and then putting the coefficient of focus variable INF as 1 in Panel A exact identification method. In our result of panel A just only EXR is significant on the basis of T-statistics higher than 2. SO we can proceed with any one variable which is non-significant. Now we conduct over-identification test panel B by putting restriction on GDP. And the result is found that there has also no change on significant and non-significant result. Therefore our restrictions also correct as the p value 73%. So, on the basis of statistics view non-significant variable has no impact on dependent variable and we can drop this variable but we will not drop this variable because we found co-integration in our co-integration test and this variable may help to get the co-integration within all variable.

After test the long-run coefficient of the variable we want to move next step of vector error correction model (VECM) from this step the granger causality test will start. Next all step is very much important for the policy maker and as well as the government financial planner. Next step VECM showing us which variables are exogenous (Leaders) and which variables exogenous (Followers). The coefficients of the variables present the speed of adjustment of the variables to equilibrium. If the values is positive its means the variables moves away from the equilibrium in

the long run. On the other hand if the values is negative and the values is within 0 and -1, it's represent that the variables have ability to fast speed of adjustment to the equilibrium.

Vector Error Correction Model (VECM)

From our study we already found that our all variables are co-integrated and significant, but still we didn't get any direction about the granger causality between the variables, its means which variables is Leaders and which variables is followers, which is more effective for Bangladesh government as like as of financial policy maker to make effective decision. So now we will go to test of vector error correction for determinant the exogenous variables and endogenous variables.

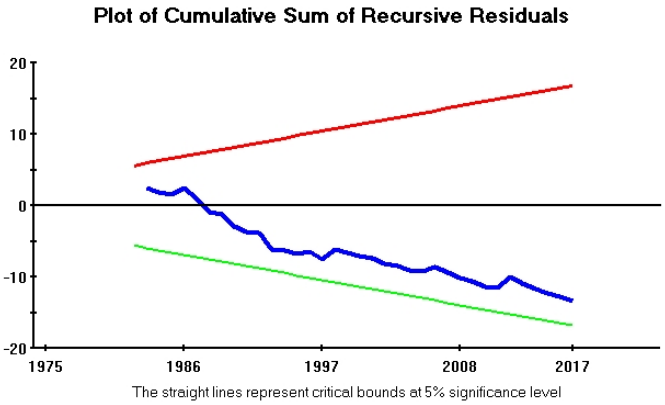
Table 11: coefficients of error correction models

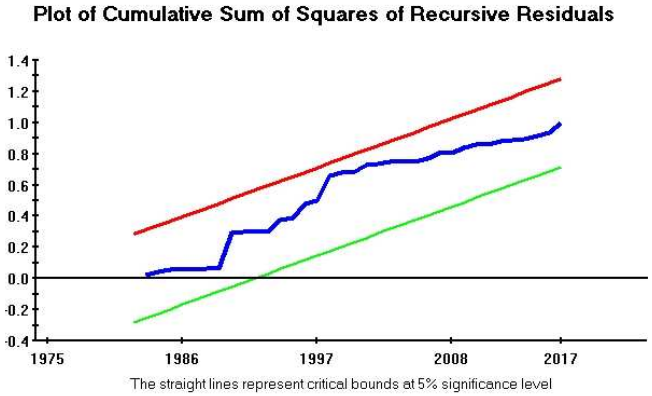
ecml(-1)	Coefficient	Standard Error	T-ratio [p-value]	C. Value	Result
DINF	-.50218	.10158	-4.9437[.000]	0.05 (5%)	**Endogenous**
DFDI	.015746	.049467	.31832[.752]	0.05 (5%)	**Exogenous**
DGDP	-.73050	.11229	-6.5056[.000]	0.05 (5%)	**Endogenous**
DEXR	.16988	.028754	5.9081[.000]	0.05 (5%)	**Endogenous**
DTO	-.29591	.25531	-1.1590[.254]	0.05 (5%)	**Exogenous**

In this study the null hypothesis of this VECM test is variables are exogenous where p-value is less than 5% is reject the null hypothesis and determinant the variables is endogenous. So our VECM test result show that on the upper table, inflation is endogenous and foreign direct investment is exogenous and other variables GDP, exchange rate are endogenous and trade openness is exogenous variable. In our result the FDI is exogenous means the demand of foreign direct investment in Bangladesh is so high but they have no power to control the inflow of foreign investment in native market by their rules and regulation. Its show that trade openness as like as the leader variable so Bangladesh finance and trade ministry has no internal control to the export and import of product. On the other hand all micro economic variable of the country inflation, GDP, exchange rate all are follower which is very alarming for Bangladesh economy. Because Bangladesh economic development fully depend on foreign investment and foreign trade if the international business will fall down and the foreign investment become narrow, Bangladesh lost their position on international economy and their internal economic condition will fall in big

trouble. For example we know about the Bangladesh garments industries which are 80% depends on foreign investor and Bangladesh earn highest amount of money by this industry.

Furthermore we also check the stability of the coefficient by CUSUM and CUSUMSQ test proposed by Brown et al (1975). And our test give us the satisfactory result, on the CUSUM and CUSUMSQ graph show that the stability of the coefficient are on 5% significant level within the critical boundaries.





Anyhow, we know that VECM identify only the exact exogeneity and endogeniety but it cannot give the exact information on relative exogenous (Leaders) and endogenous (followers). That's why we will decide to doing the variance decomposition (VDC) test for knowing the strongest leaders and weakest follower of our study

Variance decompositions (VDC)

Table no 12: Orthogonalized variance decompositions

ORTHOGONOLIZED APPROACH								
Horizon	Variable	LINF	LFDI	LGDP	LEXR	LTO	Self-dependent	Ranking
10	LINF	31%	8%	24%	24%	13%	31%	5
	LFDI	0%	97%	0%	2%	0%	97%	1
	LGDP	27%	6%	40%	27%	1%	40%	4
	LEXR	46%	0%	3%	51%	0%	51%	3
	LTO	1%	1%	17%	9%	72%	72%	2

We know that variance decompositions test used two type of method for determinant the result. For getting the correct result we performed both types of method. Our result show that on orthogonalised method foreign direct investment (FDI) is most exogenous variable and Inflation rate (INF) is most endogenous variable. The trade openness also stronger exogenous role on our study. However, the orthogonalised may give a bias result on causality chain because of particular ordering of the variable and it's also assume just one variable shock and other must be switch off on the model. For this reason we will move to generalized method of variance decomposition.

Table 13: Generalized variance decompositions

GENERALIZED APPROACH								
Horizon	Variable	LINF	LFDI	LGDP	LEXR	LTO	Self-dependent	Ranking
10	LINF	25%	7%	20%	30%	17%	25%	4
	LFDI	0%	96%	0%	3%	0%	96%	1
	LGDP	25%	5%	60%	7%	3%	60%	3
	LEXR	33%	0%	6%	60%	0%	60%	3
	LTO	1%	1%	8%	5%	85%	85%	2
Horizon	Variable	LINF	LFDI	LGDP	LEXR	LTO	Self-dependent	Ranking
20	LINF	23%	10%	15%	29%	23%	23%	5
	LFDI	0%	96%	0%	4%	0%	96%	1
	LGDP	25%	6%	61%	5%	3%	61%	3
	LEXR	34%	0%	6%	60%	0%	60%	4
	LTO	1%	1%	8%	5%	85%	85%	2
Horizon	Variable	LINF	LFDI	LGDP	LEXR	LTO	Self-dependent	Ranking
	LINF	21%	12%	13%	28%	26%	21%	5
	LFDI	0%	96%	0%	4%	0%	96%	1

30	LGDP	26%	6%	62%	4%	2%	62%	3
	LEXR	34%	0%	5%	60%	0%	60%	4
	LTO	1%	1%	8%	5%	85%	85%	2
Horizon	Variable	LINF	LFDI	LGDP	LEXR	LTO	Self-dependent	Ranking
	LINF	20%	13%	11%	28%	28%	20%	5
	LFDI	0%	96%	0%	4%	0%	96%	1
40	LGDP	26%	7%	62%	3%	2%	62%	3
	LEXR	34%	0%	5%	60%	0%	60%	4
	LTO	1%	1%	8%	5%	85%	85%	2

Now after getting the result of generalized approach the value is little bit change but the position does not change. In here foreign direct investment still controls the exogenous position. But the change on two other variables of this study, they are GDP and Exchange rate. Previous model exchange rate was the strongest endogenous then the GDP but now GDP is stronger follower of this study. And the basis of this test we get different position of the variable that's why our causality chain will show by two diagrams.

Causality chain from exogenous (left) to endogenous (right) variables:

The result of the variance decomposition confirm that Inflation rate cannot be the control power to inflow the foreign direct investment in Bangladesh but foreign direct investment (FDI) can influence the rate of inflation by more and less inflow of investment. This result shows that the Bangladesh is an open developing economy with high reliance of export and import.

Because in our study the trade openness is the second exogenous variable. And it's actually explain that Bangladesh government and financial ministry has no direct or indirect control to maintain the international trading and any international inflow investment. And as like as Bangladesh government has no strong rule for maintain the amount of foreign investment and their proper utilization to every sector.

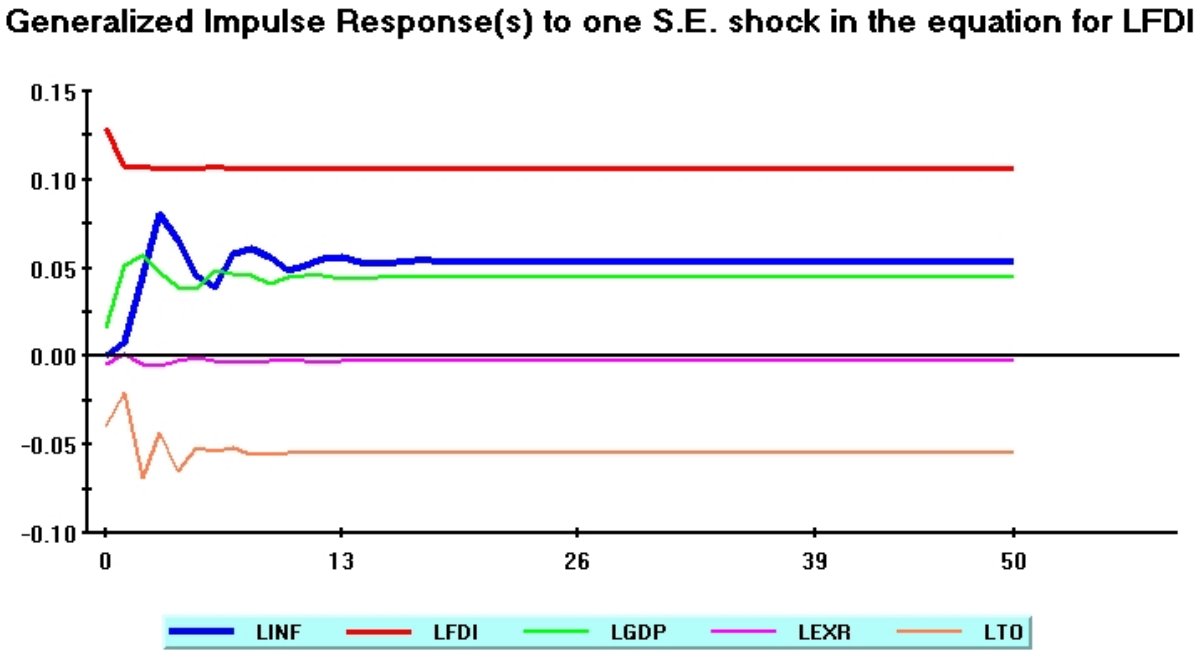
In our study we found that the country micro variable GDP also follower and it also affect by the inflow of FDI. When the amount of foreign direct investment gives more shock then the GDP is

move. We know that GDP is influenced by a large number of factors and component, for example private and public investment, household consumption, government expenditure and net export and import. Unfortunately Bangladesh government has no control or influence on their own GDP and Inflation rate on opposite of foreign direct investment. But the important thing is that if Bangladesh government wants to influence on their GDP, exchange rate and as well as the inflation rate they can change their tread and regulation of foreign direct investment in their country.

In our research it totally confirmed that Inflation rate of the Bangladesh is weakest follower and fully dependent to other variable. It already show that the FDI, trade openness, GDP and exchange rate are influence on the inflation rate for this reason in recent time Bangladesh cannot attract the foreign investor to invest on their country. So for getting the development position on all over the world Bangladesh government must need to change their policy and need to focus on their internal investment for taking the control on their economy. In this section we saw the result of our variable numerically now we will do the Impulse response functions (IRF) test which is similar as like variance decompositions, just the difference is we can see the causality graphically.

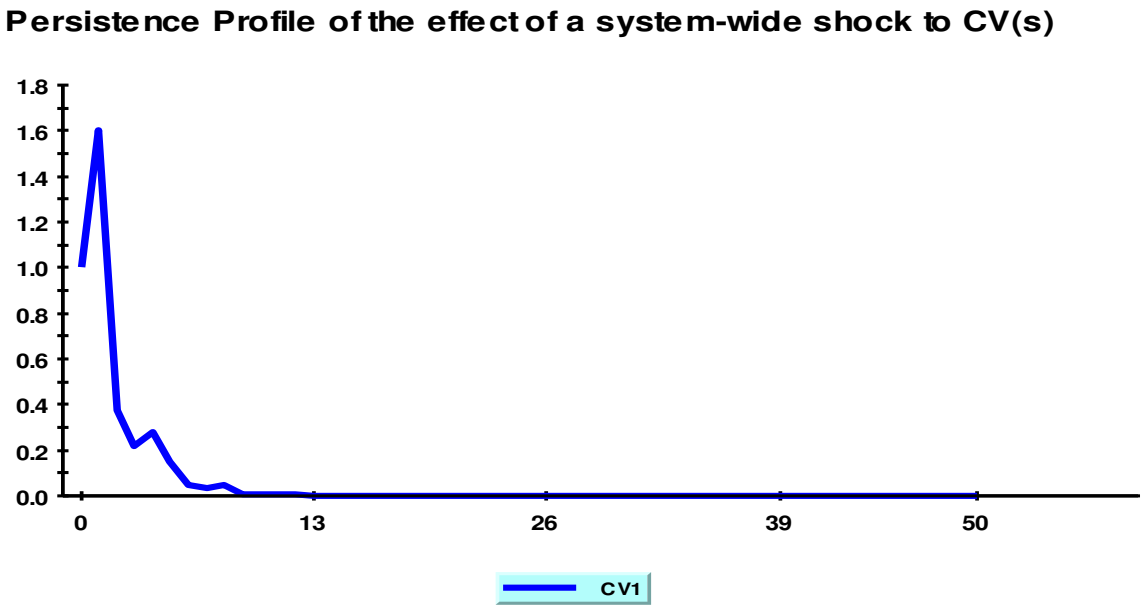
Impulse Response Functions (IRF)

In our study we also conduct with the impulse response function test which fully same as like the VDC test. However IRF represent the graphical response of one variable shocked to the other variables. In our research the graph show the impact of shock in foreign direct investment (FDI) to other variables. We already know that FDI is more exogenous variable in our study and its influence is strong to others. In this graph its shows that the shock to dependent variable and other independent variable is really strong by the FDI. And the causality is very clear that FDI has fully control the other variable of the model.



Persistence Profile function (PP)

Though the Impulse response functions represent the specific shock to the variable, here the persistence profile is a system wide shock to examine how long it takes for the total system to recover and go back to the equilibrium point. Our persistence profile graph result shows that



there is an external shock and its need minimum 10 year for full system to stabilize in the equilibrium.

6. Conclusion

According to finding previous literature on FDI inflow into any country was largely positive impact to the economic growth and way to achieve development goal in all over that world. But the result of our study is showing the negative effect on positive shock and positive effect on decrease the foreign direct investment which is really good for a country because Bangladesh acquired many foreign investment in their country but their inflation never increase by getting more money into the economy. As many literature and study was research on this area on the basis of linear and symmetric relationship and investigating the causality effect relationship. But we know that this is not realistic on the economy because the economic growth and any foreign investment are not coming into the country symmetric way on long time duration and short time duration. And our study also face the same problem and for this reason we used the more advanced technique NARDL which gives us more realistic scenario of Bangladesh economy. And it's shown that asymmetry in long run and symmetry in short run based on 45 year of information from 1973 to 2017 of Bangladesh. We choose Bangladesh as our sample to doing the study because in very recent time Bangladesh achieves the goal of developing country by UN. And they are doing more sustainable development on their economic sector. So that our study was focused on their economic growth, inflation, GDP, exchange rate and export and import. We try to find the effectiveness of foreign direct investment inflow into the country. After conducted some advance technique we found that the impact of foreign direct investment inflow into the Bangladesh is very important role to doing decrease their inflation rate and develop the internal economy, it's because of largely depend on the external investment and structural ideas to developing the new and innovative project for utilize the foreign direct investment. We also found that in short time duration the foreign direct investment is symmetric shock into the country which is good to achieve the short run goal of the government of Bangladesh. And we know that short term achievement is not a sustainable in long time which will be keep negative impact in future.

In our study we conduct with two type's test 1st we test the co-integration between the variables and after getting the co-integration within them we conduct the Granger causality test of our study for helping the Bangladesh government to giving some recommendation on the based on our study by comparing on previous study on the same area. And we already told that we applied the NARDL method for getting the co-integration and asymmetry test. And our results also follow the previous existing study without some specific difference. Our study focus on the consumer price index of the Bangladesh and it represent that Bangladesh consumer price is not control by the government of Bangladesh its influence by the external factor of the country and it's mostly the foreign direct investment inflows. And other factor as like the GDP also affected by the external investment inflow. We know that this all internal factor Bangladesh can control by using some policy and new regulation of foreign direct investment inflow into the country. If Bangladesh really wants to achieve the future goal of development country within 2041 they must need to take more control on the foreign investment and international trade which is possible just only by taking more advantage sustainable ideas, political stability, ethical thinking, anticorruption rules and practice and after all proper guideline, regulation and their practice on the country.

Policy Implications

The findings of our study may be introducing some innovative recommendation to the Bangladesh and by addition most developing countries as like Bangladesh and beyond. Firstly our findings suggest that the level of consumer product index is important things that the relevant authorities in Bangladesh must need to give more concentration by controlling the unsystematic FDI inflow. And the policy makers of Bangladesh need the cognizant of the comprehensive theoretical and empirical study, which is found the positive, sustainable and long term FDI inflow that help to stabilize the inflation rate and help develope the country's economic situation.

Another important implication from our finding it that the policy of foreign direct investment into the Bangladesh if well implemented, try to managed and continuously applied and if possible to the traditional FDI pull factors, which may be show the impact of vital organ of the policy tools for the government authorities and all policy maker of Bangladesh as well the developing countries. The purpose of this implication is for the strategy management and the relevant authorities who can be managing their inflation through to secure levels of FDI.

And the final implication of our study is that the consequence of real effective exchange rate may be ensured the possible important to determinant of FDI inflow into the Bangladesh. By this finding it's suggest that to the authorities and the policy makers, in terms of macroeconomic policy and decision making, to improve exchange rate stability. We know that the Bangladesh used the free-floating exchange rate regulation which is very risky for them because is any negative shock will come into the financial world then this impact also influence on their FDI and trade. And this impact also effect on the internal factor of Bangladesh economy. So in this situation Bangladesh government authorities need to make strong strategies to promotion of exchange rate stability, by this attempt it may be improve the levels of secure FDI inflow into the country.

Limitations and suggestions for future research

In term of caution, respectful readers should be attentive on the important fact of our study is that we used a small number of dataset for our research. In our study we applied annual data because most of the studies related area of FDI and inflation rate relationship used annual data set due to inherent data limitation. And another most important limitation of our study is that we cannot include too many variables such a model due to small sample size. And another reason to small number of variable is that a scenario would lead to loss of degree of freedom. Additional is that the number of variables used in this research are relatively in small in number. Therefore, the model has we used in our study it has ability to explain the variation in FDI in light of only a few variables, for resulting we try to introduce just only three implication on the study for the policy makers. Thus, we have very limitation time and data frequency for this study, may we will try to monthly or quarterly frequency data for our next research and must be takes long time to go more deep on this area. If you can get more time and more information about this area of study may be we can try to find new information for next implication which might be more effective to taking the investment decision for Bangladesh and as like as all developing countries that are depends on foreign direct investment.

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