Tax Revenue and Foreign Direct Investment in Bangladesh: An Empirical Analysis

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As per the common narrative, Foreign Direct Investment (FDI) is a crucial source of capital investment. Most of the developing countries try to attract FDI for improving their domestic investment scenario. However, FDI inflow may be hampered due to high tax revenue in developing countries. To the best of our knowledge, no studies have been conducted to investigate the underlying relationship between FDI and tax revenue in Bangladesh. Thus, the core objective of this paper is to analyze the impact of tax revenue on FDI with the help of time series data ranging from 2001-2015. According to Johansen's cointegration test result, concerned variables are cointegrated in the long run. By employing the Granger causality test, we have found that there is a unidirectional causality running from tax revenue to FDI in the long run. For long run estimation, we have used Dynamic Ordinary Least Square (DOLS) approach. According to the estimation result, the coefficient of tax revenue is negative indicating an inverse relation with FDI. These results may help policymakers to come up with proper policies to boost the economy of Bangladesh.

Field of Research: Economics

1. Introduction

Investment is an important determinant of sustainable and rapid economic growth of an economy. The size and rate of investments significantly determine the extent of growth of an economy. Investment typically comes through domestic as well as foreign channels. The need for investment has necessitated the inflow of foreign direct investment (FDI). FDI is widely considered to be beneficial for the host country as it can potentially generate productivity spillovers for the host economy, increase the volume and efficiency of investment, expand the existing stock of knowledge, facilitate the access to latest technology, generate chains of new local suppliers, and open access to new markets. Consequently; there has been increasing competition among countries, particularly developing countries, in recent times to attract FDI.

Another source of capital is tax. Tax is broadly classified into two main categories: direct and indirect taxation. Direct tax is the one that is imposed on incomes, corporate profits and properties etc. Indirect tax is comprised of value added tax,

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sales tax and import duty etc. For direct taxes, tax revenue is largely dependent on a country's policy. A country can either choose to relax the direct taxes for attracting foreign investment or tighten to mobilize revenue collection. As such, tax revenue is a determinant of FDI inflow. Strict tax revenue policies can pose a hindrance to FDI. FDI generally has a positive effect on the economic growth and income levels in a country, hence it is desirable to maintain a satisfactory level of FDI inflow to the country.

FDI hold important economic implications for Bangladesh as well. Despite the global declining trend, Bangladesh has managed to consolidate significant FDI inflows into the economy. Impressively, FDI inflows to Bangladesh rose by 4.38% to $2.33 billion in 2016, which was $2.23 billion in 2015, according to World Investment Report 2016 of the United Nations Conference on Trade and Development (UNCTAD). In 2017, FDI rose to $6.24 billion compared with an increase of $8.59 billion in the previous quarter. Bangladesh accounts for only 0.1% while it is 4% of total South Asia's FDI, in terms of total world FDI flows. Bangladesh's FDI inflow can be increased if barriers such as taxes are slackened, ideally leading to the greater development of Bangladesh.

Through this paper, we choose to analyze the impact of tax revenue on FDI with the help of time series data ranging from 2001-2015. The welfare of the host country depends on the intricate relationship between FDI and Tax Revenue. We wanted to understand what implications this relationship had in the context of Bangladesh. There is a dearth of studies on the relationship of FDI and tax revenue on Bangladesh. This paper sought to bridge that research gap to assist in making policies that can lead to improvement of the investment climate. It provides evidence on how the government and policymakers should seek to find a balance in their desire to offer a competitive tax environment for FDI. The research questions are as follows: What is the long run causal relationship between tax revenue and FDI? What is estimated long-run elasticity of tax revenue?

The paper is organized as follows: The next section contains a brief review of theoretical and empirical literature available on the topic. The third section discusses the data collection methods and the econometric model used. The fourth section is about data analysis and empirical findings, and the final section includes the conclusion and policy recommendations.

2. Literature Review

Quéré*et al.* (2003) conducted a panel study to shade light on the tax revenue and FDI scenario for 11 OECD countries with the help of panel data covering from 1984-2000. The empirical framework is based on a conventional gravity model where FDI is the dependent variable. Taxation is explained by statutory, ex-post effective, and ex-ante average and marginal tax rates. According to the authors, relatively high corporate taxation can discourage FDI inflow in the selected countries though the gravity factors and public goods are controlled in the model. Furthermore, the impact of positive tax differentials is not homogenous for tax scheme in the investing country. As there is asymmetry in the stemming of FDI tax, incentives might come handy.

Hakim and Bujang (2012) asserted that higher tax revenue might increase the government expenditure but incorporating high tax rates on FDI to gain more revenue can decoupage the motivation of the investments. Authors conducted a research on the relationship between tax revenue and FDI inflow for different countries (high income, lower middle income, upper middle income) with the help of panel data set spanning from 1960-2009. According to the Ordinary Least Square results, a negative relationship exists between FDI and tax revenue in all categories of countries.

Mahmood and Chaudhary (2013) discussed their study on FDI impact on Tax Revenue in Pakistan. They used FDI and GDP per person employed as independent variables and tax revenue is taken as dependent variable. They also applied tests like Augmented Dickey Fuller, Ng-Perron, Phillips-Perron and Zivot-Andrewsot to find the integration level in the time series. Autoregressive Distributive Lag and its error correction model are applied to find long run and short run relationships. The study had been conducted to find out the long run and short run relationships in the model, also showed that FDI and GDP per person employed had a positive and significant impact on tax revenue in Pakistan. Therefore, the FDI is helpful in increasing general welfare through raising the tax revenue to the government. GDP per person employed also had a positive and significant impact on tax revenue, so it also helps in increasing tax revenue.

Peters and Kiabel (2015) conducted their study to find out the Tax Incentives and Foreign Direct Investment in Nigeria to explore the influence of tax incentives in the decision of an investor to locate Foreign Direct Investment in Nigeria. The annual statistical bulletin of the Central Bank of Nigeria and the World Bank World Development Indicators Database had been used to collect data (1980-2011). A multiple regression model had been used, static Error Correction Modelling (ECM) to verify the time series properties of tax incentives captured by annual tax revenue as a percentage of GDP) and FDI. According to the results, using linear regression analysis, FDI respond negatively to tax incentives, as in, a rise in tax incentives does not show a corresponding increase in FDI. It had been recommended to lower down dependence on tax incentives and focus more on other incentives strategies like stable economic reforms and a stable political climate. Nigeria might be gaining FDI due to huge availability of natural resources, such as oil and gas, as such losing a lot of Nigerian money to tax incentives might have the negative effect as was shown.

Babatunde and Adepeju (2012) investigated the determinant factors of FDI (on oil and gas sector) in Nigeria and analyzed some of the factors mainly, tax incentives, availability of resources, macroeconomic stability in the nation, market size, openness to trade, infrastructure development. Annual dataset covering from 1990-2010 has been used in the study. According to the results, tax incentives significantly impacts the FDI inflow in Nigeria. On the other hand, market size, macroeconomic stability and infrastructure development have so significant impact on FDI for oil and gas sectors. Authors recommended that a particular attention should be given to institute new regulations to encourage different types of FDI to support the vision 20-20-20.

Jeza *et al.* (2016) conducted a study to investigate the relationship between FDI flows and tax revenues in Ethiopia. The study was done at aggregate and disaggregate tax revenue levels like income tax, trade taxes, corporate tax, and

business profit tax. Time series methods and cointegration analysis had been used for the verification, using the ARDL model and error correction model (ECM) for the period between 1974 and 2014, using a structural break for 1989. The results depicted that both FDI and GDP had a negative impact on the aggregate tax revenue in the short run and long run, mixed results had been observed at disaggregated tax revenue components level. Both CUSUM and CUSSQ tests have been done to check the stability of the model. Models both aggregate and disaggregate models are found stable in the long run and short run. It had been recommended that the terms of tax incentives are needed to be assessed and monitored carefully in Ethiopia.The related costs and benefits, to these incentives are needed to be evaluated. The monitoring and evaluation system should be properly developed and implemented properly, to increase the tax revenues.

Balıkçıoğlu et al. (2016) examined whether FDI raises tax revenue in Turkey, with more attention on the differentials between firms operating at different technology levels. A comprehensive dataset had been used for Turkish manufacturing firms between the period of 2004-2012 and utilized the Generalized Method of Moments (GMM), OLS and Fixed Effect (FE). It had been verified according to the study that foreign association increases the taxes paid by the firms, and found a bigger impact of FDI on taxation for high-technology firms.FDI is known to bring new capital, to assist knowledge transfers in terms of information and technology, and also as making the access easy to international markets. For designing policies, it had been recommended to take into account the quality effects and the supplementary tax revenue from the taxation of wages and profits of multinationals.

After the wide discussion of different literatures, we can set our hypothesis relevant to our research question. We will consider a set null hypothesis in this paper.

H_1: tax revenue does not cause FDI.
H_2: FDI does not cause tax revenue. Furthermore, we will also conduct an estimation analysis for which hypothesis testing is not necessary.

3. Methodology

To check the stationarity of the variables, the existence of unit root has to be tested. Macroeconomic and financial data are well known because of their non-stationarity (Amin, 2011). There are several ways to find out the existence of unit root of the variables. For example, Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) test are broadly employed. For our study, we have performed the (ADF) test to test the existence of unit root and found that all of the variables are non- stationary at levels and thus cannot be regressed without making them stationary. After the ADF test, we performed a cointegration test to investigate a possible linear combination of the variables that can be considered stationary. If cointegration is established, then we ran the causality test to check the possible direction of causality between the variables of interest.

Non-stationary data may lead to specious regression in the context of time series analysis unless there is at least one cointegration relationship. The Johansen technique is employed to test for cointegration. A unified framework of estimation and testing cointegration relations are provided in the context of Vector

Autoregressive (VAR) error correction models. Here one has to estimate Unrestricted Vector of Autocorrelation of the form:

$$\Delta x_t = \alpha + \theta_1 \Delta x_{t-1} + \theta_2 \Delta x_{t-2} + \theta_3 \Delta x_{t-3} + \ldots + \theta_{k-1}\Delta x_{t-k+1} + \theta_k \Delta x_{t-k} + u_t \quad (1)$$

In the equation above, Δ is the difference operator, $x_t\,(n \times 1)$ is a vector of non-stationary variables (in levels) and is the vector of random errors. The information on the long run relationship is articulated by the matrix θ_k the variables are not cointegrated, if the rank of θ_k =0. Nevertheless if rank (usually represented by r) is equal to one, there exists one cointegrating vector and in conclusion if, $1 < r < n$ there are multiple cointegrating vectors. Johansen and Juselius (1990) have derived two tests for cointegration, which are trace test and the maximum Eigen value test. The trace statistic assesses the null hypothesis that there are at most r cointegrating vectors while the maximal eigen value test, estimates the null hypothesis that there are r exactly cointegrating vectors in x_t.

If two variables are cointegrated, then there is at least one direction of causality. Granger-causality is one of the important issues that has been enormously studied in empirical finance of macroeconomics. Granger-causality is introduced by Granger (1969, 1980 & 1988). Engle and Granger (1987) asserted that the presence of non-stationary can lead to distorted conclusions in the Granger-causality test. In this test, we can only infer long run relationship between nonstationary time series when the variables are cointegrated.

If x and y are variables of interest, they by applying Granger-causality test we can determine whether past value of y augment the explanation of present values of x given that by information in past values of x itself. y does not Granger cause x if changes past values of y does not explain changes in x values at present. Likewise, we can probe whether x Granger causes y. There are four probable outcomes in the Granger causality test:

   a. neither variable Granger cause each other
   b. y causes x but not otherwise
   c.   x causes y but not otherwise
   d. both x and y Granger cause each other

Following two sets of equation will be estimated:

$$x_t = \alpha_0 + \alpha_1 x_{t-1} + \ldots + \alpha_i x_{t-i} - \beta_1 y_{t-1} + \ldots + \beta_i y_{t-i} + u_t$$
$$(2)$$
$$y_t = \alpha_0 + \alpha_1 y_{t-1} + \ldots + \alpha_i y_{t-i} + \beta_1 x_{t-1} + \ldots + \beta_i x_{t-i} + v_t$$
$$(3)$$

It is for all possible pairs of (x,y) series in the group. The stated F-statistics are the Wald statistics for the joint hypothesis $\beta_1 = \beta_2 = \beta_3 = \ldots = \beta_i = 0$.
The Dynamic OLS (DOLS) approach was proposed by Stock and Watson (1993). DOLS is an improvement version of OLS approach where we can deal with small

sample size and dynamic sources of bias. It is a robust single equation approach corrects the regressor endogeneity by incorporating lags and leads. DOLS can estimate long run equilibrium where variables are integrated in same or different order. This is one of the major advantages of this approach. Moreover, it has the same kind of optimality like Johansen distribution. Since our sample size is small, we applied DOLS approach for avoiding false estimation. If Y_t is the dependent variable with regressors $X_{i,t}$ i=1,2,3…,n then,

$$Y_t = \beta_0 + \beta_1 X_{1,t} + \beta_2 X_{2,t} + \ldots + \beta_k X_{k,t} + \sum \alpha_i {}_\Delta X_{1,t-i} + \sum \gamma_i {}_\Delta X_{2,t-i} + \ldots + \sum \delta_i {}_\Delta X_{k,t-l} + \varepsilon_t \qquad (4)$$

The paper is based on annual data covering the period of 2001-2015. Data of Foreign Direct Investment (FDI $US) and Total Tax Revenue ($US) are taken from the World Development Indicator (WDI). It should be mentioned here that as Bangladesh got her independence in 1971 and this research paper focuses on the period 2001-2015 for which 15 observations are available at most. Small sample size might be problematic in finding the long run relationship.

4. Results and Discussions

Unit root tests are conducted to determine the order of integration of the data series. Optimal lag is chosen by Schwartz Information Criterion (SIC). Table 1 shows the ADF statistics and corresponding critical values of all the variables in their level and first differenced forms.

Table 1: Augmented Dickey Fuller Unit Root Test for the Variables

Panel 1: Levels			
Variable	**ADF Statistics (Only Constant)**	**ADF Statistics (Constant & Trend)**	**Decision**
LNTR	0.26	-1.91	Non-stationary
LNFDI	-2.19	-4.66	Non-stationary at constant but stationary at constant and trend
Panel 2: First Differences			
Variable	**ADF Statistics (Only Constant)**	**ADF Statistics (Constant & Trend)**	**Decision**
LNTR	-3.098	-4.072	Stationary
LNFDI	-5.34	-5.38	Stationary

Table 2: Mackinnon Critical Values for Rejection of Hypothesis of Unit Root

Critical Value	Levels		First Differences	
	No Trend	**With Trend**	**No Trend**	**With Trend**
1%	-3.632900	-4.243644	-3.639407	-4.252879
5%	-2.948404	-3.544284	-2.951125	-3.548490
10%	-2.612874	-3.209699	-2.614300	-3.207094

Unit root tests have non-standard and non-normal asymptotic distribution. These distributions are extremely affected by the inclusion of deterministic terms such as constant, time trend etc. An extraneous regressor whose enclosure reduces the power of the test is called time trend. Yet if the true data generating process were trend stationary, failing to include a time trend also results in a decline in power of the test. Additionally, this loss of power from without a time trend when it should be present is more severe than the reduction in power associated with including a time trend when it is extraneous. One of the main issues in unit root testing is lag length selection. Including a moderately long lag length and select the model by the usual t-test is one of the approaches. When the t-statistics on lag p is insignificant at some stated critical value, the regression should be frequently assessed using a lag length (p-1) until the lag is significantly different from zero. From the unit root test, it is clear that all the variables are found to be stationary at their first differences. From the table it is clear that the variables would yield spurious results unless the variables are cointegrated. The results, however, allow proceeding to the next stage of testing for cointegration. The Johansen cointegration test results indicate that our variables have a cointegrating relationship. Maximum Eigen value test and the trace test (Table 3a and 3b) both point out one cointegrating relationship at 95%. After the Cointegration test, we performed Granger Causality Test at lag 2.

Table 3a: Johansen Test for Cointegration (Maximum Eigen value Test)

	Null Hypothesis	Alternative Hypothesis	Statistics	95% Critical Value	Conclusion
LNTR and LNFDI	None	(At Most One)	22.85 (0.21)	15.49 3.84	One Cointegrating Relationship

Table 3b: Johansen Test for Cointegration (Trace Test)

	Null Hypothesis	Alternative Hypothesis	Statistics	95% Critical Value	Conclusion
LNTR and LNFDI	None	(At Most One	22.63 (0.21)	14.26 3.84	One Cointegrating Relationship

Table 4: Granger Causality Test Results

Variable	Null-Hypothesis	F-Statistic	P-Value	Conclusion
Granger Causality Test Statistics between LNFDI and LNTR				
LN FDI	LNTR does not cause LNFDI	4.97	0.04	LNTR causes LNFDI
LNTR	LNFDI does not cause LNTR	0.34	0.72	

From the Table 4, above, we can see two null hypotheses. From these two null hypothesis, we can reject the first null hypothesis and can assert that there is unidirectional causality running from tax revenue to foreign direct investment but not vice versa. It means that tax revenue in Bangladesh causes foreign investment. The result answers the first research question. In Bangladesh, higher tax revenue might

affect foreign direct investment in the long run because the high rate of tax could reduce the investors' net profit. However, we cannot reject the second null hypothesis as probability value is higher than the desired level. It means foreign direct investment actually does not cause tax revenue.

After analyzing the long run causal relationship, now we move to analyze the long run estimation results. DOLS estimation results are reported in the Table 5. Fixed leads and lags option has been chosen for running the estimation.

Table 5: Results of DOLS Estimation

Variable	Coefficient (Prob)
LNTR	-0.42 (0.9126)
C	25.72 (0.7724)
R^2	0.92
Adjusted R^2	0.70
SE of Regression	0.315824
Long Run Variance	0.039151

As can be seen that the coefficient of tax revenue is inelastic and negative as expected (but not significant) ensuring that there is a negative relationship between tax revenue and foreign direct investment. The estimation result answers the second research question. One of the reasons of insignificance of the coefficient value is data constraint as we used a small sample size.

5. Conclusion

FDI has widely been touted as a driver of significant economic change, positively affecting domestic income through spillover effects such as the enhancement of human capital the introduction of new technologies, among others. As such, any hindrance posed to FDI inflow is not desirable. In this paper, we sought to analyze the relationship between FDI and tax revenue and found that tax revenue does, in fact, hinder the inflow of FDI, as hypothesized.

We have empirically analyzed the short run and long run causal relationship between Tax Revenue and FDI with respect to Bangladesh, on annual data covering the period of 2001-2015, taken from World Development Indicator (WDI). We also analyzed the long run estimation results and estimated the long run coefficient. We found that a unidirectional causality runs from tax revenue to foreign direct investment in the long run but not vice versa. On the other hand, from the long run estimation results, it is clear that the coefficient of tax revenue is inelastic in nature and negative as well. The result is consistent with (Hakim & Bujang 2012). Policy makers should create a framework wherein Tax Revenue would not pose a hindrance for Foreign Direct Investment. For instance, policies such that reduced tax rates or tax holidays should be implemented to attract foreign direct investment. This will help to create favorable conditions for entry of foreign direct investment. On the other hand, tax base should be increased so the pressure from investors is reduced as well. By doing this the revenue of tax might escalate.

One of the main limitations of this paper is data constraint. This research paper focuses on the period 2001-2015 for which 15 observations are available at most. The observations from the preceding years since Bangladesh's independence were not accounted for. Adding more observations would have yielded more solid results and enhanced our knowledge better on the relationship between tax revenue and FDI. This paper can be further expanded by conducting further studies pertaining to Asia or South Asia. Having such insight can make policymakers come up with a policy framework that can help to achieve prosperity in this region.

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