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NEXUS BETWEEN CORPORATE INCOME TAX AND ECONOMIC GROWTH IN BANGLADESH

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Abstract

This study assembles a dataset on the corporate income tax (CIT) rate during 2001-2020 in Bangladesh and tries to capture the influence of CIT on the country's economic growth. It takes into account the impact of the CIT rate on per capita GDP, government spending, foreign direct investment (FDI), and inflation. In the last two decades, with the increasing trend of CIT revenue, it is observed that CIT revenue contributes almost 32 percent in total tax revenue. This study incorporates empirical analysis to capture the association between CIT and economic growth. Firstly, the associated tests identified the stationarity of variables which are significant properties of time series analysis. In the second step, one cointegrating vector has been observed in the variables. Finally, this study tries to figure out the causal relationship among variables by applying appropriate methods and tests. The test results endorse that CIT rate granger causes to GDP per capita. Accordingly, for a rise in CIT revenue, there is a positive change in GDP per capita.

Keyword: Tax structure, Corporate income tax, GDP per capita, Economic growth, Bangladesh

Introduction

The connection of corporate income tax (CIT) with economic growth is a long-debate. The discussion exhibits contentions from researchers, policymakers and stakeholders with different point of view. In Bangladesh, this is a concerning phenomenon, especially during budget discussion in every year. Like many other countries, Bangladesh has a long history of adaptation of taxation system. In this section of the paper, we try to report the laws and regulation which has shaped the taxation system of the country. Bangladesh inherited the British-India tax system. The British-Indian Income Tax Act 1922 remained operational in Bangladesh even after the independence. The Income Tax Ordinance, 1984 (XXXVI of 1984) became functional in the country since July 01, 1984 (Islam, 2003). The first taxation enquiry commission was established in 1976 headed by the then governor of Bangladesh Bank. The prime objective of the commission was to appraise the rules and regulations of tax structure of a new born country. Bangladesh economy was agrarian and most of the industries of the country were in public sector. A high corporate tax rate amounting around 60 percent (Ahsan, 1995) was evident initially in the country which was later rationalized at 40-50 percent.

The corporate tax structure varies among different types of companies in Bangladesh. The listed companies had to pay twenty-five percent taxes while the non-listed companies had to pay thirty-five percent taxes since FY 2014-2015 with some exceptions. However, a 2.5 percent reduction was made in the tax rate of non-listed companies to ease the tax burden at the crucial time of the COVID-19 pandemic in FY 2020-2021.

The lion share of revenue earnings of Bangladesh comes from tax. The direct tax and indirect tax constitute the fiscal regime of Bangladesh. The National Board of Revenue (NBR) of Bangladesh governs tax-related issues in the country. NBR data states that only about 30 percent of tax revenue was mobilized as direct tax and the rest 70 percent as indirect tax in year 2021 [i]. Personal Tax, Corporate Tax and Sales Tax together consists Direct Tax. The share in revenue mobilization of these taxes was respectively 25 percent, 32.50 percent and 15 percent in 2021 [ii].

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General objective

This study attempts:

- To estimate the association of corporate income tax with economic growth in Bangladesh.

Growth generally depends on accumulation of labor and capital. Changes in tax policy can generate transitory growth effects. Entrepreneurial activity and investment in terms of public expenses produce positive spillovers. Accordingly, this paper attempts to evaluate the influence of corporate income tax on growth and other related economic phenomena such as GDP per capita, government expenditure, inflation and so on.

Specific objectives

Under the umbrella of the general objective, this research intends to focus on two specific objectives.

1. To analyze the trend of CIT rate and revenue earnings of Bangladesh.

The corporate tax structure has undergone through some changes in last several decades. The trend of increased tax rate is specifically observed from the last decade. Hence, an attempt has been made to trace out the trend of revenue collection of corporate income tax in Bangladesh.

2. To appraise the link of corporate income tax with economic growth of Bangladesh.

Social justice, equity and sound policy implementation depends on an economy's tax system and socio-economic condition. Accordingly, this study attempts to explore the link of CIT with economic growth of Bangladesh.

Literature Review

A bunch of research work is available discussing the influence of corporate tax on economic growth in Organization for Economic Co-operation and Development (OECD) countries and South African Development Community (SADC) countries. However, only a few articles have been found from Bangladesh perspective addressing the impact of CIT on economic growth.

Solow (1970; as cited in Lee and Gordon, 2005) stated that total factor productivity would be free of influences from taxes. In contrast, the contemporary arguments advocate that positive externalities play a significant role in clarifying long-run growth. Although the association between personal tax-rate and growth is unclear, however, a significant effect of CIT rates on economic growth is evident. If public infrastructure accelerates compared to other inputs, growth might be higher. This happens when govt. revenue increases (Lee and Gordon, 2005). Literature endorses the direct influence of tax-revenue on economic growth. For example, Islam (2019) identifies a positive correlation between tax revenue and GDP.

Terry et al. (2019) identified a negative connotation between aggregate effective tax rate and future macroeconomic growth. Literature argues that a change in tax rate has comparatively smaller impacts on firms' tax obligations, as both tax rate and tax base are revised simultaneously (Devereux and Sorensen, 2006; Kawano and Slemrod, 2015; and Serrato and Zidar, 2018). Arnold (2008) strongly put his argument against of corporate tax rate in his research. In his analysis it is observed that corporate tax rate severely and negatively affects GDP per capita. His findings suggest shifting part of revenue source away from corporate taxes.

The governments of Canada, United States of America, the Netherlands and United Kingdom have influenced country's economic development through tax revenue. They originate substantial revenue from CIT and other excise duties (Oluba, 2008). A vital share of tax revenue increase in Africa stems from natural resource taxes. This included income from production sharing, royalties and CIT on oil and mining companies (Pfister, 2009).

Corporate tax rate is the most discussed issue during budget session in every year. Accordingly, this study attempts to extract information about influence of corporate tax on economic growth and tries to trace out the effective and efficient corporate tax rate which would boost up economic growth of Bangladesh. This study may visualize the importance of tax rate to the policy makers and stakeholders. As there has been found a very few research papers on corporate tax in Bangladesh, hence readers may find it helpful to figure out the current scenario about this sector.

Myles (2009) found that, the pace of economic growth might be influenced by policy choices related to taxation. Tax burden shrinks the yields from investment and research & development. Less return tends to less accumulation, innovation and hence lower growth. Positive aspects of tax burden include increase in public

expenditure which might boost productivity in terms of infrastructure, education and health care. Taxation makes the room for financing these expenditures and indirectly contributes to growth. Barro (1990) figured out the linkage between government policy and growth and summarizes for boast in growth through additional input in public good financed by taxation. Schumpeter (1942) highlighted the entrepreneurial role in breeding new ideas that promotes productivity.

This research focuses on the association between CIT and economic growth of Bangladesh. It has been found that there is a significant association between these two factors. But we still don't know at which tax rate the taxpayers would response more. That is, the effective and efficient tax rate is yet a debatable question in Bangladesh. Though there is a demand for lower tax rate by the stakeholders, however, there is a need for further research to find out the efficient tax rate in Bangladesh.

Materials and Method

Data

This research has analyzed time-series data of the variables under consideration during 2001-2020. The relevant data source for the study includes Bangladesh Bureau of Statistics (BBS), and World Development Indicators, 2022 (World Bank, 2022). The study is based on empirical analysis. For disclosing the stationarity of the considered variables, two widely recognized tests, namely Augmented Dicky-Fuller (ADF) and Phillips-Perron (PP) tests are executed. Johansen Cointegration test (JCT), Vector Error Correcting Model (VECM) and Granger Causality (GC) tests are also performed to investigate the long-run connection among variables.

Econometric techniques

The first objective of the research is to observe the trend of CIT rate. In this step, the study tries to focus on the stake of CIT in total tax income, GDP and revenue earnings from CIT sector in last 20 years in Bangladesh. There was a continuing change in CIT rate in last two decades. The study uses a time series data of corporate income tax during 2001-2020 for calculating the revenue trend and the analysis results are described by graphical presentation based on Chowdhury and Hossain (2019) and Sarkar (2015). Exemptions, incentives and special regimes often generate obstacles in corporate tax sector. Accordingly, securing an ideal tax system is important to generate revenue, which is essential for hastening growth and enlightening the wellbeing of the citizen.

The second objective of this research is to explore the connotation between CIT rate and long-term growth in Bangladesh. For addressing this objective, the study uses unit root test to test stationarity and cointegration of variables.

List of variables

Table 1 lists the key variables of interest in this study.

Table 1. List of Variables

Variables	Symbol	Unit of measurement	Expected sign	Reference
GDP per capita	GDP	US$	+	Lee and Gordon (2005)
Corporate income tax revenue	CIT	BDT	+	Serrato and Zidar (2018)
Government expenditure	GE	BDT	+	Barro (1990)
Trade openness	TO	%	+	Lee and Gordon (2005)
Foreign direct investment	FDI	US$	+	NKoro and Christian (2012)
Inflation	INF	%	+	NKoro and Christian (2012)

Unit root test

To inspect the influence of CIT on economic growth in terms of per capita GDP growth, the study evaluates time-series data by employing ADF test which was developed in 1981 and PP test based on Nkoro and Christian (2012), Hosen (2019), Dutta et al. (2017) to detect the stationarity of the discrete variables. The ADF estimation covers the following OLS estimation:

Regression equation with drift: $\Delta y_t = \gamma y_{t-1} + \sum_{i=1}^{m} \beta_i \Delta y_{t-1} + \varepsilon_t$……(1)

Regression equation without drift: $\Delta y_t = \alpha_0 + \gamma y_{t-1} + \sum_{i=1}^{m} \beta_i \Delta y_{t-1} + \varepsilon_t$……...(2)

Drift and trend model: $\Delta y_t = \alpha_0 + \alpha_1 t + \gamma y_{t-1} + \sum_{i=1}^{m} \beta_i \Delta y_{t-1} + \varepsilon_t$……...(3)

Where, α_i is a deterministic constant factor, ε_t is a white noise error term, Δy_{t-1} is the 1st difference of y_{t-1} and m is the number of lags in the dependent variable, y_t. Here, α, β, γ are the parameters. The presence/absence of drift (α_0) and trend ($\alpha_1 t$) term is the main difference among the three equations. The Akaike's Information Criteria (AIC) and Bayesian Information Criteria (BIC) determine the optimal number of lagged difference terms to be included (K). It fixes the optimal lag choice such that autocorrelation problem in the residual term might be solved (Akaike, 1970). $AIC = In\left(\frac{RSS}{T-K}\right) + \frac{2K}{T-K}$, where K refers to the number of estimated parameters, T refers to sample size and RSS refers to residual sum of square. The null hypothesis Ho implies that Δy_t has a stochastic trend.

The Phillips and Perron test estimates the regression equation (4) which examines the null hypothesis of no stationarity.

$$y_i = \alpha + \rho\gamma_{i-1} + \varepsilon_i \text{ …….(4)}$$

Cointegration test

After stationarity test the study applies cointegration test to estimate long-run relationships between variables. The cointegration test attempts to see whether GDP, FDI, INF, GE and CIT are individually nonstationary but become stationary when they are linearly combined. Johansen (1988) and Johansen and Juselius (1990) proposed the famous vector auto regression (VAR) test to estimate cointegration. This test is administered in this study following Hosen (2019), Dutta et al. (2017) and Islam (2019).

At first, the order of integration is determined. Later, trace statistics (λ_{trace}) and maximum eigen-value (λ_{max}) are used to determine the number of cointegration vectors. The estimated VAR model for tracing statistics:

$$\Delta y_t = r_1 \Delta y_{t-1} + r_2 \Delta y_{t-2} \ldots\ldots + r_p \Delta y_{t-p+1} \text{ …….(5)}$$

On the contrary, the estimated VAR model for the maximum eigenvalue:

$$y_t = r_1 \Delta y_{t-1} + r_2 \Delta y_{t-2} \ldots\ldots + r_p \Delta y_{t-p+1} \text{ ……..(6)}$$

Where, y_t refers to the vector of variables connected to the model and p refers to autoregression order. The null hypothesis for JCT is no cointegration vector ($r = 0$), and the corresponding alternate hypothesis signals the existence of one or more cointegration vector ($r > 1$).

VECM and Granger Causality

The Vector Error Correction Mechanism (VECM) usually attempts to identify long-run causality among variables. Such causality might arise from lagged difference and error correction term (Granger, 1988). It is anticipated that both the changes and long-term association among macroeconomic variables might influence economic growth. The significance of error correction term directs the inclination to reinstate equilibrium. Long-term causal link among the variables under consideration in the research is analyzed through estimating the following models.

$$\Delta GDP = \alpha_1 + \alpha_{GDP}\, \varepsilon_{t-1} + \sum_{i=1}^{n} \alpha_{11}\, CIT_{t-i} + \sum_{i=1}^{n} \alpha_{12}\, \Delta GVTEX_{t-i} + \sum_{i=1}^{n} \alpha_{11}\, \Delta GDP_{t-i} + \sum_{i=1}^{n} \alpha_{11}\, \Delta FDI_{t-i} + \epsilon_{GDPt} \text{ ……(7)}$$

$$\Delta CIT = \alpha_2 + \alpha_{CIT}\, \varepsilon_{t-1} + \sum_{i=1}^{n} \alpha_{21}\, CIT_{t-i} + \sum_{i=1}^{n} \alpha_{12}\, \Delta GVTEX_{t-i} + \sum_{i=1}^{n} \alpha_{11}\, \Delta GDP_{t-i} + \sum_{i=1}^{n} \alpha_{11}\, \Delta FDI_{t-i} + \epsilon_{CITt} \text{ ……..(8)}$$

$$\Delta \text{GVTEX} = \alpha_3 + \alpha_{\text{GVTEX}}\, \varepsilon_{t-1} + \sum_{i=1}^{n} \alpha_{31}\, \text{CIT}_{t-i} + \sum_{i=1}^{n} \alpha_{12}\, \Delta\text{GVTEX}_{t-i} + \sum_{i=1}^{n} \alpha_{11}\, \Delta\text{GDP}_{t-i} + \sum_{i=1}^{n} \alpha_{11}\, \Delta\text{FDI}_{t-i} + \epsilon_{\text{GVTEXt}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(9)$$

$$\Delta \text{FDI} = \alpha_4 + \alpha_{\text{FDI}}\, \varepsilon_{t-1} + \sum_{i=1}^{n} \alpha_{41}\, \text{CIT}_{t-i} + \sum_{i=1}^{n} \alpha_{12}\, \Delta\text{GVTEX}_{t-i} + \sum_{i=1}^{n} \alpha_{11}\, \Delta\text{GDP}_{t-i} + \sum_{i=1}^{n} \alpha_{11}\, \Delta\text{FDI}_{t-i} + \epsilon_{\text{FDIt}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(10)$$

Where, α_i , α_{ij} stand for the parameters, ε_{t-1} for the one-period lagged error correction term, ϵ_{GDPt}, ϵ_{CITt}, ϵ_{GVTEXt}, ϵ_{FDIt} are the error terms, GDP = Gross Domestic Product Per Capita, CIT= Corporate Income Tax Revenue, GVTEX = Government Expenditure, FDI = Foreign Direct Investment. The literature states the existence of unidirectional or bidirectional causality, if two variables possess a common trend (Granger, 1988). Estimation of the regression equations (11) and (12) helps us to detect causality.

$$y_t = \sum_{i=0}^{n} \alpha_i\, x_{t-i} + \sum_{j=0}^{n} \beta_j\, y_{t-i} + u_{1t} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(11)$$

$$x_t = \sum_{i=0}^{m} \alpha_i\, \lambda_{t-i} + \sum_{j=0}^{m} \delta_j\, y_{t-i} + u_{2t} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(12)$$

A first variable granger causes the second variable if a regression of the first variable with respect to the lag values of both the variables enhances the prediction of the first variable. Accordingly, we can say that (x_t) granger causes (y_t) if the regression of y_t with respect to $x_{t-1}$and y_{t-1} significantly enhances the prediction of (y_t). The corresponding H0 is: x_t does not granger cause y_t and H1: x_t granger causes y_t. Such hypotheses are tested in equation (11). Similarly, the H0: y_t does not granger cause x_t and H1: y_t granger causes x_t, are tested in equation (12).

Results and Discussion

In Bangladesh, there is a considerable increase in total and corporate tax revenue over the last two decades. But the main reason behind this escalation is uncertain. There is an increase in salary in public sector, reforms in administration system and lower marginal tax rates (Sarkar, 2015). This could not be identified that which factor to which extent was helpful in shaping the increasing trend of revenue.

Share of CIT in total tax revenue

The corporate tax revenue is the provider of one-third share of direct tax in Bangladesh. Figure 1 shows the increasing trend of corporate tax revenue during the years 2012-2020. Though it is still questionable, whether this rate or trend is statistically significant or not.

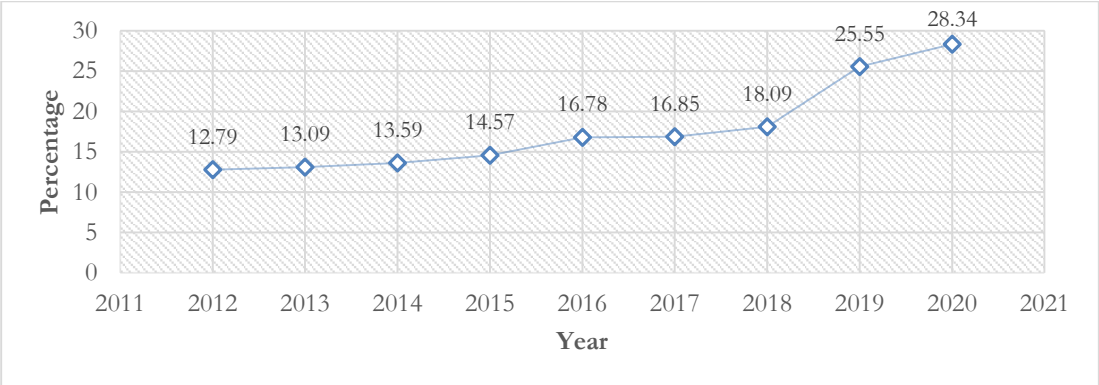

Figure 1. Share of CIT in Total Tax Revenue, *Source: BBS (2010, 2015, 2020, 2022)*

The trend of CIT depicts that since 2012 the share of CIT revenue has been increasing in total tax revenue. In 2020, the share stands at more than 28 percent, though this amount still falls in a low level of tax collection.

Result of unit root test

To diagnosis the stationarity is inevitable for time-series data. This study has used ADF and PP tests to diagnosis the stationarity. Both of these two-unit root tests are widely accepted and used in different researches (Hosen, 2019; Dutta et al., 2017; Islam, 2019).

Augmented Dicky-Fuller (ADF) test

Table 2 presents the results of ADF test. It is depicted that the H0 of 'non-stationary' should not be rejected at the 5 percent level as the ADF test statistic is less than the critical values for each variable. The one sided p values are not significant in level-series (MacKinnon, 1996). Accordingly, it might be argued that all the variables under consideration are not stationary in level-series. Table 2 presents the results for first differences which signal the stationarity of the variables.

Table 2.Unit Root Test Using ADF

Variable	**No Drift and No trend**	**Drift and Trend**	**Drift and No Trend**	**Decision**
GDP	5.973	2.418	4.508	I (1)
GDP (difference)	2.150***	-3.625*	-2.627*	
CIT rev	4.198	-1.695	2.843	I (1)
CIT rev (difference)	-4.168***	-6.212*	-5.479**	
Gov Exp	0.949	-2.492	-0.514	I (1)
Gov Exp (difference)	-4.255***	-4.609***	-4.686***	
Inflation	-0.015	-3.192	-3.349	I (1)
Inflation (difference)	-5.553***	-6.288***	-5.381***	
Net FDI	-0.209	-1.377	-1.584	I (1)
Net FDI (difference)	-4.598***	-0.288*	-4.655***	
Tax rev	4.075	-1.642	2.739	I (1)
Tax rev (difference)	-4.132*	-6.136*	-5.433***	
Trade open	-0.278	-0.554	-1.230	I (1)
Trade open (difference)	-3.083***	-3.316*	-2.985**	

Notes: The values are expressed in logarithmic form for all the variables.
**** refers to significance at 1%, ** at 5%, and * at 10% level.*

Table 3. Phillips-Perron Test

Variable	No Drift and No trend	Drift and Trend	Drift and No Trend	Decision
GDP	5.709	-0.864	2.566	I (1)
GDP (difference)	-1.491*	-3.625*	-2.557*	
CIT rev	7.907	-1.341	3.828	I (1)
CIT rev (difference)	-4.305 ***	-11.938 ***	-5.568 ***	
Gov Exp	1.207	-2.492	-0.514	I (1)
Gov Exp (difference)	-4.257 ***	-4.609 ***	-4.687 ***	
Inflation	-0.214	-4.268	-3.397	I (1)
Inflation (difference)	-6.209 ***	-7.498 ***	-6.177 ***	
Net FDI	-0.153	-1.377	-1.548	I (1)
Net FDI (difference)	-4.598 ***	-4.999 **	-4.658 ***	
Tax rev	7.092	-1.283	3.288	I (1)
Tax rev (difference)	-4.257 ***	-11.318 ***	-5.506 ***	
Trade open	-0.292	-0.428	-1.367	I (1)
Trade open (difference)	-3.015 ***	-5.410** *	-2.910 **	

Notes: The values of all the variables are presented in logarithmic form.
**** refers to significance at 1%, ** at 5%, and * at 10% level.*

Phillips-Perron (PP) Test

To cross check the result of ADF test, PP test has been administered (Table 3) to check the stationarity of the variables. This PP test is applied to identify the order of integration in time series data. The corresponding H0 is: a time series is integrated of order 1. The result of PP test depicts that, all the variables are stationary in 1st difference and non-stationary in level-form. Like ADF test, the PP test is also done with and without time trend. The results of PP test coincide with that of ADF test. Accordingly, it can be argued that, the variables of this study are first-order integrated, that is, I(1). The second step is to figure out the presence of long-run interdependence among the variables, if any. Cointegration test guides to figure out this interdependence.

Johansen Cointegration Test (JCT)

Cointegration test identifies circumstances where multiple non-stationary time series are integrated that cannot diverge from stability in the long-run. The test tries to identify the sensitivity of variables over a definite period of time. As the considered variables are first-order integrated, it is essential to execute the cointegration test. For this, the authors apply the JCT. The trace statistics and max. eigenvalue are reported in Tables 4 and 5.

Table 4. Trace Value Statistics

H0	H1	Unrestricted Cointegration Rank Test		
		Trace (λ_{trace})	5% Critical Value	Prob.
r=0	r=1	114**	89	0.00
r≤1	r=2	64	64	0.05
r≤2	r=3	38	43	0.14
r≤3	r=4	19	26	0.27
r≤4	r=5	6	13	0.49

Table 5. Maximum Eigenvalue Statistics

H0	H1	Unrestricted Cointegration Rank Test		
		Maximum Eigenvalue (λ_{max})	5% Critical Value	Prob.
r=0	r=1	51**	38	0.00
r≤1	r=2	26	32	0.02
r≤2	r=3	19	26	0.23
r≤3	r=4	14	19	0.33
r≤4	r=5	6	13	0.48

*Note: r refers to the cointegration vector. ** refers to rejection of H0 at 1% level.*

The authors use 95% confidence interval (CI) as the use of 90% CI would widen the probability to accept the H0. Enders (1995) advocated using 99 percent or 95 percent CI. As shown in the Table 4, the value of trace statistics, λtrace (0)2 is 114 which exceeds the 5% CI. As a result, H0 (r=0) should be rejected due to absence of cointegrating vector and accept the H1 having cointegrating vector(s) in the variables. In the second phase, we test the H0: r≤1 against the H1: r=2 of two integrating vectors. Since the trace statistics (64) is smaller than the critical-value at 95 percent CI, the H0 should not be rejected. The result of other trace statistics endorses no more than one cointegrating vector at 95 percent confidence interval.

The eigenvalue demonstrates that the H0 is rejected as the (λmax) value 51 exceeds the critical value (Table 5). The test of H0 indicates that we cannot reject λmax (1), λmax (2), λmax (3) and λmax (4) at the same significance level. Accordingly, there exists one (1) co-integrating vector in the model.

Result of Vector Error Correction Model (VECM) and Granger Causality (GC)

A VECM model is used when the time-series are not-stationary in their levels, but stationary in their differences and the variables are cointegrated. In this study, by applying JCT it is found that there is one cointegrating vector in the time-series data. Therefore, the long-run relationship has been found by applying the VECM test.

Table 6. VECM Model Diagnostic

	ΔGDP	ΔCIT Rev	ΔTrd Open	ΔGov Ex	ΔINF
Adjusted R^2	0.99	0.89	0.68	0.78	0.67
Serial residual correlation test for the model					
H0	H_0: No serial correlation;				
H1	H_1: Serial correlation				
	LM lag 1	$\chi^2 = 26.33$,	ϱ-value= 0.57		
	LM lag 2	$\chi^2 = 31.52$,	ϱ-value= 0.34		
Normality test					
time-series	H_0: residuals are multivariate normal;				
Alternative Hypothesis,	H_1: residuals are not multivariate normal				
	Skewness	$\chi^2 = 9.56$,	ϱ-value= 0.08		
	Kurtosis	$\chi^2 = 3.64$,	ϱ-value= 0.60		
	Jarque-Bera	$\chi^2 = 13.21$,	ϱ-value= 0.21		

Table 7. Result of Granger Causality Test

H0: V_1 does not Granger cause V_2	H1: V_1 Granger causes V_2	F Statistics	Result
CIT, GDP	CIT, GDP	1.142	CIT → GDP
GDP, CIT	GDP, CIT	4.325	
Inflation, GDP	Inflation, GDP	0.293	-
GDP, Inflation	GDP, Inflation	1.613	
Govt. expenditure, GDP	Govt. expenditure, GDP	0.0111	GOV↔GDP
GDP, Govt. expenditure	GDP, Govt. expenditure	2.094	
FDI, GDP	FDI, GDP	5.136	FDI → GDP
GDP, FDI	GDP, FDI	1.912	
Tax revenue, GDP	Tax revenue, GDP	1.046	Tax rev → GDP
GDP, Tax revenue	GDP, Tax revenue	4.259	
Trade openness, GDP	Trade openness, GDP	1.957	TRD → GDP
GDP, Trade openness	GDP, Trade openness	0.862	
Inflation, CIT	Inflation, CIT	3.551	INF ↔ CIT
CIT, Inflation	CIT, Inflation	5.123	
Govt. expenditure, CIT	Govt. expenditure, CIT	0.058	-
CIT, Govt. expenditure	CIT, Govt. expenditure	2.188	
FDI, CIT	FDI, CIT	1.827	-
CIT, FDI	CIT, FDI	0.249	
Trade openness, CIT	Trade openness, CIT	1.507	
CIT, Trade openness	CIT, Trade openness	2.638	CIT →TRD

Note: Significant at 5% level, V_1 refers to the first Variable and V_2 refers to the second Variable; separated by comma. GDP = Gross Domestic Product Per Capita, INF = Inflation, GOV = Government Expenditure, Tax rev = Tax Revenue, TRD = Trade Openness, CIT = Corporate Income Tax Revenue, FDI = Foreign Direct Investment

The R^2 values for variables are 99, 89, 68, 78, 67 percent. In VECM diagnostic test, it is found that the H0 cannot be rejected. The corresponding null hypothesis is: serial residual correlation at lagged order of Lagrange Multiplier (LM) (Table 6). The normality test findings support that the residuals are normally distributed. The VECM result is found stable. The number of lags has been chosen here as three. All the lag points are positioned inside the unit-circle which satisfies the VECM stability condition based on Akaike Information Criterion (AIC) and Schwartz Information Criterion (SIC). In Vector Error Correction Estimates, it is also identified that if there is 1 percent increase in Corporate Income Tax revenue then the GDP Per Capita would increase by 0.03 percent.

Granger causality explores connectedness among variables in a time series. It refers to a probabilistic account of causality to find patterns of correlation. Cause and effect are the pillars behind causality analysis. In this test, $p>0.05$ signals 'no causality', while $p<0.05$ signals 'existence of causality'.

Table 7 illustrates that, there is a causal relationship between variables. Specifically, CIT, Net Foreign Direct Investment and Tax revenue granger cause GDP, referring unidirectional relationship among the variables. Government Expenditure and GDP, Trade openness and GDP have a bidirectional relationship. On the contrary, Trade openness and corporate income tax exhibit unidirectional relationship.

All the above steps of unit root test, cointegration test, and Granger causality test are widely accepted and used in the literature (Hosen, 2019; Dutta et al., 2017; Islam, 2019; NKoro and Christian 2012).

Conclusion

This study tries to figure out the trend of corporate tax revenue of Bangladesh in last 20 years. This research also examines the association between CIT and economic growth. To do so, the study selects some growth indicators (for example, GDP per capita, Foreign Direct Investment, Government Expenditure, Inflation, Corporate Income Tax Revenue and Trade Openness). The unit-root test result endorses stationarity of the variables at 1st difference form. The cointegration test identifies a single cointegrating vector in the dataset. Finally, the authors deployed VECM framework to find out the long-run Granger causality.

According to the findings, there is a unidirectional causal relationship approaching from CIT to GDP which indicates that further policy to generate more tax revenue from this corporate sector would enhance the economic growth of Bangladesh. As we have observed in this paper, there is a significant association between corporate income tax and economic growth in Bangladesh, so the appropriate authority should adopt effective policy measure to enhance tax collection from corporate sector.

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Conflict of Interest

The authors declare no conflict of interest.

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